Tele-ECHO for Point-of-Care Ultrasound in Rural Kenya: A Feasibility Study
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ABSTRACT

BACKGROUND: Geographical isolation limits continuous point-of-care ultrasound (PoCUS) education for healthcare providers in rural Kenya. This study evaluates the use of the Project ECHO (Extension for Community Healthcare Outcomes) videoconference platform to connect healthcare providers in rural Kenya with PoCUS trainers at Brown University.

METHODS: Twelve PoCUS trainees from 11 clinics were included in the study. Every week, trainees participated in a 2-hour Tele-ECHO session via Zoom. Attendance was logged onto iECHO. A Qualtrics survey was used to collect participant feedback.

RESULTS: Trainees faced difficulty with computer-based Wi-Fi connection and mostly used smartphone-based Internet. Whatsapp messaging was preferable to email for Tele-ECHO notifications. Work obligations kept some trainees from participating. The majority of participating trainees felt that the didactic material was relevant to their practice.

CONCLUSION: Telementoring through Project ECHO was found to be an acceptable adjunct to PoCUS training for rural trainees. Internet access was primarily smartphone-based.

KEYWORDS: ultrasound, Tele-ECHO, training, rural, Kenya

BACKGROUND

The use of point-of-care ultrasound (PoCUS) benefits patient screening, accuracy of diagnosis and management for a wide range of indications in low- and middle-income countries (LMICs). Several studies examining patient outcomes in low-resource settings revealed ultrasound findings made significant contributions to treatment plans in medical, surgical and obstetric care specialties. Evidence of the advantages of PoCUS as well as improvements in cost and ease of use has contributed to growing interest in applications for ultrasound services in LMICs. However, challenges in training and poor access to ultrasound machines persist around the world. In a survey of health care professionals in LMICs in 2015, providers identified lack of training, insufficient access to equipment and inadequate maintenance as the most significant barriers to ultrasound use. Additional issues include the lack of robust frameworks for image review and feedback largely due to poor infrastructure and limited Internet connectivity.

Different telemedicine and teleradiology platforms have been employed to bridge the gap between providers in remote areas and specialists at teaching institutions. International telehealth services reveal significant improvements to quality of patient care, patient diagnosis, and cost.

While telemedicine programs provide direct patient care, telementoring services train health care providers who can then provide these services locally with the benefit of building local capacity. Education-oriented telementoring programs contribute to improved access to specialty care. For example, telementoring programs were shown to be a feasible and effective option for training health care providers in low-resource settings in Guatemala.

For ultrasound instruction specifically, several studies have demonstrated that remote training programs offer a viable option. Telementoring services that expand ultrasound training have been shown to improve provider knowledge and specificity of differential diagnoses. A pilot study revealed beginner ultrasound users were able to identify an ejection fraction after telementoring training through Google Glass technology. Telementoring is a useful supplement to PoCUS training programs in resource poor areas because it enables specialists to provide remote support, education and feedback to their trainees. It also allows for continued training without requiring trainees to leave their already under-resourced facilities for extended training in an academic center.

In 2013, a point-of-care ultrasound (PoCUS) training program was developed to train rural Kenyan providers on point of care ultrasound applications, including the Extended Focused Assessment with Sonography for Trauma (E-FAST), thoracic ultrasound, basic ECHOCardiography and focused obstetric ultrasonography. This program was coupled with ultrasound machine donation. Based on feedback from trainees, the main barriers that impede routine use of PoCUS include lack of guidance while scanning at their facilities, lack of frequent feedback on their scans and limited interaction with trainers outside of the scheduled sessions 3 times.
a year. Therefore, the goal of this pilot study was to explore the utility and acceptability of Project ECHO as a telementoring platform to connect POCUS trainees in rural Kenya with trainers from Brown University for the purpose of continued education and feedback.

PROJECT ECHO
Project ECHO (Extension for Community Healthcare Outcomes) is a telementoring platform developed with the primary aim of providing continuous medical education, guided practice and capacity building by connecting specialists to health care providers working in remote low resource areas. It is distinct from telemedicine in that the focus is not on virtual patient care, but on developing local experts who can then provide high quality care at their own institutions. The platform uses a ‘Hub’ and ‘Spoke’ model whereby specialists or experts at the Hub and community-based health care providers at several spoke sites schedule regular Tele-ECHO clinics through video conferencing. Providers present patient cases and ask questions about best practices. Experts provide advice and mentorship, supplemented with didactics and demonstration of skills and modeling. Project ECHO has inbuilt tools that allow for program evaluation at every stage of implementation, making it particularly well suited for this project.

METHODS
We assessed the utility and acceptability of the Tele-ECHO clinic sessions among POCUS trainees in rural Kenya. Twelve trainees from 11 clinics (Figure 1) were included in the study. Trainees were medical officers (medical school graduates who have also finished 1 year of internship), clinical officers (graduates from a 3-year clinical medicine diploma program), nurses, and radiographers. These trainees were among a cohort that had received prior POCUS training, and had a donated ultrasound machine for use at their health care facility. The study participants received funds to purchase 3G-network access through their smartphones. Training sessions took place once a week from June 22 through August 18, 2018. Every week, participants received a link to log on for a 2-hour Tele-ECHO session via Zoom. Topics covered included: E-FAST for trauma, establishing intra-uterine pregnancy, diagnosing ectopic pregnancy, 2nd and 3rd trimester dating, establishing presentation, placental location, and fetal heart rate. Attendance was logged onto iECHO (an in-built tracking feature within the project ECHO platform).

A Qualtrics survey was sent to participants via Whatsapp on July 31, 2018 after 6 weeks of training sessions to collect participant feedback. The survey included 7 multiple-choice questions regarding their perception of the training sessions, with the option to fill in additional comments. Participants were asked about quality of the teaching sessions, Internet quality, relevance of training content, and barriers to participation.

RESULTS
Of the 12 trainees, 50% participated in the survey including 2 clinical officers, 2 radiographers, 1 medical officer and 1 nurse. The majority of participants in the survey felt the didactic material was valuable and well presented. Among
participants in the survey, 83% selected they Strongly agree the material was relevant to their practice. All participants selected Agree or Strongly agree that the cases were relevant and 83% selected they Strongly agree the material was clear and well presented. When asked if the sessions increased their confidence in ultrasound scanning, 66% replied Strongly agree or Agree. Participants primary concerns were related to their ability to participate in the Tele-ECHO sessions. Three participants endorsed poor Internet connection, and 66% reported their work schedule prevented them from attending the entire session at times.

As most trainees experienced technical difficulties accessing the Internet through their work computers, smartphone-based Internet access was found to be superior. All our trainees had their own smartphones, but they required financial support to purchase Internet bundles that would allow them to participate in 2-hour Tele-ECHO sessions every week. Zoom was selected as the videoconference platform as it performs well in low bandwidth settings. Whatsapp messaging was preferable to email for the purpose of sending Tele-ECHO notifications and for scheduling sessions.

DISCUSSION

The results of the Qualtrics survey suggest telementoring through Project ECHO is an acceptable adjunct to prior PoCUS training for rural health care providers. Our trainees were willing to participate, and felt the material presented was not only relevant to their practice but also helped them improve their confidence in ultrasound scanning. These findings are consistent with various studies that have examined the feasibility and efficacy of Tele-ECHO training programs in health care. A study on a Tele-ECHO training program in India regarding oral cancer screening and smoking cessation revealed significant knowledge gain among health care providers. These studies support our findings that telementoring is feasible using smartphones. However, Internet access through these phones can be cost prohibitive, and future telementoring programs should keep this in mind. Health care facilities should be encouraged to release trainees from clinical duties so they can participate in telementoring sessions. Future research is recommended to examine specific areas of knowledge gain to continue to improve training programs for participants.

CONCLUSION

This feasibility study found that telementoring is an acceptable adjunct to established PoCUS training programs in rural Kenya. Participants found the content to be relevant and helpful to their practice. Videoconferencing via Zoom is feasible using smartphones. However, Internet access through these phones can be cost prohibitive, and future telementoring programs should keep this in mind. Health care facilities should be encouraged to release trainees from clinical duties so they can participate in telementoring sessions. Future research is recommended to examine specific areas of knowledge gain to continue to improve training programs for participants.

References


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