ATS Highlights 2020:
Critical Care Assembly Early Career Professionals

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Tell us about yourself.

I am an anesthesiologist and critical care specialist currently working at a university teaching hospital in Nairobi, Kenya.

How would you describe your academic work?

My research has both clinical and translational aspects.

Please describe your academic work.

My academic work focuses on critical care outcomes in Kenya, exploring cost-effective interventions to support the provision of quality critical care in low-resource settings and generating local data to support quality improvement efforts. I am currently enrolled in a DPhil in Evidence-Based Healthcare at the University of Oxford in the United Kingdom where my area of research is the impact of focused cardiac ultrasound training on critical care outcomes in Kenya. I am also involved in a project funded by the NIHR that will lead to the first national critical care registry in Kenya to support national clinical care, research and quality improvement efforts.

Do you have an inspirational quote?

"I'm very conscious of the fact that you can't do it alone. It's teamwork. When you do it alone you run the risk that when you are no longer there nobody else will do it." — Wangari Maathai

What are your passions in life?

I love to sing

What are you looking for in future collaborators?

I would like to be part of projects that impact critical care service provision in my country.

How has the Critical Care Assembly contributed to your career?

The Critical Care Assembly has enabled me to build collaborative research networks over the years. I have had the privilege of presenting my work to leaders in the field from around the world, enhancing my visibility as a researcher.

What are you looking for in future collaborators?

The present and the future of Critical Care Medicine are multidisciplinary. Given the nature of clinical and research interests, I would like to collaborate not only with clinical researchers, but also with those in the field of biophysics and biomedical engineering.

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Building Focused Cardiac Ultrasound Capacity in a Lower Middle-Income Country: A Single Centre Study to Assess Training Impact

Objectives: In low and middle-income countries (LMICs) where echocardiography experts are in short supply, training non-cardiologists to perform Focused Cardiac Ultrasound (FoCUS) could minimize diagnostic delays in time-critical emergencies. Despite advocacy for FoCUS training however, opportunities in LMICs are limited, and the impact of existing curricula uncertain. The aim of this study was to assess the impact of FoCUS training based on the Focus Assessed Transthoracic Echocardiography (FATE) curriculum. Our primary objective was to assess knowledge gain. Secondary objectives were to evaluate novice FoCUS image quality, assess inter-rater agreement between expert and novice FoCUS and identify barriers to the establishment of a FoCUS training program locally.

Methods: This was a pre-post quasi-experimental study at a tertiary hospital in Nairobi, Kenya. Twelve novices without prior echocardiography training underwent FATE training, and their knowledge and skills were assessed. Pre- and post-test scores were compared using the Wilcoxon signed-rank test to establish whether the median of the difference was different than zero. Inter-rater agreement between expert and novice scans was assessed, with a Cohens kappa > 0.6 indicative of good inter-rater agreement.

Results: Knowledge gain was 37.7%, with a statistically significant difference between pre-and post-test scores ($z = 2.934$, $p = 0.001$). Specificity of novice FoCUS was higher than sensitivity, with substantial agreement between novice and expert scans for most FoCUS target conditions. Overall, 65.4% of novice images were of poor quality. Post-workshop supervised practice was limited due to scheduling difficulties.

Conclusions: Although knowledge gain is high following a brief training in FoCUS, image quality is poor and sensitivity low without adequate supervised practice. Substantial agreement between novice and expert scans occurs even with insufficient practice when the prevalence of pathology is low. Supervised FoCUS practice is challenging to achieve in a real-world setting in LMICs, undermining the effectiveness of training initiatives.

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Table 1: Novice FoCUS Diagnostic Accuracy

FoCUS target condition			Diagnostic accuracy of novice FoCUS			
Target condition	**True positives (no. %)**	**True negatives (no. %)**	**Sensitivity (no. %)**	**Specificity (no. %)**	**PPV (%)**	**NPV (%)**
Reduced ejection fraction	13/27 (48.2)	14/27 (51.9)	10/13 (76.9)	8/14 (57.1)	62.5	72.7
Hyperdynamic contractility	0 (0.0)	27/27 (100.0)	NA	26/27 (96.3)	NA	100.0
Right ventricular dilatation	4/27 (14.8)	23/27 (85.2)	2/4 (50.0)	17/23 (73.9)	25.0	89.5
Pericardial effusion	5/27 (18.5)	22/27 (81.5)	2/5 (40.0)	19/22 (86.4)	40.0	86.4
Left pleural effusion	5/27 (18.5)	22/27 (81.5)	2/5 (40.0)	16/22 (72.7)	25.0	84.2
Right pleural effusion	5/27 (18.5)	22/27 (81.5)	0/5 (0.0)	18/22 (81.8)	0.0	78.3
Normal scan	13/27 (48.2)	14/27 (51.8)	7/13 (53.9)	10/14 (71.4)	63.6	62.5

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