

Original Research

An Exploration of the Perceptions of Radiology Professionals towards Point of Care Ultrasound Training for Non-Radiology Health Care Providers

Aloysius G. Mubuuke, PhD^{*}; Francis Businge, MSc

Department of Radiology, School of Medicine, Makerere University, P. O. Box 7072, Kampala, Uganda

^{*}Corresponding author

Aloysius G. Mubuuke, PhD

Department of Radiology, School of Medicine, Makerere University, P. O. Box 7072, Kampala, Uganda; Tel. +256772616788; E-mail: gmubuuke@gmail.com

Article information

Received: January 24th, 2020; Revised: February 18th, 2020; Accepted: February 24th, 2020; Published: February 27th, 2020

Cite this article

Mubuuke AG, Businge F. An exploration of the perceptions of radiology professionals towards point of care ultrasound training for non-radiology health care providers. *Radiol Open J.* 2020; 4(1): 16-20. doi: [10.17140/ROJ-4-126](https://doi.org/10.17140/ROJ-4-126)

ABSTRACT

Introduction

Point of care ultrasound (POCUS) has been adopted across many countries as a way of addressing the human resource gap of radiologists and sonographers. It involves providing basic and focused ultrasound skills to non-radiology health care providers to enhance their routine clinical work.

Objective

The purpose of this study was to explore the perceptions of radiology professionals about POCUS training.

Methods

The study was qualitative, involving radiologists and sonographers who perform ultrasound examinations. Purposive sampling was used to select the participants. Purposive sampling is a type of sampling where participants are selected because they have the knowledge and experience needed to answer the research objective. Focus group discussions and individual interviews were used to collect data and thematic analysis employed.

Results

Participants generally held negative perceptions towards POCUS training. These were reflected in four major themes: 1) Absence of standardized training curriculum; 2) Limited consultations with radiology professionals; 3) Fear of loss of professional identity and 4) Challenges with POCUS training.

Conclusion

The participants felt negatively about POCUS training. For future acceptability, we recommend involvement of radiology professionals in designing a POCUS curriculum as well as having a regulatory mechanism for monitoring the trainees.

Keywords

Point of care ultrasound (POCUS); Training; Perceptions; Radiology professionals.

INTRODUCTION

Point of care ultrasound (POCUS) has been adopted across the globe to address the human resource gap in areas where radiology professionals (radiologists and sonographers) cannot easily be accessed.^{1,2} POCUS is aimed at equipping non-radiology professionals such as nurses, mid-wives, clinical officers and doctors with basic ultrasound skills to enable them perform their routine clinical tasks. It is thus used as a tool to aid routine standard of clinical care. The non-radiology professionals that have undergone

point of care ultrasound training are ideally not expected to write comprehensive radiological reports, but rather the ultrasound skills gained just assist them to make instant clinical decisions at their point of work. The comprehensive ultrasound investigations remain the domain of qualified radiologists and sonographers.

The less developed countries still have challenges in delivering adequate care to their populations. It has been reported that many people in such countries still lack access to basic ultrasound services.^{1,2} However, ultrasound plays an important role as

a diagnostic tool across all countries. This is because it is relatively affordable, portable and uses non-ionizing radiation. Previous studies have reported the utility of ultrasound in medical, surgical, and obstetric care settings.^{3,4} As part of the routine antenatal care, many women are now required to at least undergo an obstetric ultrasound scan during their pregnancy as it has the potential to identify high-risk pregnancies and pregnancy-related complications. However, many countries still face the challenge of having few radiologists and sonographers who are specially trained to perform ultrasound scans. In many rural areas for example, there are no radiologists/sonographers at all, leaving these areas devoid of qualified professionals to perform the ultrasound scan examinations.

One way that has been suggested is to have role extension, where non-radiology health professionals are equipped with basic skills to perform emergency ultrasound scans during routine clinical care. As a result of the importance of the significant clinical role of ultrasound in diagnosis, POCUS training programs have been initiated especially in less developed countries in order to equip non-radiology health workers with basic skills to perform emergency ultrasound scans.¹ POCUS training programs have been introduced in many areas across the globe with some level of success.⁵⁻⁷ For example, Kenya commenced POCUS training in 2013 having realized that radiologists and sonographers were scarce in many rural based health facilities.⁸ Health care in such rural health facilities was being provided by clinical officers (mid-level providers with a diploma in clinical medicine), nurses/mid-wives, and community workers. These health workers were equipped with skills to perform basic ultrasound applications.⁸ Similar POCUS training programmes have been reported elsewhere.⁹⁻¹⁵

In Uganda, where this study was conducted, maternal mortality due to pregnancy-related complications remains high especially in rural communities. Some of these pregnancy-related complications can be detected early during obstetric ultrasound and timely management effected. The government has equipped many lower level health facilities with basic ultrasound equipment. However, despite these efforts, the lack of skilled workers to utilize this equipment and provide the much-needed basic service is frustrating government's efforts, thus still having women die due to undetected, but avoidable pregnancy-related complications. There are few professionally trained health workers (radiologists and sonographers) that can ably perform obstetric ultrasound and the few who are trained only remain in the more lucrative private hospitals and large public hospitals in the urban centres. Thus, women in rural communities continue to die from pregnancy-related complications that are often not detected early enough using ultrasound. In order to address the human resource gap POCUS training for non-imaging professionals has been suggested. However, there is still concern especially among the radiology fraternity about this POCUS training. At the same time, there is a dearth of published literature about the perceptions of radiology professionals towards such point of care ultrasound training programs. Therefore, the purpose of this study was to explore the perceptions of radiology professionals towards point of care ultrasound training to non-radiology health professionals. It is hoped that findings from the study can further inform the design and implementation of such

programs not only in Uganda, but also in other countries.

METHODS

Design

It was an exploratory qualitative study conducted within the Department of Radiology of Mulago National Referral Hospital in Uganda.

Participants

The study included radiologists and sonographers. Purposive sampling was used to select the participants. Purposive sampling is a type of sampling where participants are selected because they possess knowledge and experience about the study subject that is required to address the study objective. Fifteen (15) sonographers and 5 radiologists were selected to participate in this study. The final number of participants was determined at the point of data saturation.

Data Collection and Analysis

Focus group discussions (FGDs) and structured individual interviews were used to collect data. Three FGDs were conducted with the sonographers, each group having 5 participants and 5 interviews were conducted with the radiologists. It was not possible to conduct FGDs with the radiologists due to their busy schedule. Responses from the FGDs and interviews were audio-recorded and thereafter transcribed verbatim. Thematic analysis was employed. This was done through a process of open coding. Coding commenced immediately after the first focus group discussion and immediately after the first interview.

Ethical Issues

Approval to conduct this study was granted by the Mulago Hospital Ethics Committee and participants provided written informed consent prior to enrolling into the study. Confidentiality of the participant responses and transcripts was ensured. The transcripts were kept by the researcher and locked in a safe. Electronic information was secured with a password only known to the researcher.

RESULTS

The study recruited 20 participants of whom 15 were Sonographers and 5 were radiologists. Of the 20 participants, 7 were female and the rest were male. All participants were actively involved in providing ultrasound clinical services in the radiology department of Mulago Hospital. Table 1 summarizes the major themes that emerged.

Theme I: Absence of a Standardized Training Curriculum

All participants in this study expressed concern with the haphazard manner in which the POCUS training has been happening in Uganda. They reported that there is no specific curriculum that is followed and that all people involved in this training have been

Table 1. Themes and Related Key Issues that Emerged	
Theme	Key Issues
Absence of standardized training curriculum	<ul style="list-style-type: none"> • Lack of guiding training curriculum • No stipulated duration of training • No clear expected competencies/Outcomes • Lack of assessment/evaluation methods
Limited consultations with radiology professionals	<ul style="list-style-type: none"> • Radiologists not consulted • Sonographers not consulted • No involvement of radiology associations • Unclear roles of radiology professionals
Fear of loss of professional identity	<ul style="list-style-type: none"> • Loss of professional territory • Dilution of the professions • Unlimited opening up to other staff
Challenges with POCUS training	<ul style="list-style-type: none"> • No regulatory framework for trainees • No supervisory framework • Fear of going beyond real competency • Misuse of ultrasound services • Risks to patients • Possible law suits

suggesting to use training curricular got from outside the country yet the context of Uganda is quite unique. The following responses represented this feeling.

“There is no curriculum that is followed in this kind of training.....how far can one go with the training and what competencies are going to be taught. There is need to clearly define competencies that a nurse for example will be required to demonstrate before rolling out such training.”

“One mistake that is being done is to train with imported training documents. We have unique challenges and one cannot just adopt training materials from abroad.....what level of ultrasound will a nurse do, a doctor do, a mid-wife do or a clinical officer do? These people require different skills and you cannot just bundle them altogether.”

The importance of having a training curriculum was also reflected in the duration of training as can be seen from the following response:

“I have heard some people proposing 2-week training. Surely what can one learn in 2-weeks and call themselves competent.”

The above responses point to the need of first defining competencies for each cadre of targeted staff and having a guiding document in form of a curriculum that can be followed.

Theme 2: Limited Consultations with Radiology Professionals

The responses from both FGDs and interviews generally reflected ignorance of starting point of care ultrasound training to non-radiology health workers in Uganda. All participants reported that they never received any invitations consulting them about the POCUS training. This ignorance can be seen through the following responses:

“We would expect that if POCUS is good and with no ill-intentions, stakeholders need to be consulted. As radiology professionals who struggled to take on lengthy training in ultrasound, we are not being consulted regarding this at least to the best of my knowledge.”

“.... before starting this kind of training, we all need to be consulted through our regulatory bodies and associations. This has not been and I highly doubt this can work without such consultations taking place.....a few individuals should stop thinking that they will gain from this and bring everyone on board if we are to support it.”

From these responses, it can be seen clearly that the trained people who perform ultrasound services need to be consulted before taking on such role-extension to other groups of health workers.

Theme 3: Fear of Loss of Professional Identity

The fear to lose professional identity and uniqueness was a common thread through the discussions and interviews. The common denominator in almost all participant responses was that radiology is being sold to other health cadres and that the discipline is slowly being infiltrated thus the traditional radiology trained health care workers (i.e. radiologists and sonographers) are likely to slowly lose their identity and territory. The following responses can reflect this:

“If we let other people invade the radiology professions and especially ultrasound, we shall lose relevance since employers will be at liberty to employ a nurse for example who can also do ultrasound.”

“Every profession must protect its boundaries.....I doubt if it is possible at all for the surgeons for example to allow me train for 2-weeks and start doing hernia repairs...they will all be up arms. Unfortunately, this POCUS business is meant to water down ultrasound services such that anybody can do it.....this means we are soon becoming jobless.”

One can infer from the above responses that there is inherent fear for radiologists and sonographers when other people try to invade their professional territory. POCUS training is thus viewed as a means meant to open up the professions to many other non-radiology health care workers.

Theme 4: Challenges with POCUS Training

This was also a major theme with participants pointing out signifi-

cant challenges with the proposed POCUS training. Key among these were; a lack of a regulatory and supervisory framework for other cadres trained in point of care ultrasound, lack of well-defined competencies expected of the POCUS trainees, limited control of the extent to which the POCUS trainees can practice thus exceeding their competency and bringing danger to patients. These challenges can be sieved through the following responses:

“The question of which regulatory body will be regulating and supervising nurses and doctors while they are doing ultrasound is not yet resolved. This thus leaves these people to practice ultrasound without regulating them and this is dangerous.”

“The problem is that no one will control these people. Even if you train them with some basics, they will go out there and practice ultrasound scanning each and every body part presented simply because it is profitable.... this is dangerous to both the profession and human life. I foresee people diagnosing non-existent pathologies and subjecting patients to real danger including death.”

“The issue of commercialization of health care. Ultrasound is now everywhere and if you release quarter baked people into society to practice ultrasound, it is our profession that suffers. The truth is that these people will practice beyond what they can handle simply because the patient pay.”

There were some suggestions that resonated through the responses that could guide in implementing such POCUS training.

“I think POCUS training is every well intentioned. However, lets first sort out issues of defining clearly what these people are expected to do and how they are going to be regulated.”

“We all need to be consulted because we are stakeholders in this profession, so we cannot let it crumble. It is not that we are against POCUS training, in fact it is good. However, we should go through the right channels of doing it instead of rushing it. First do a small pilot study to assess its feasibility and then sort out the training curriculum with all of us involved because at the end of the day, these trainees will be referring to us already messed up patients. Let's also be sure how they will be regulated not to practice beyond what they have been trained to do.”

DISCUSSION

The purpose of this study was to explore perceptions of radiology professionals (radiologists and sonographers) towards point of care ultrasound training for non-radiology health care providers. Findings from the responses generally reflect negative perceptions towards POCUS training that targets non-radiology professionals such as nurses, physicians, mid-wives and clinical officers. This kind of negativity has been previously reported.^{14,15} From this study, there seems to be fear among the radiologists and sonographers that their territory is being invaded by cadres in the health care system and as such may lose their own professional identity and their roles in the healthcare team. POCUS training for non-radiology professionals has been previously reported with some level of success.^{4,8} Many of these studies have also reported good receptivity of this kind of training among the radiology profes-

sionals. In this study, POCUS training was generally received with negativity. Closely interrogating reasons as to why POCUS training received such negativity among participants in this study points to a number of them.

First, the lack of clearly well-defined ultrasound competencies for the different cadres of health workers was a concern. For example, the ultrasound skills needed by a nurse or mid-wife may quite differ from those skills needed by a clinical officer or medical officer and thus cannot be trained together due to this. It would be plausible to first clearly define ultrasound competencies needed by each cadre of health worker in order to perform their routine clinical work. Defining these competencies thus drives the designing of the curriculum including the duration needed to impart such skills.

The idea of simply adopting POCUS training curricular from elsewhere needs to be revisited. Different countries have different contexts as well as resources for training. For example, a 2-week POCUS training course may be adequate in Europe due to availability of equipment and protected time. However, it might not be adequate in the context of a less developed country with inferior and limited equipment as well as limited human resource capacity. Therefore, the curricular need to be adapted and contextualized to each individual country. This observation has been emphasized in previous literature.⁸ In relation to this, there is need to involve local stakeholders from the design to implementation of the POCUS curriculum. The radiologists and sonographers are important stakeholders in this process because they will be called upon to supervise the trained nurses or mid-wives. Stakeholder involvement is more likely to lead to acceptance and collaboration.

An important finding from this study related to supervision and regulation of the trained nurses, mid-wives or clinical officers. It is expected that the people that have undergone POCUS training will not write reports, but rather utilize the skills gained to enhance their normal clinical work. However, it is also a challenge to ensure that these trained people actually stick to their boundary and prevent possible litigation due to practising beyond their competency, an observation that has been reported elsewhere.¹⁴ Herein lies the fear of the radiology professionals. In the current POCUS training environment, there is no regulatory and supervisory framework to follow-up the trainees and to ensure that they do what they are mandated to do. It is thus advisable that the current supervisory mechanisms come together to map out ways in which such trainees will be supervised. The fear that such people can be a danger to patients as expressed by participants in this study needs to be taken seriously. With the commercialization of ultrasound services, it is easy for anybody with basic skills to start scanning patients including conditions beyond their own competency. Therefore, before POCUS training can start, the issue of regulation needs to be looked into.

It is however interesting to note that the radiologists and sonographers who participated in this study seemed to be in support of POCUS training and role extension of some ultrasound skills to non-radiology health care providers to enhance their clini-

cal work. This is a good entry point to start with. The point of concern thus appears to be the undefined scope of practice, absence of a curriculum with well-defined competencies for each cadre of staff, absence of a regulatory and supervisory framework as well as limited involvement of the radiology professionals as key stakeholders. It is advisable that these people get involved in discussions and that all these aspects need to be looked into if POCUS training is to be acceptable in this setting. Specifically, a training curriculum contextualized to a particular setting and to a particular cadre of health worker needs to be developed with adequate time given to master the skills. This coupled with the fact that having a regulatory mechanism in place were strongly reflected in the participant responses, policy makers need to look into these. The fear of invading the radiology professional territory also needs to be addressed by for example benchmarking in other areas where POCUS has been successful. One would think that this only requires a mindset change. However, more research is needed to fully ascertain this. This being a purely qualitative study conducted in one setting limits the generalizability of the findings. However, the study still provides useful insights and stimulates debate on the issue of POCUS training and role-extension of ultrasound skills to other non-radiology professionals. Insights from other settings would thus be a welcome addition to this discourse.

CONCLUSION

This study has shown that despite the fact that point of care ultrasound training for non-radiology professionals may be well intentioned, the radiologists and sonographers still have a negative perception towards it. This is mainly because it is seen as an invasion into their profession and there is no regulatory and supervisory framework to monitor the trained health workers. Acceptability in future is likely to be achieved through involvement of radiologists and sonographers in the process and having a regulatory mechanism for the trainees in place.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

REFERENCES

1. LaGrone LN, Sadasivam V, Kushner AL, Groen RS. A review of training opportunities for ultrasonography in low- and middle-income countries. *Trop Med Int Health*. 2012; 17(7): 808-819. doi: 10.1111/j.1365-3156.2012.03014.x
2. Mindel S. Role of imager in developing world. *Lancet*. 1997; 350(9075): 426-429. doi: 10.1016/S0140-6736(97)03340-0
3. Kotlyar S, Moore CL. Assessing the utility of ultrasound in Liberia. *J Emerg Trauma Shock*. 2008; 1(1): 10-14. doi: 10.4103/0974-2700.41785
4. Henwood PC, Mackenzie DC, Rempell JS, et al. A practical guide to self-sustaining point-of-care ultrasound education programs in resource-limited settings. *Ann Emerg Med*. 2014; 64(3): 277-283.e2. doi: 10.1016/j.annemergmed.2014.04.013
5. Ferraioli GM, Meloni F. Sonographic training program at a district hospital in a developing country: Work in progress. *AJR Am J Roentgenol*. 2007;189(3): W119-W122.
6. Shah S, Noble VE, Umulisa I, et al. Development of an ultrasound training curriculum in a limited resource international setting: Successes and challenges of ultrasound training in rural Rwanda. *Int J Emerg Med*. 2008; 1(3): 193-196. doi: 10.1007/s12245-008-0053-z
7. Adler D, Mgalula K, Price D, Taylor O. Introduction of a portable ultrasound unit into the health services of the Lugufu refugee camp, Kigoma District, Tanzania. *Int J Emerg Med*. 2008; 1(4): 261-266. doi: 10.1007/s12245-008-0074-7
8. Bell G, Wachira B, Denning G. A pilot training program for point-of-care ultrasound in Kenya. *Afr J Emerg Med*. 2016; 6: 132-137. doi: 10.1016/j.afjem.2016.03.002
9. Moore CL, Copel JA. Point of care ultrasonography. *N Engl J Med*. 2011; 364(8): 749-757. doi: 10.1056/NEJMr0909487
10. Craig S, Egerton-Warbutton D, Mellet T. Ultrasound use in Australasian emergency departments: A survey of the Australasian College for Emergency Medicine Fellows and Trainees. *Emerg Med Australas*. 2014; 26(3): 268-273. doi: 10.1111/1742-6723.12231
11. Soni NJ, Lucas BP. Diagnostic point of care ultrasound for hospitalists. *J Hosp Med*. 2015; 10(2): 120-214. doi: 10.1002/jhm.2285
12. Buerger AM, Clark KR. Point-of-care ultrasound: A trend in health care. *Radiol Technol*. 2017; 89(2): 127-138.
13. Stolz L, O'Brien KM, Miller ML, Winters-Brown ND, Blaivas M, Adhikari S. A review of lawsuits related to point-of-care emergency ultrasound applications. *West J Emerg Med*. 2015; 16(1): 1-4. doi: 10.5811/westjem.2014.11.23592
14. Nguyen J, Cascione M, Noori S. Analysis of lawsuits related to point-of-care ultrasonography in neonatology and pediatric subspecialties. *J Perinatol*. 2016; 36(9): 784-786. doi: 10.1038/jp.2016.66
15. Poon WB, Wong KY. Neonatologist-performed point-of-care functional echocardiography in the neonatal intensive care unit. *Singapore Med J*. 2017; 58(5): 230-233. doi: 10.11622/smedj.2017036