

Point-of-care Ultrasound (POCUS) Educational Intervention in Anesthesia at a Resource-Limited Setting (PEARLS).

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INTRODUCTION

Ramsingh et al¹ describe Point-of-care Ultrasound (POCUS) is a clinically useful tool for the assessment of vital organs, obtaining vascular access, and management of patient care. Burleson et al² support that resource-limited settings (RLS), like India, lack the practice and training of POCUS. To address this gap, Hospital for Special Surgery (HSS) in New York, NY partnered with Osmania General Hospital (OGH) in Telangana, India to conduct a pilot novel POCUS training program in February 2023. The pilot training included anesthesiology attendings and residents (*N*=26) at OGH for a 1-week didactic in-person. However, we posit that a single course may not be sustainable for participants to fully absorb skills into practice, and thus, conducted a refresher course in a follow-up study. The refresher course's aim was to repeat the training with an emphasis on teaching in the medical/surgical units and intensive care units to further solidify their POCUS knowledge and clinical skills.

METHODS

- This study does not have patient identifiable information and therefore is exempt from IRB review requirements as per HSS policy.
- Participants were the same anesthesiology attendings and residents with only one participant unable to attend (*N*=25).
- The refresher course included a 1-week didactic in-person training at OGH, combined with online didactics and training modules.
- Data was collected for pre- and post-training knowledge tests and clinical exams and will be analyzed for planned interrupted time series (ITS) design.

References

• Davinder Ramsingh, Joseph Rinehart, Zeev Kain, Suzanne Strom, Cecilia Canales, Brenton Alexander, Adriana Capatina, Michael Ma, Khanh-Van Le, Maxime Cannesson; Impact Assessment of Perioperative Point-of-Care Ultrasound Training on Anesthesiology Residents. *Anesthesiology* 2015; 123:670–682 doi: <https://doi.org/10.1097/ALN.0000000000000776>

• Burleson SL, Pigott DC, Gullett JP, Greene C, Gibson CB, Irvine S, Kaminstein D. Point-of-care ultrasound in resource-limited settings: the PURLS fellowship. *Ultrasound J.* 2020 Mar 20;12(1):14. doi: 10.1186/s13089-020-00159-6. PMID: 32193724; PMCID: PMC7082434.

• Naji A, Chappidi M, Ahmed A, Monga A, Sanders J. Perioperative Point-of-Care Ultrasound Use by Anesthesiologists. *Cureus.* 2021 May 24;13(5):e15217. doi: 10.7759/cureus.15217. PMID: 34178536; PMCID: PMC8221658.

RESULTS

Table 1. Descriptive statistics for all main variables of the study

Study	N	Mean	SD	Range
Pre-training Knowledge (T1)	29	17.72	4.99	20
Post-training Knowledge (T1)	18	24.39	4.1	13
Pre-training Clinical (T1)	26	29.5	3.33	22.21
Post-training Clinical (T1)	25	46.28	3.2	13.57
Pre-training Knowledge (T2)	28	24.21	3.36	13
Post-training Knowledge (T2)	26	23.7	2.34	10
Pre-training Clinical (T2)	25	44.6	4.05	14.57
Post-training Clinical (T2)	25	49.5	2.31	10.43

Figure 1. Time series analysis



- Repeated measures ANOVA shows that there was a significant positive effect of the training on participant's clinical knowledge ($F = 140.92, p = .< 0.001$)
- Repeated measures ANOVA shows that there was a significant positive effect of the training on participant's theoretical knowledge ($F = 9.3, p = .< 0.001$)
- Repeated measures ANOVA shows that there was a significant positive effect of the training on participant's clinical global rating ($F = 50.43, p = .< 0.001$)
- Satisfaction Survey results at T1 indicated the a mean score of 9.4 out of 10 on the question "how would you rate the training overall on a scale of 1-10 (with 1 being poor and 10 being outstanding)
- There was reportedly no POCUS usage prior to the implementation of the first training at T1, however, 108 number of POCUS exams were conducted since the first training at T1

Table 2. Repeated measures analysis on variance

Name	df	Mean Square	F	p
Pre and Post Training Knowledge Test	1.8	162.47	9.3	<0.001
Pre and Post Training Clinical Exam	3	1939.11	140.92	<0.001
Pre and Post Training Global Rating Scale	2.13	1831.17	56.43	<0.001

DISCUSSION

- The needs assessments confirmed that no POCUS exams were performed at OGH by anesthesia providers.
- The logbooks also indicated that the POCUS exam findings often directly changed management of the patient, suggesting that POCUS utilization impacted patient care.
- The study indicates a necessity for a follow-up training course to adequately train and provide essential POCUS skills to anesthesia providers.
- The participants encountered obstacles to POCUS utilization at OGH after the first intervention.
- A large proportion of the participants were unable to perform POCUS exams due to 1) reassignments to other clinical sites without ultrasounds or POCUS probes and 2) equipment issues at OGH e.g. malfunctioning phased array probe in between the two PEARLS courses with over a month delay in repair time.
- We emphasize the importance of long-term follow-up of study participants for program sustainability in global health education and research.