UAEU كلية الطب والعلوم الصحية College of Medicine and Health Science
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Online Extended Focused Assessment with Sonography for Trauma (EFAST) Course Enhanced Knowledge and Perceived Confidence Among Medical Trainees during the COVID-19 Pandemic

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iEM INTERNATIONAL EMERGENCY MEDICINE EDUCATION PROJECT

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Disclosure Statement

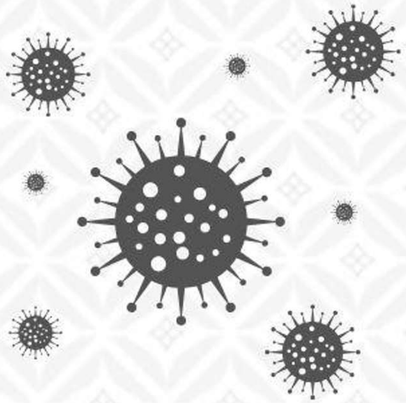
There are no conflicts of interest to declare.

Prof. Arif Alper Cevik & Prof. Fikri Abu-Zidan

Introduction

EFAST is useful in emergency settings to quickly detect free fluid and air in the peritoneal and pleural cavities which is crucial for the rapid triage of hemodynamically unstable patients.

Landsperger JS, Bhatt M. Extended Focused Assessment with Sonography in Trauma (EFAST). In: Taylor, D.A., Sherry, S.P., Sing, R.F. (eds) Interventional Critical Care. Springer, Cham. 2021



The COVID-19 pandemic was the most severe global crisis faced by humanity since World War II.

Seddighi H. COVID-19 as a Natural Disaster: Focusing on Exposure and Vulnerability for Response. Disaster Med Public Health Prep. 2020; doi: 10.1017/dmp.2020.279.

Healthcare education was initially unprepared for the pandemic. However, the mitigation and response phases were effectively utilized to reduce the negative impact of the pandemic.

During the pandemic, online ultrasound training has emerged as a feasible alternative to traditional in-person training.

Introduction

The International Emergency Medicine Education Project is a non-profit initiative that provides free educational resources for medical students and interns worldwide.

Cakal ED, Cevik AA, Quek LS, Noureldin A, Abu-Zidan F. Establishment of an Undergraduate FOAM Initiative: International Emergency Medicine (iEM) Education Project for Medical Students. West J Emerg Med. 2020; doi:10.5811/westjem.2020.10.48385

The project launched its course platform as a social responsibility initiative to meet emerging training needs, focusing on the mitigation and response phases of disaster medicine.

Cevik AA, Cakal ED, Kwan J. From the pandemic's front lines: A social responsibility initiative to develop an international free online emergency medicine course for medical students. Afr J Emerg Med. 2021; doi:10.1016/j.afjem.2020.11.005

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EFAST was one of the five courses offered on the platform

The goal of achieving the required basic theoretical and practical knowledge in preparation for more practical, hands-on training in real-life during the post-COVID-19 recovery period.

Acknowledgment

Dr Ashley Bean

Ashley Bean, M.D., an associate professor in the UAMS College of Medicine's Department of Emergency Medicine, was honored by the American Academy of Emergency Medicine for her dedication to global education and improving the quality of emergency and acute care globally for more than a decade. She is the eFAST chapter author in iEM Education Project 2018 EM Clerkship eBook.

Dr Rasha Buhumaid

Rasha Buhumaid M.D. is an assistant professor at the Muhammed Bin Rashed University College of Medicine. She is a consultant in Emergency Medicine, President of Emirates Society of Emergency Medicine, and Co-founder – Ultrasound Section Emirates Society of Emergency Medicine. She is the RUSH protocol chapter author in iEM Education Project 2018 EM Clerkship eBook.

Dr Toh Hong Chuen

Hong Chuen is an Emergency Physician at KTPH. He is a member of the EM Residency Advisory Committee and is appointed by Ministry of Health (MOH) as a National Examiner in EM. Under the Ministry's Human Manpower Development Programme, he pursued his passion in Emergency Ultrasound at the Mount Sinai Hospital, New York City, as an international fellow from 2010-2011. He is a board-certified diagnostic medical sonographer with ARDMS. Hong Chuen has actively participated in the development and training of the Emergency Ultrasound in Singapore. He has conducted ultrasound courses and lectured in this field on numerous occasions, both locally and overseas, including South Korea, Hong Kong, Thailand, Indonesia, Malaysia, Turkey and India. He is currently the Program Director of AACES. He is the author of Blue Protocol chapter in iEM Education Project 2018 EM Clerkship eBook.

Objectives

Online training was found efficient to enhance knowledge, confidence and satisfaction on advanced medical concepts, including ultrasound skills.

This study evaluated the effectiveness of an online extended EFAST course, delivered via the project's platform, to improve participants' knowledge and perceived confidence.

Heejun, et al. Prehosp Disaster Med. 2023
Soon et al. Pediatr Emerg Care. 2020
Schroeder et al. Am J Phys Med Rehabil. 2020

Methods

A prospective observational study was conducted between May 17, 2020, and December 20, 2023.

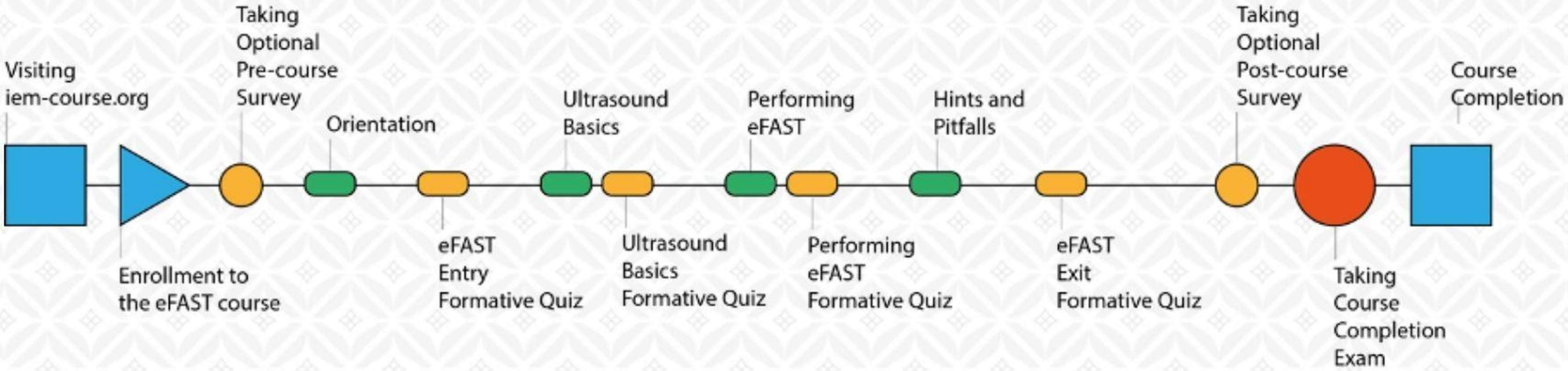
Pre- and post-course quizzes and surveys were used to assess participants' knowledge and confidence.

Participant demographics, quiz scores, and survey responses were collected.

Quantitative data were analysed using the Wilcoxon Signed-Rank test and Cohen's d to evaluate knowledge improvement and confidence changes.

Thematic analysis of qualitative feedback was performed with the assistance of large language model AI tools for emerging themes.

Methods


Visiting iem-course.org
Enrollment to the eFAST course
Taking Optional Pre-course Survey
Orientation
eFAST Entry Formative Quiz
Ultrasound Basics
Ultrasound Basics Formative Quiz
Performing eFAST
Performing eFAST Formative Quiz
Hints and Pitfalls
eFAST Exit Formative Quiz
Taking Optional Post-course Survey
Taking Course Completion Exam
Course Completion

Results - Demographics

Enrolled

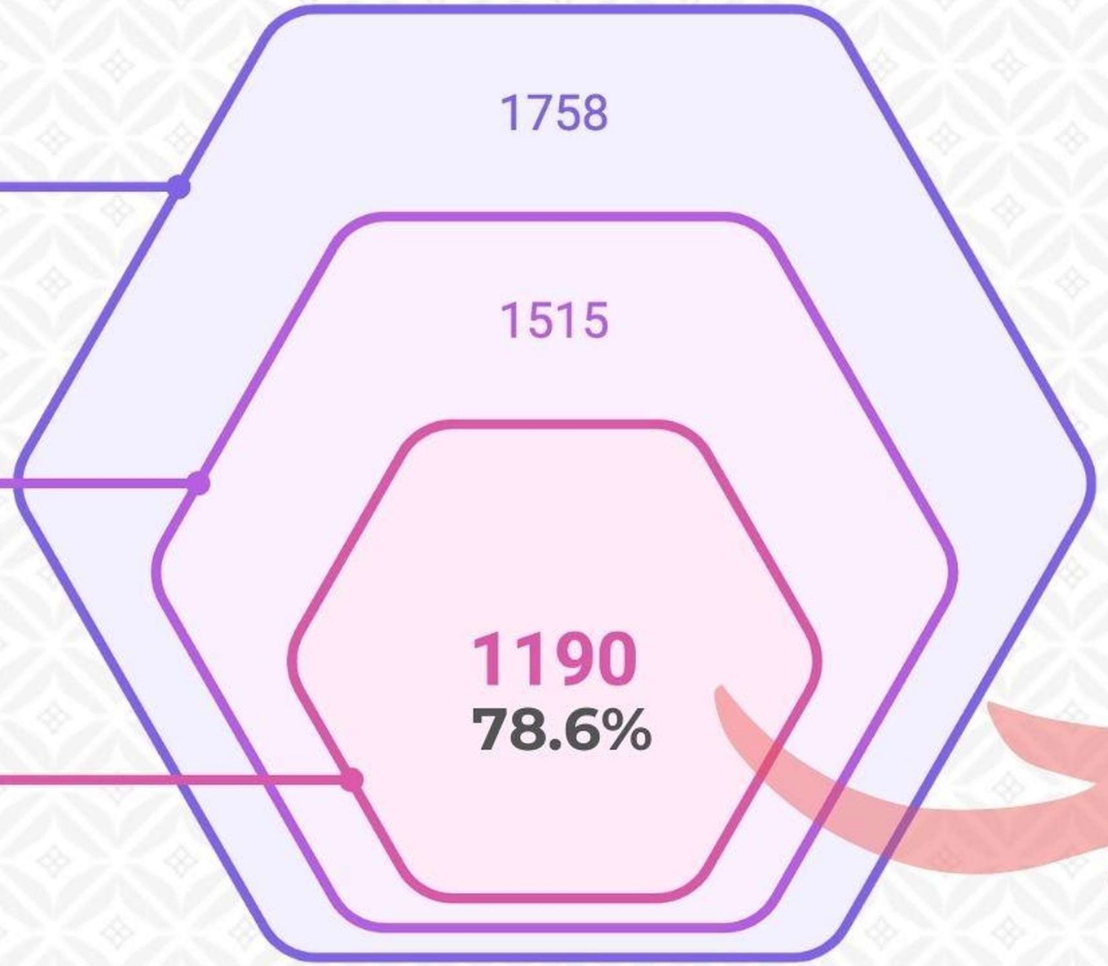
Total participants enrolled

Started

Participants who started the course

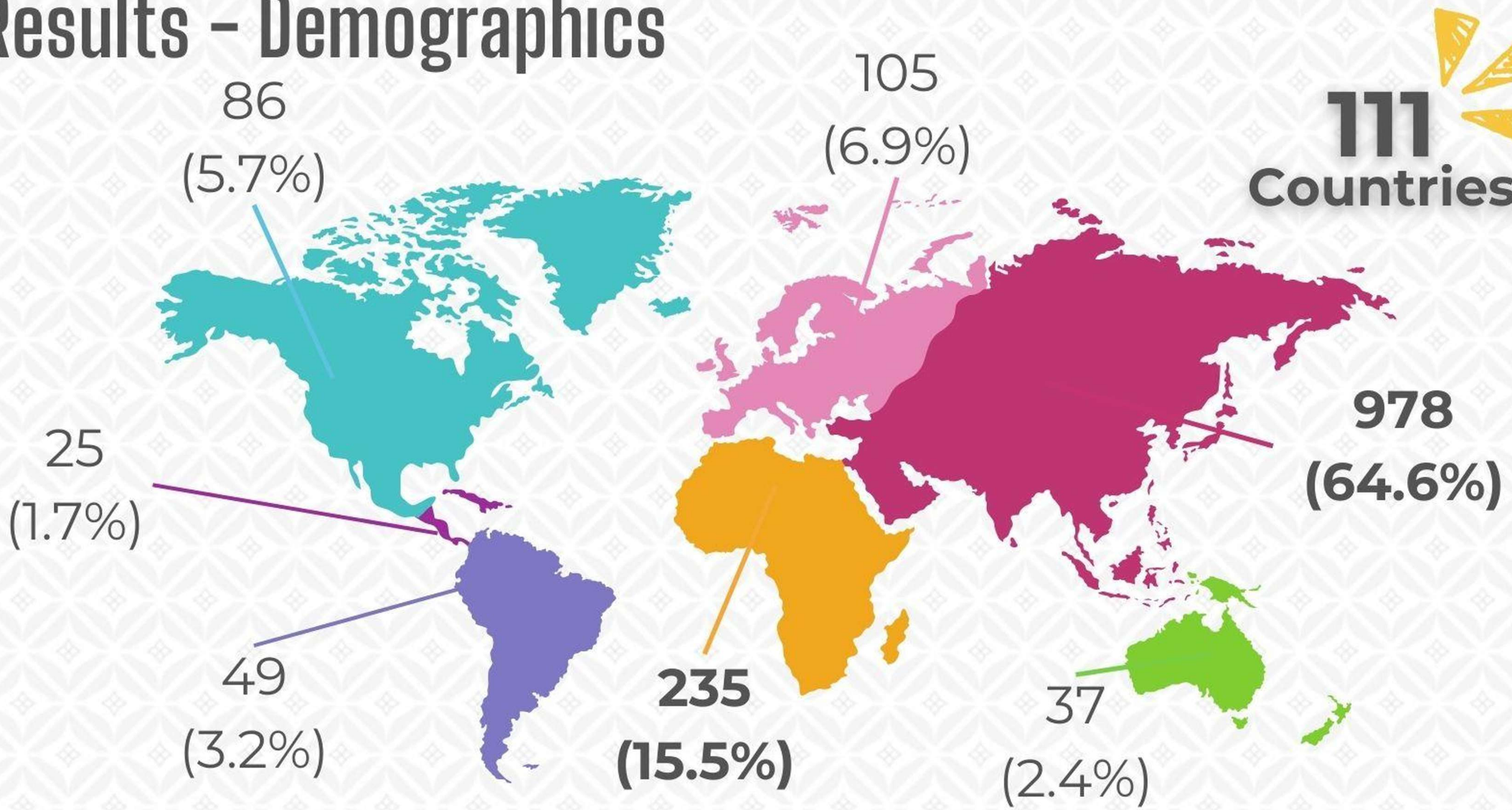
Final Exam

Participants who reached final exam

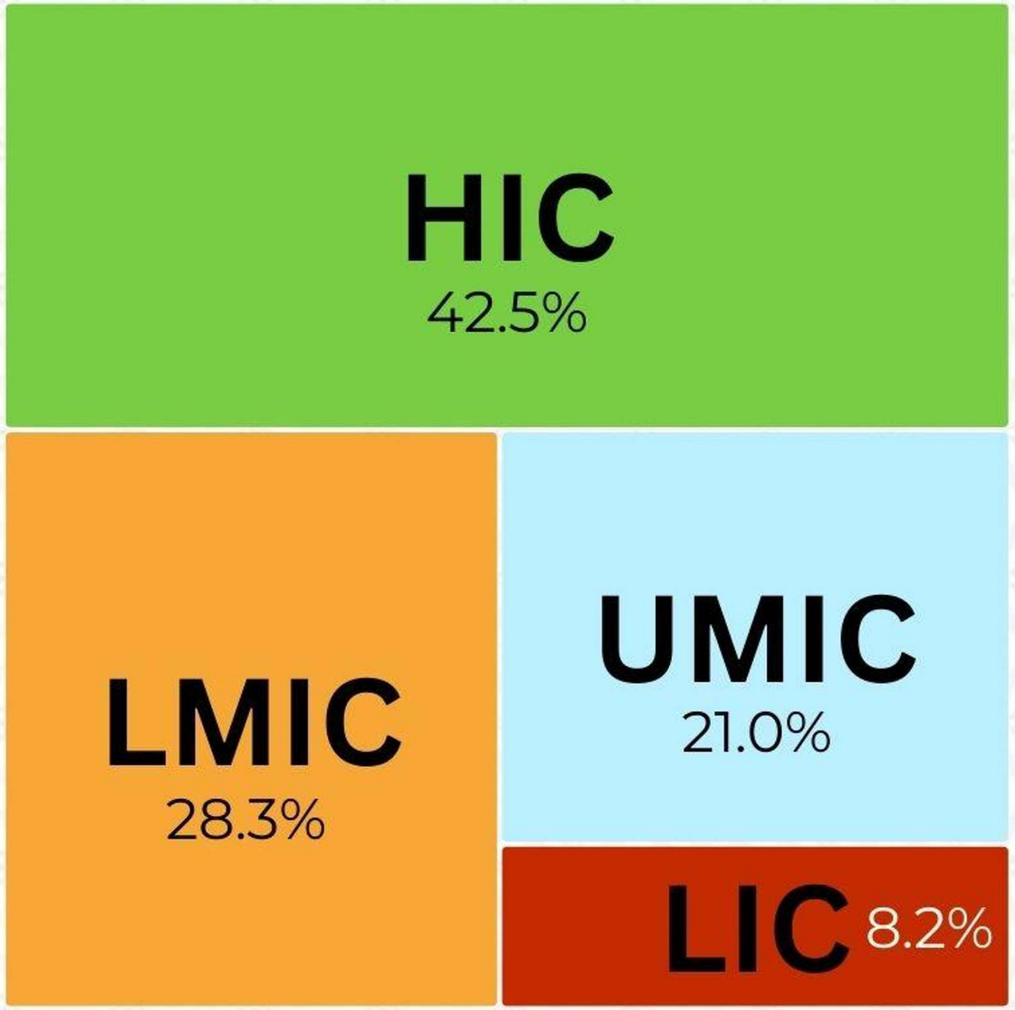


96.1%

Results - Demographics

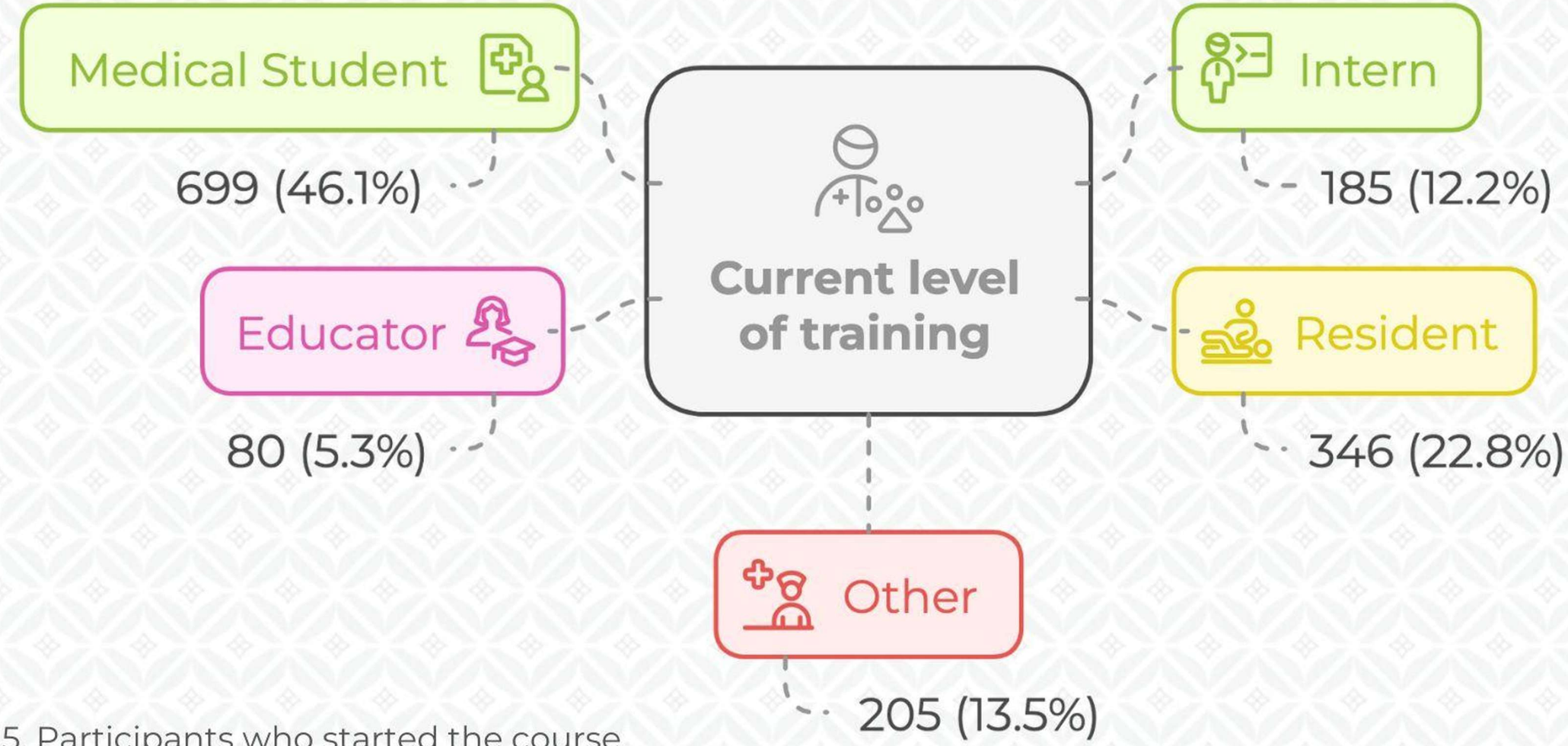


Results – Demographics



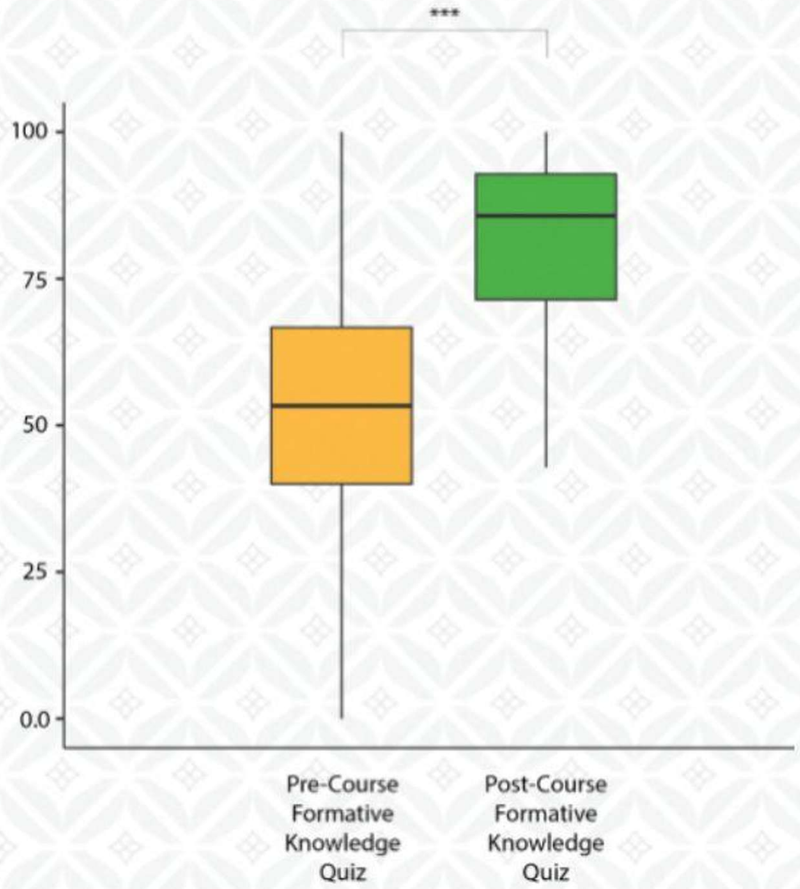
LIC+LMIC = 36.5%

Results - Demographics



n = 1515, Participants who started the course

Results – Pre & Post-Course Knowledge

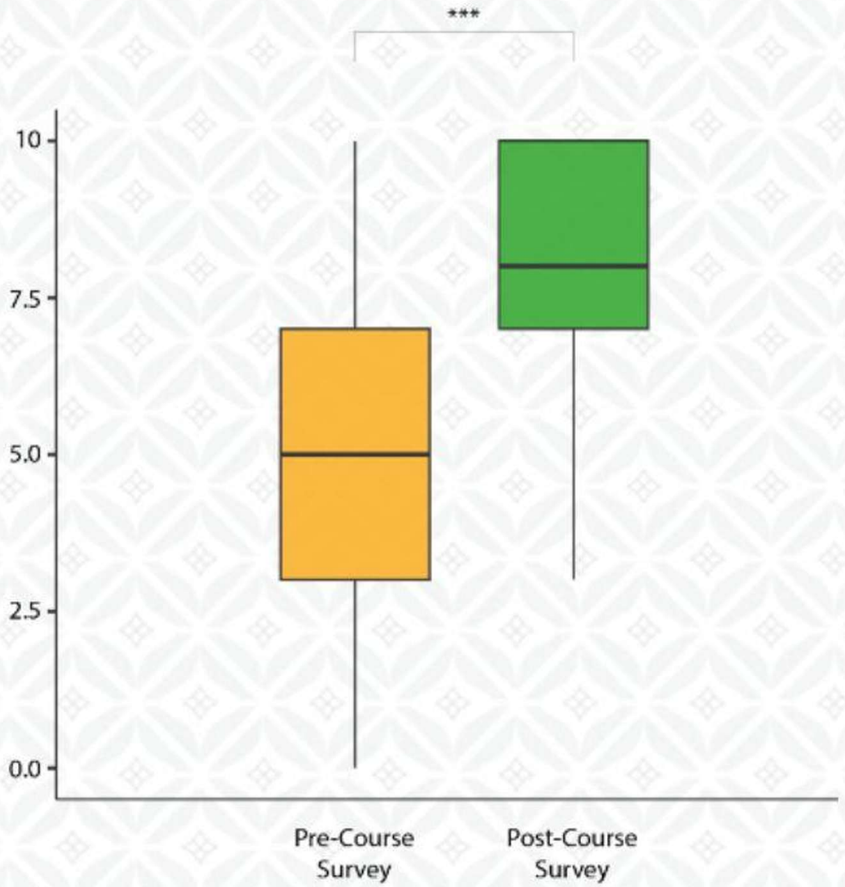


The quizzes consisted of 15 multiple-choice questions, including true/false and single-best-answer formats.

The median (IQR) scores were **53.3** (40.0–66.7) pre-course and **86.7** (73.3–93.3) post-course ($p < 0.001$, effect size: -0.958).

n = 1175, Participants who completed pre & post-course quizzes

Results – Pre & Post-Course Confidence



Questions	Pre-Course	Post-Course	P value	Effect Size
Expectation and Fulfilment of Expectation	8 (6-10)	10 (8-10)	<0.001	-0.519
Current perceived overall confidence level about EFAST	5 (3-7)	8 (7-10)	<0.001	-0.844
Current perceived confidence on				
Ultrasound physics and knobology	4 (2-6)	8 (7-10)	<0.001	-0.950
Recognizing pericardial effusion	5 (2-7)	9 (7-10)	<0.001	-0.939
Recognizing intraperitoneal free fluid	5 (2-7)	9 (7-10)	<0.001	-0.936
Recognizing pelvic free fluid	4 (1-6)	8 (7-10)	<0.001	-0.922
Recognizing pleural free fluid / hemothorax	4 (2-7)	8 (7-10)	<0.001	-0.922
Recognizing pneumothorax	5 (2-7)	9 (7-10)	<0.001	-0.900
Recognizing IVC collapse	4 (1-6)	8 (6-9)	<0.001	-0.905

Participants' median (IQR) confidence in EFAST increased from **5** (3–7) to **8** (7–10) ($p < 0.001$, effect size: -0.844).

n = 771, Participants who completed pre & post-course surveys

Results – Qualitative Results

From the qualitative data**, 14 codes** were extracted, and **three themes** emerged based on these codes: Content Delivery and Engagement, Technical and Structural Improvements, Positive Learning Experience.

- **Content Delivery and Engagement**
- **Technical and Structural Improvements**
- **Positive Learning Experience**

n = 220, of 938 participants who completed post-course survey.

Results – QL Results – Content Delivery and Engagement

Participants emphasized the need for enhanced content delivery and engagement, with more videos, showcasing abnormal cases and interactive practical scenarios, clinical case quizzes

n = 220, of 938 participants who completed post-course survey.

"***Interactive quizzes with clinical cases would improve the learning experience.***"
A participant from Mexico.

"***Make a hands-on assessment through a video clip that the student can record a short clip about the assessment and share a link with you so you can assess the practical side and operative capabilities of the trainees and also open a portal so the trainers can share interesting cases they diagnosed. Thank you for this amazing course I learned a lot.***"
A participant from USA.

Results – QL Results – Tech. & Structural Improvements

Several respondents found some videos too short or lacking in clarity, requesting longer, higher-quality videos with clearer labelling to aid comprehension. Reducing redundant quizzes and focusing more on critical concepts.

n = 220, of 938 participants who completed post-course survey.

"***Improve video quality and include proper labelling of structures in all the videos.***"

A participant from India.

"***The Pneumothorax and the IVC parts are not as in depth as the rest of the exam's explanation. More videos, like split screen, in one side we see the sonographer manipulate the transducer, the other side a real time image of the ultrasound.***"

A participant from Algeria.

Results – QL Results – Positive Learning Experience

it was helpful, well-structured, and effective in enhancing their knowledge and skills. Many emphasized that the course content was easy to understand and well-organized, contributing to their confidence in applying the EFAST concepts in practice.

n = 220, of 938 participants who completed post-course survey.

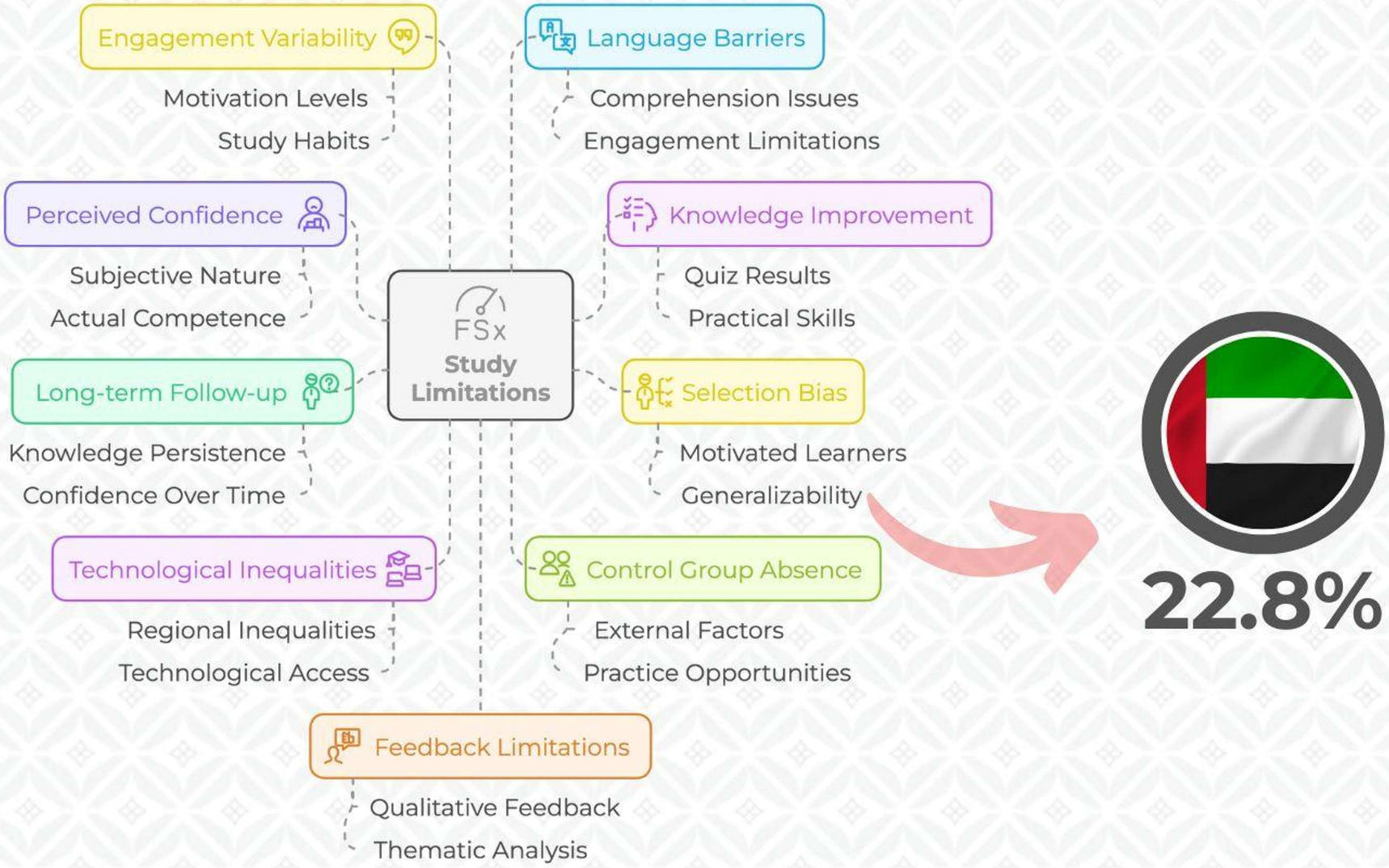
"***The course has been awesome! I have really understood it, and now I am confident about EFAST because it has given me ample knowledge.***"

A participant from Uganda.

"***I found it very helpful. I admire what you have prepared in this teaching sessions. I really appreciate the effort and willingness to share such easy-to-understand training. It has made my knowledge on EFAST go to another level, thanks.***"

A participant from Ethiopia.

Limitations



Conclusions

Efficient	VS	Lacking
Enhanced diagnostic skills		Lack of hands-on practice
Increased competence		Limited clinical reinforcement
Improved motivation		Potential for reduced engagement
Geographical accessibility		Dependence on technology
Resource-efficient		Need for hybrid models

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