Education Based Simulation Training for Ultrasound Guided Anesthesia: Improving Confidence Among Anesthesia Providers

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Background

- The placement of invasive catheters and monitors is a necessary, fundamental skill, within the Certified Registered Nurse Anesthetists (CRNAs) scope of practice
- Point-of-care ultrasound (POCUS) is a portable, noninvasive, ultrasonography tool that improves safety and efficacy of interventions provided in anesthesia care (American Association of Nurse Anesthesiologists [AANA], 2020)
- Currently, there is no standard ultrasound curriculum for anesthesia providers in the United States
- 36% of anesthesia providers receive general POCUS training (Canon et al., 2018)
- AANA (2020) supports CRNAs advancing their clinical expertise and incorporating POCUS into routine care
- Research shows participants involved in education-based simulation training are more willing to incorporate the skills learned into practice (Cannon et al., 2018)
- American Society of Anesthesiologists states >90% of anesthesia providers incorporated skills learned in simulation into practice (Cannon et al., 2018)

PICO

For Certified Registered Nurse Anesthetists, does the use of education-based simulation training for ultrasound-guided anesthesia compared to no simulation training improve the knowledge, confidence, and incorporation of ultrasound use within the clinical practice setting?
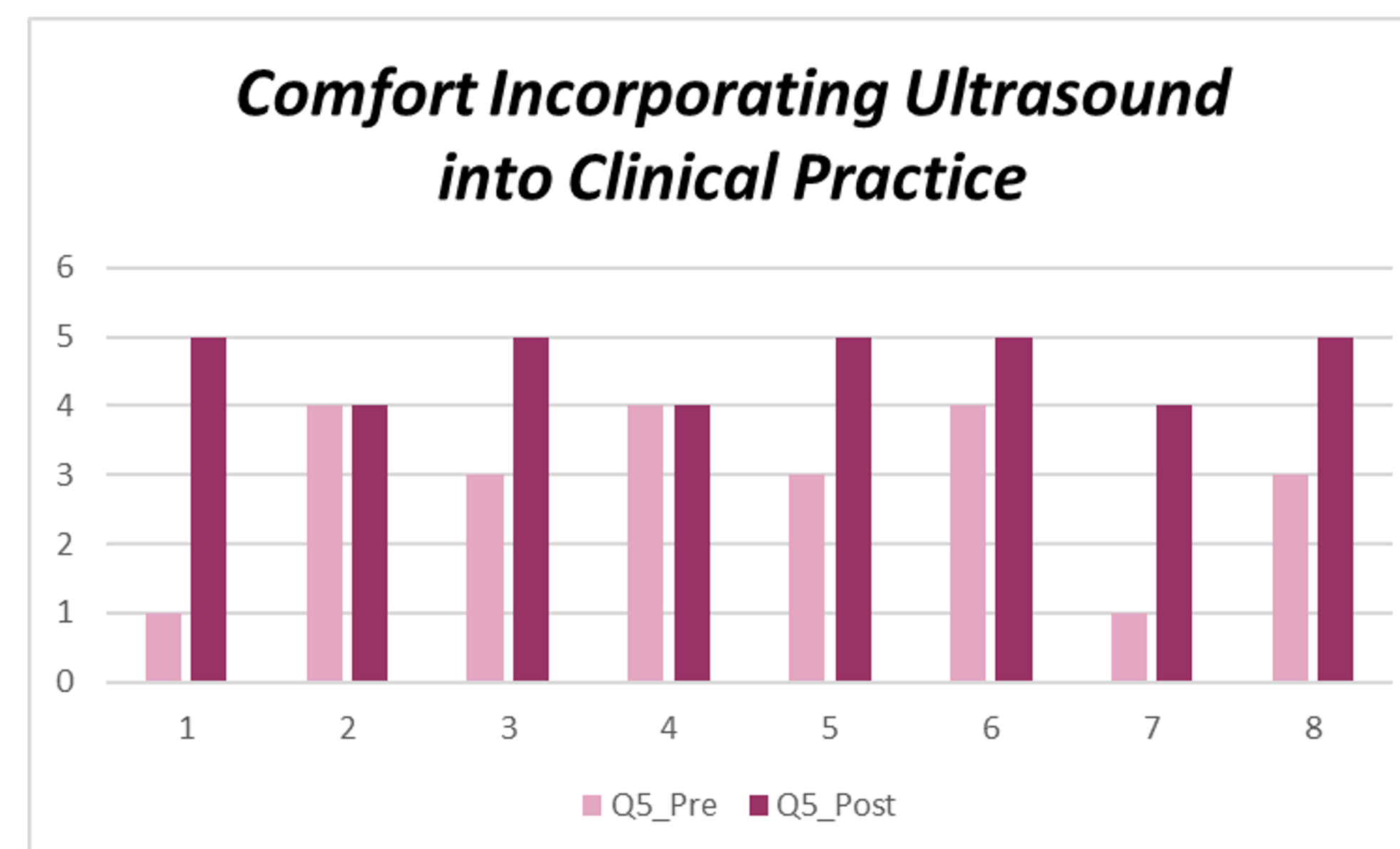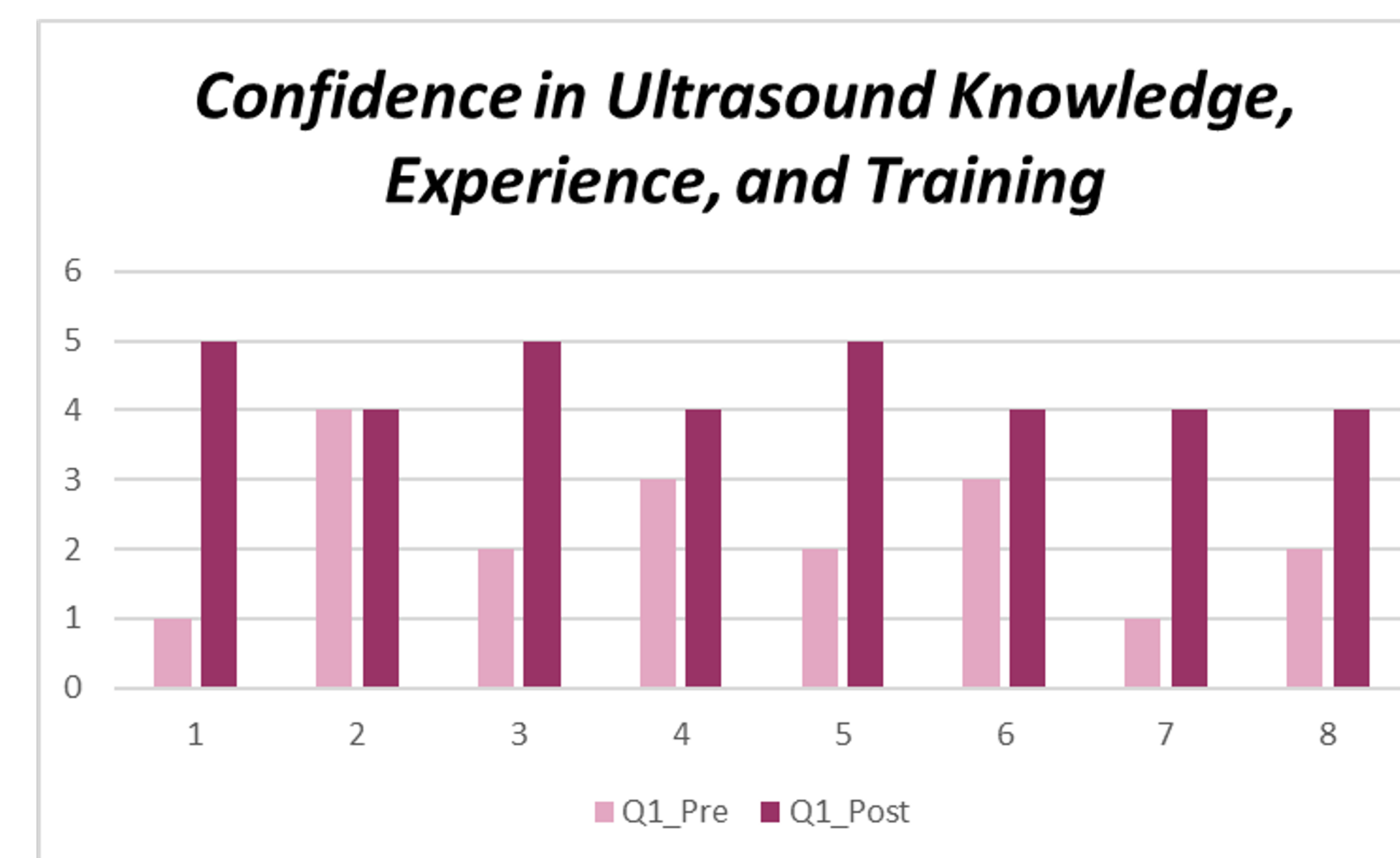
Objectives

1. CRNAs self-perceived confidence and knowledge levels in using ultrasound will increase after attending the educational-based ultrasound simulation, as indicated with the information provided by the pre-intervention and post-intervention surveys

2. Incorporation of ultrasound use within clinical practice settings will increase for CRNAs who attended the education-based ultrasound simulation, as evidenced by the data collected from the post-intervention survey

Methodology

- Literature search utilized Google Scholar, PubMED, and CINAHL databases with articles between 2017 and 2022
- Keywords included "ultrasound simulation", "POCUS", "education-based simulation", "anesthesia", and "CRNA"
- The search yielded 750 articles of which 5 articles with the strongest evidence to answer the research question were chosen
- Of the 5 articles included there was 1 Systematic Review, 1 Randomized Controlled Trial, and 3 Prospective Cohort Studies
- The Iowa Model for Sustainability Framework was used to assist with implementation of the project

Translation

- An education-based ultrasound simulation was developed and implemented at Cedar Crest College, School of Nursing Simulation Center in Allentown, Pennsylvania
- CRNAs were recruited by placement of an educational ultrasound flyer within anesthesia break rooms at local hospitals
- A total of eight CRNAs attended the simulation day
- The ultrasound simulation included a didactic PowerPoint presentation followed by three stations: arterial line insertion, peripheral intravenous catheter insertion, and ultrasound technique basics using a Blue Phantom Simulator

Confidence in Ultrasound Knowledge, Experience, and Training
Q1_Pre ■ Q1_Post

Comfort Incorporating Ultrasound into Clinical Practice
Q5_Pre ■ Q5_Post

- All participants completed a pre-intervention and a post-intervention survey using Microsoft forms to assess their knowledge, confidence, and incorporation of ultrasound use in the clinical practice setting
- Data was analyzed using the 2020 Dr. Joshua Lambert's *t*-test calculator (Lambert, 2020)
- Data analysis concluded a significant increase in CRNAs knowledge, confidence, and incorporation of ultrasound use in clinical practice settings

Recommendations for Practice

- CRNAs must continue to learn new skills in order to adapt to changes in healthcare and improve patient outcomes
- Education-based ultrasound simulation should be utilized to enhance the knowledge, confidence, and incorporation of ultrasound into clinical practice
- There needs to be continued education-based ultrasound simulation for CRNAs within clinical practice to maintain skills
- Further investigation needs to be completed to identify other barriers that exist to ultrasound use in clinical practice
- Future ideas should include conducting ultrasound simulations for ultrasound-guided peripheral nerve blocks and ultrasound-guided central line placement

Conclusion

- POCUS can be used in fast paced anesthesia environments to improve patient outcomes

- Educational simulation allows CRNAs to learn or improve their POCUS skills in a controlled, safe environment, which ultimately increases their skills and confidence with POCUS use

- The main purpose of this project was to improve the knowledge, confidence, and incorporation of ultrasounds in clinical practice settings

- There was an increase in post-intervention scores compared to the pre-intervention survey scores indicating that CRNAs had an increase knowledge, confidence, and incorporation of ultrasound use

- The project results were clinically significant, indicating this educational simulation has the potential to improve patient outcomes in clinical settings

- Limitations include a small sample size, recruitment from one local hospital, and only utilizing CRNAs in the participation

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