

Development and Evaluation of a Peer Education-Based Ultrasound Curriculum with Emphasis on Clinical Reasoning

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Introduction

- Point-of-care ultrasonography (POCUS) as a bedside diagnostic tool is universally appreciated because of its versatility and ease.
- Ultrasound technology is gradually being incorporated in undergraduate medical education curriculum and is utilized to augment anatomy, physiology and clinical skills didactic sessions^{(1),(2),(3)}.
- The use of ultrasound as a teaching tool enriches the learning experience by reducing the need to learn facts as it offers a visual representation of pathological problems and promotes clinical application of knowledge⁽⁴⁾.
- When there are limited resources and trained faculty, peer tutors can be a useful resource for accomplishing curricular goals.
- Our objective is to pilot and assess a peer education based bedside ultrasonography curriculum at Oakland University William Beaumont School of Medicine with the aim of teaching medical students to gain skills in interpretation of ultrasound images and identification of clinical applications.

Objectives

- Assess the feasibility of integrating ultrasound education into the Physical Diagnosis course at Oakland University William Beaumont School of Medicine.
- Evaluate whether ultrasonography facilitates students' development of clinical reasoning.
- Determine the efficacy of using peer tutors to teach medical students image acquisition and interpretation as a tool for clinical reasoning in a Physical Diagnosis course.

Approach/Process

- 16 M2s were recruited to participate in this optional POCUS curriculum.
- The curriculum involved:
 - A virtual lecture facilitated by 5 M3 peer tutors who were trained and certified in ultrasonography.
 - In-person practice sessions (minimum of 6 hours divided into 2-hour sessions). Students worked in pairs to obtain a predetermined list of ultrasound views. A single faculty member supervised the hands-on components of the curriculum. The specific elements included in this point-of-care ultrasound curriculum were determined based on the corresponding organ systems that were already reviewed in the pre-clerkship course work. Sonographic examination techniques which augment standard physical examination and which help in bedside decision making and clinical reasoning were emphasized (e.g. lung sliding, cardiac ejection fraction estimation, IVC size and respiratory variability, abdominal free fluid evaluation).
 - Portfolio compilation of the required ultrasound views provided on a given checklist. The submitted images were assessed by the faculty using the criteria listed in the checklist. Feedback on suboptimal views was reviewed by the faculty and an additional debriefing session was later held with all participants to review deidentified images obtained by the students.
 - An 18-question post-test in order to assess the efficacy of the curriculum.
 - An optional five-question survey to measure their overall satisfaction with the program.

Results

Of the 16 participants who completed the virtual learning session and had at least 6 hours of in-person practice session, 13 students completed the post-test. On average, students scored 83.3% on the post-test with a 95% CI [0.78,0.89].

15 students completed the post-curriculum survey. The first four survey questions and the results are presented in Figure 1. The median score on the Likert scale was 5 for all four questions. Table 1 contains some sample responses from the open text section of the survey.

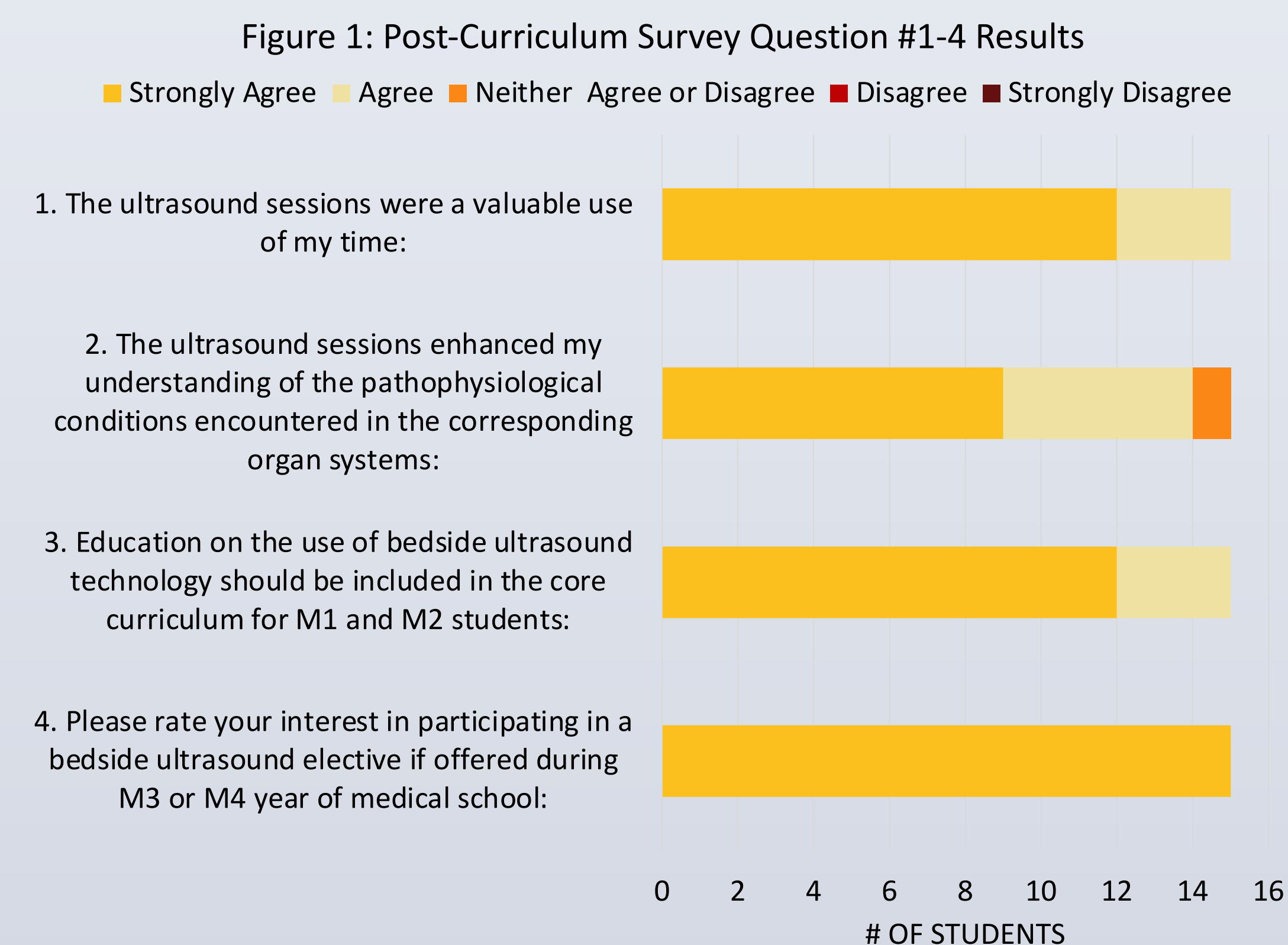


Table 1: Post-Curriculum Survey Question 5 Comments

Q5: Please Provide any other comments you may have about the bedside ultrasound program:

"I very much enjoyed the program, and I would definitely like to try other exams as well, like a lower extremity venous compression study for DVT evaluation."

"I loved it! Best education I have [had] thus far in the 1.5 years I have been at OUWB yet. The hands on practice and the visualization of organ systems is exhilarating."

"I loved the program! I wish it could also incorporate MSK radiology or have us choose what other organ systems we want to study..."

"It was a really valuable experience that I think would have been a perfect fit to include in APM coursework. All students should learn the basics of using ultrasound, and I feel like it helped me with radiology topics in organ systems as well."

DVT = deep vein thrombosis, OUWB = Oakland University William Beaumont School of Medicine, MSK = musculoskeletal, APM = Art and Practice of Medicine



Figure 2: Peer tutors learning how to use an ultrasound machine.

Discussion

- We believe that with the advent of affordable, handheld ultrasound machines, integrating ultrasonographic images in the clinical reasoning workflow is an important skill that future physicians need to be prepared for.
- Due to the lack of ultrasound machines and trained faculty, peer tutors provide an opportunity to maximize student-teacher contact.
- Student scores on the post-test knowledge assessment indicate that they were able to retain and apply the POCUS education they received through this curriculum.
- The post-curriculum survey portion of our study showed that students highly valued this optional educational program and hoped that ultrasound would be incorporated into the formal medical school curriculum.
- Our next step would be to expand the curriculum so that more OUWB students may take advantage of POCUS education. We anticipate making these 16 participants peer ultrasound tutors.

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