Point of Care Ultrasound Program Implementation for an Advanced Practice Provider Cohort



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Introduction:

Point of Care Ultrasound (POCUS) is an emerging field of bedside diagnostics that facilitates provider assessment for life-threatening causes of shock and the response to bedside interventions. Compared to traditional echocardiography or ultrasound, clinicians perform POCUS at the bedside via smaller, affordable, cart-based, or even handheld devices. These attractive features and its potential to increase the quality of care have caused exponential growth of its utilization across acute care settings.

Problem:

- Ultrasound fellowships, board certifications, and credentialing for physicians have emerged alongside this increased utilization of POCUS to guide medical decision-making.,
- Advanced practice providers (APP) currently lack formal guidance from their regulatory bodies on training standards or required training to perform POCUS.
- Healthcare institutions are operating without formal guidance, training requirements, or credentialing pathways for POCUS users, potentially compromising patient safety (Raiten et al., 2020).
- This has led to individual institutions or healthcare systemlevel efforts to standardize ultrasound training, credentialing, and equipment (Smalley et al., 2020).
- Specific to this project setting at UPHS, the Heart and Vascular Intensive Care Unit (HVICU) at Penn Presbyterian Medical Center (PPMC) utilizes APPs in a high acuity setting. The number of APPs has grown from three in 2017 to ten in 2021, and only three have attended a formal POCUS course. Therefore, it was of the utmost importance to address the educational gap in POCUS use for APPs in this specific setting.

Aim:

Increase the APP's confidence and knowledge of POCUS through the implementation of the POCUS curriculum for the advanced practice provider and to serve as a model for future advanced practice cohorts.

Objectives:

- 1: Develop and implement a 4-hour POCUS training program for the advanced practice provider cohort within the Heart and Vascular Intensive Care Unit, which will provide the APP with an educational foundation for basic cardiac and lung ultrasound, as well as the assessment of the patient in shock.
- 2: Prior to and after the training program, confidence and knowledge levels will be assessed using a confidence and knowledge survey of POCUS that has been adapted from Gopal et al., 2021.

Results

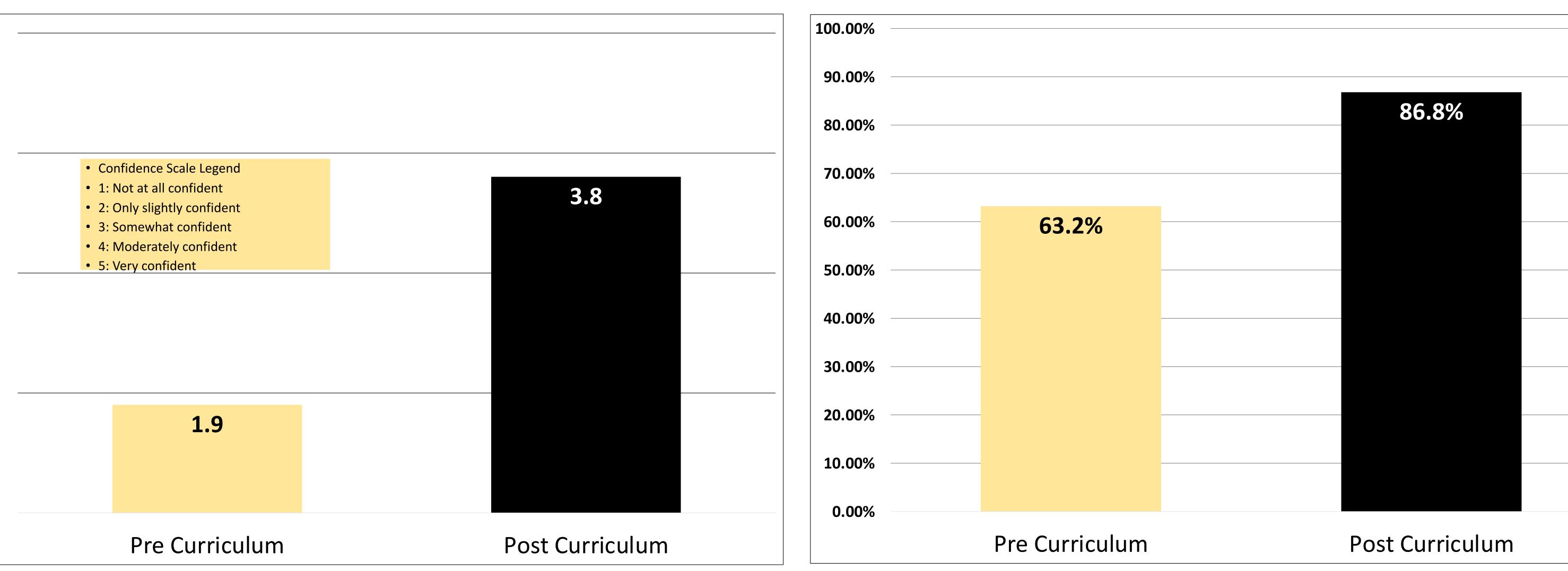


Chart 1. Self-reported confidence mean for POCUS Pre to Post Curriculum

Chart 2. Mean Scores Pre to Post Curriculum

Hypotension (SALVATION) POCUS Curriculum Composition (4hrs)

- Step 1: Contractility and Afterload Evaluation
 Modes of Ultrasound (2D/B, M-Mode, Brief Intro to Doppler, Types of Ultrasound Probes
 Aprical 4-Chamber View
 Cardiac/Pulmonary Qualitative Assessment,
 - Assessment for Intraabdominal Free Fluid

Act

- Clinical Syndromes of Shock: Tamponade, Tension Pneumothorax, Hypovolemia, Pulmonary Embolus/Cor Pulmonale, Aortic Dissection..
- "Hands on" Practice/Demonstration of Cardiac, Pulmonary, Intraabdominal Views

Curriculum: 3D Printed Heart
Models from National Institute of
Health Library (Bramlet, 2016)

Methods

Knowledge gap identified for POCUS utilization by APPs in HVICU.

- Literature search conducted and PICOT question developed.
- Project leader meets with ICU Medical Director and APP lead to discuss need for POCUS
 education to obtain stakeholder buy-in via Microsoft Teams for project.
- Meeting with Dr. Cameron Baston (Gopal et al., 2021 author) → to obtain permission to adapt confidence and knowledge assessments.
- REDCap surveys adapted/prepared from Gopal et al., 2021
- Project proposal completed, presented, and passed by VUSN committee member and committee chair.
- IRB approval obtained for QI project at Penn and Vanderbilt.

Data is reviewed on Microsoft Excel and arranged for clarity

staff w/ plan to include more hands-on practice

class to additional critical care APP cohorts.

Subcostal 4-Chamber View

Left Upper Quadrant View

9. Pulmonary Views

Curriculum: (SALVATION) protocol

teaching POCUS views (Fatima et al.

tables and figures.

2021).

laminated cards provided to students for

Step 2: Preload Evaluation

Step 3: Hypoxia Evaluation

Presentation to stakeholders on project outcomes with

Adopt & Continue POCUS education quarterly for HVICU

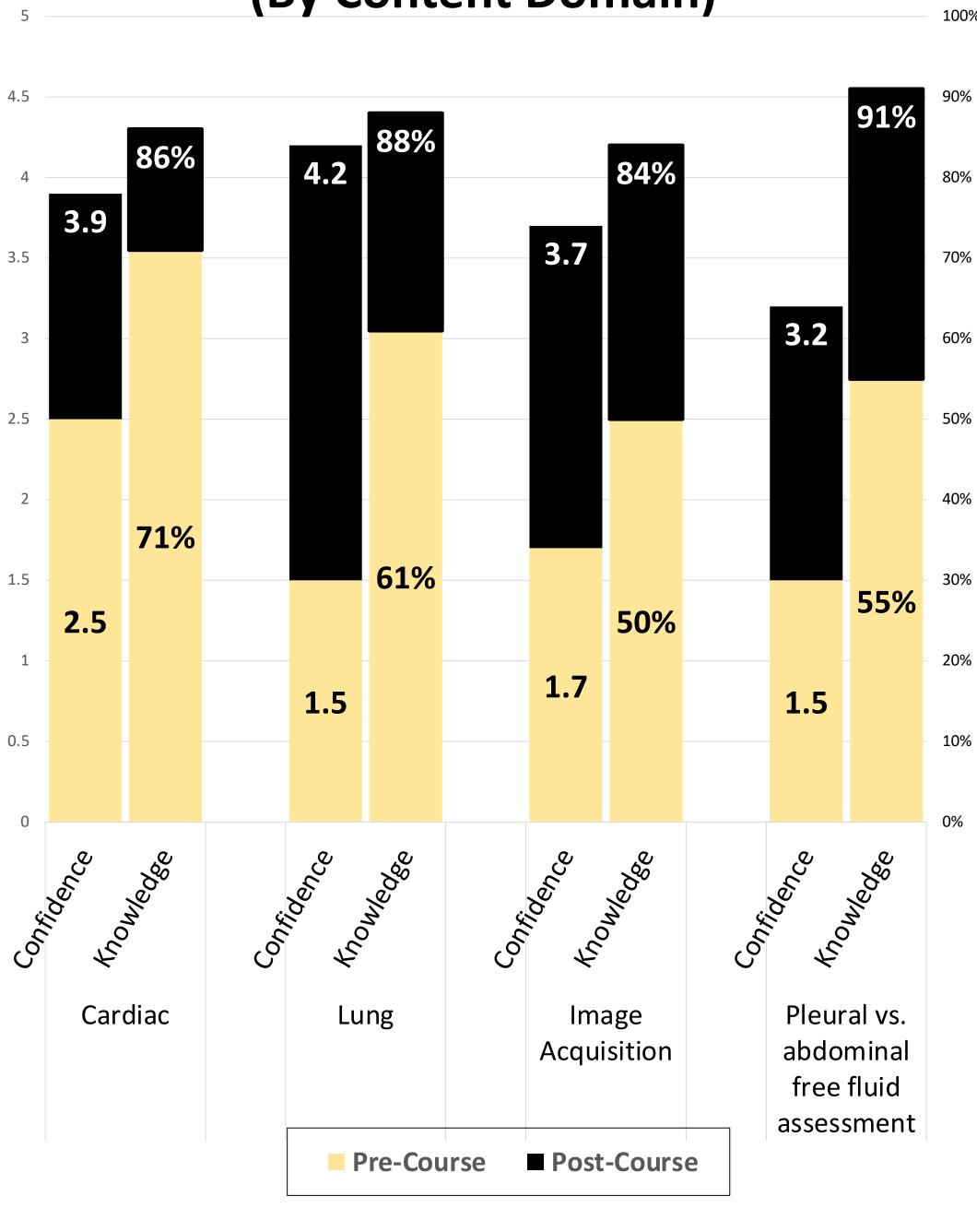
Begin to plan new project with stakeholders to expand

- Meeting virtually with VUSN statistician to develop statistical analysis plan.
- Descriptive statistics utilized to calculate mean and standard deviation for confidence & knowledge in pre and post data.
- Data is transferred to tables and figures in Microsoft Powerpoint.

Study Do:

- Curriculum developed & PPT slides created by project leader.
- PPT slides laminated reference cards developed, 3-D models obtained.
- Project leader develops and teaches the 4-hour POCUS class (each student receiving 4hr curriculum once (October 8th, October 21st, November 1st, 2021, N=11)
 - Students complete demographics assessment (3 questions)
 - Students complete pre and post (identical) knowledge assessment (20 multiple choice questions) via Red Cap immediately before and after class.
 - Students complete pre and post (identical) confidence assessment (12 questions, 5-point Likert scale style) via Red Cap immediately before and after class
- All data collected is downloaded from REDCap to and Excel spreadsheet.

Confidence & Knowledge Mean Comparison (By Content Domain)



Implications for Practice

- Implementation of a POCUS curriculum for advanced practice providers (APPs) can provide the APP with an educational foundation for basic cardiac and lung ultrasound and the assessment of the patient in shock.
- This curriculum demonstrated, on average, that students' confidence levels increased from "only slightly confident" to "moderately confident" across all domains of knowledge. Students should become confident in a skillset as it could increase their utilization of POCUS, potentially reinforcing the student to continue training on their own.
- Due to the increased utilization of POCUS across acute care settings amongst physician colleagues, APPs should understand this evolving assessment methodology as evidence to support its usage grows.
- This curriculum can serve as a model for future advanced practice cohorts that are seeking to address the current gap in POCUS education and training.



