



JEMTAC

Journal of Emergency Medicine
Trauma & Acute Care

A PEER REVIEWED JOURNAL

OPEN ACCESS

Research article

Physician's perspective on point-of-care ultrasound: Experience at a tertiary care emergency department in Qatar

Khalid Bashir*, Sohaib Chaudhry, Israr Bashir, Peter Cameron

Emergency Department, Hamad General Hospital, Hamad Medical Corporation, Doha, Qatar

*Email: khalidbashir1@btinternet.com

ABSTRACT

Background: Point-of-care ultrasound (POCUS) is an invaluable tool in the diagnosis and management of conditions presenting to emergency departments across the world. It has also improved the success rate of invasive bedside procedures.

Objectives: This study aimed to investigate the current utilization of POCUS in a large tertiary care emergency department in the Middle East and to identify barriers to its utilization.

Methods: A cross-sectional survey of emergency physicians' experience with ultrasound was conducted, which included examining the training, exposure, and barriers to use. This paper-based survey was completed by the participants in the presence of the authors of this study to improve compliance. Data were collected over a period of two months, from October to November 2014.

Results: A total of 105 physicians participated in the survey. Of these participants, 56 had undergone prior training in ultrasonography by successfully completing courses approved by the Royal College of Emergency Medicine in the United Kingdom, and the Royal College of Physicians and Surgeons of Canada. Twenty-two physicians had completed other non-accredited ultrasound courses. An improvement in ultrasound procedural skills was reported by all those who completed training. A perceived lack of time in the emergency department was the main barrier to scanning patients. Other shortcomings included a deficiency of trained personnel for guidance, shortage of equipment, and a lack of experience and interest among physicians. Hands-on training was considered the preferred method among physicians for enhancing ultrasonography skills.

Conclusions: The study identified an underutilization of POCUS by emergency physicians. Availability of dedicated time, equipment, supervision, and training may help to increase its usage.

Keywords: Point-of-care ultrasonography, emergency department, utilization, physicians, training

<http://dx.doi.org/10.5339/jemtac.2016.9>

Submitted: 14 November 2015

Accepted: 18 July 2016

© 2016 Bashir, Chaudhry, Bashir, Cameron, licensee HBKU Press. This is an open access article distributed under the terms of the Creative Commons Attribution license CC BY 4.0, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.



An Initiative of Qatar Foundation

Cite this article as: Bashir K, Chaudhry S, Bashir I, Cameron P. Physician's perspective on point-of-care ultrasound: Experience at a tertiary care emergency department in Qatar, *Journal of Emergency Medicine, Trauma & Acute Care* 2016;9 <http://dx.doi.org/10.5339/jemtac.2016.9>

INTRODUCTION

Point-of-care ultrasound (POCUS) is used by physicians for diagnostic or therapeutic purposes. POCUS has enhanced the clinical judgment of emergency physicians in situations posing a significant diagnostic challenge. Emergency physicians and physicians in other specialties frequently perform POCUS, and its diagnostic accuracy may be considered superior to physical examination.^{1,2}

Point-of-care ultrasound also facilitates invasive bedside procedures, which can now be performed with higher precision and accuracy. Studies have shown a decreased incidence of complications encountered with central venous catheter placement performed under ultrasound guidance as it improves patient safety and reduces associated healthcare costs.^{3,4} Additionally, there has been a significant reduction in the time required for the early disposition of unstable patients by facilitation of early diagnosis and intervention using POCUS. Until quite recently, radiologists had to be involved in the care of all such patients, which led to unnecessary delays in the provision of life-saving interventions.⁵

Most emergency medicine training programs across the world have incorporated POCUS in their curriculum. Although there has been a rapid increase in the availability of bedside ultrasound machines in emergency departments, it still remains underutilized in emergency situations.^{5,6}

Point-of-care ultrasound has now emerged as a favorite tool for diagnosis and treatment in the emergency department (ED). Most developed countries, in particular the USA, have established guidelines for ultrasound training during undergraduate medical education, residency, and fellowship training. Robust quality assurance processes are also in place for education, training, and credentialing in many centers. Some publications discuss the barriers to utilization of POCUS in the ED, most of these are from the USA.^{7,8} In order to develop national standards of ultrasound training for physicians in Qatar, we must first understand current practices and attitudes. To the best of our knowledge, there is no such data available from Qatar.

The aim of this study was to identify the barriers to the use of POCUS in our ED and to develop strategies for improving utilization by physicians. Moreover, we sought to explore their current level of training and interest in developing this skill.

METHODS

A questionnaire survey (Appendix A) of emergency physicians (residents, specialists, and consultants), working at the Emergency Department of Hamad General Hospital, the only tertiary care academic and teaching hospital in the State of Qatar, was conducted over a two-month period (October - November 2014). Approximately half a million patients visit this facility every year. A self-administered paper-based survey was distributed among the emergency physicians. The questionnaire was initially piloted and changes were incorporated before the final questionnaire was rolled out to study participants. The Ethics Committee of Hamad Medical Corporation approved this study and waived the requirement of a written informed consent. A convenient sample of participants was selected.

RESULTS

The questionnaire was sent to 120 participants. Of these, 105 physicians completed the survey, giving a response rate of 87%. Seventeen ($n = 17$) of the participants were residents with less than five years of ED experience, while 88 ($n = 88$) were specialists and consultants with over five years of ED experience. Of the study participants, 44.8% ($n = 47$) stated that they use ultrasonography less than five times a week and 5.7% ($n = 6$) reported that they do not scan at all in spite of taking courses in ultrasound (Table 1). Of the 105 physicians, 74% ($n = 78$) undertook courses in ultrasonography. The e-fast exam was perceived as the most technically difficult to perform and interpret (Figure 1).

Table 1. Weekly ultrasound scans performed by the emergency physicians.

Variables	Frequency
Scans per week	
None	6
Less than 5	47
Between 5 and 10	36
More than 10	16

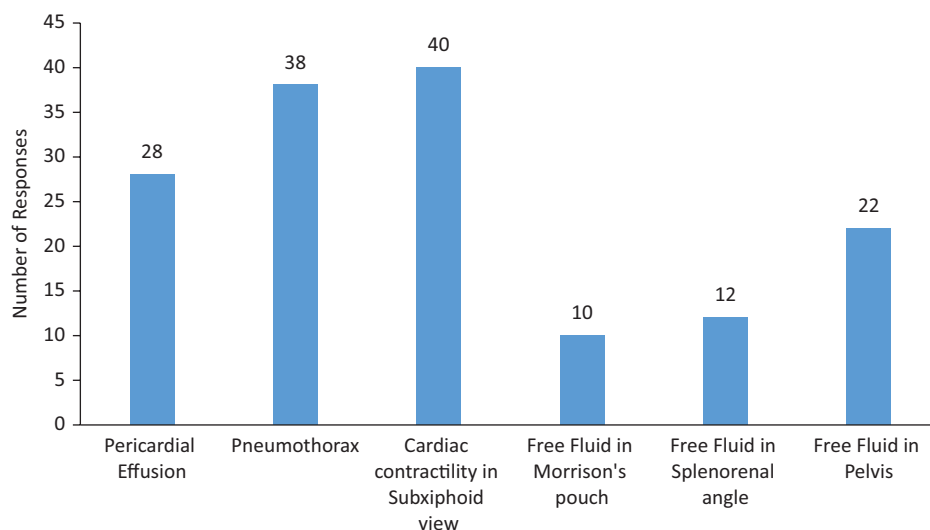


Figure 1. Level of perceived difficulty to perform POCUS for various conditions in the ED.

Point-of-care ultrasound for focused cardiac ($n = 40$) and lung ($n = 38$) conditions were perceived as the most difficult scans to perform. In our study, 74.3% ($n = 78$) of the participants agreed that they achieved a higher success rate for central venous access when guided by ultrasonography (Figure 2).

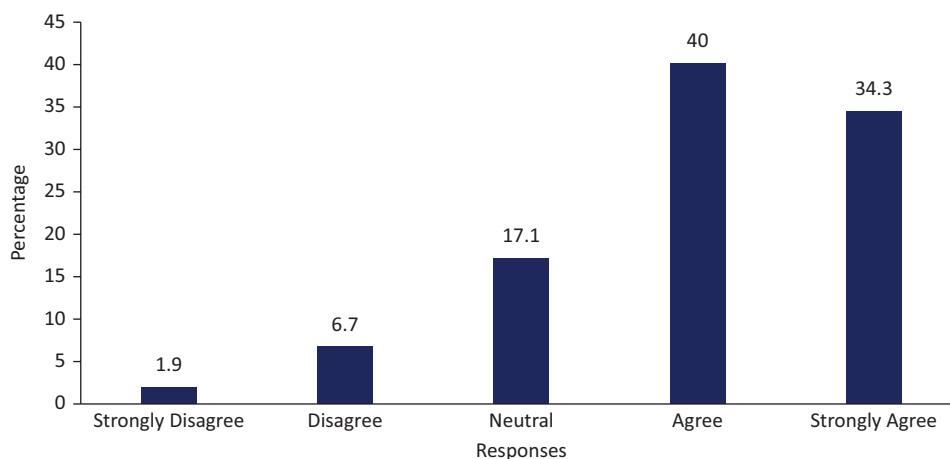


Figure 2. Enhanced success rate with central line insertion after using POCUS.

The perceived obstacles specified by the participants are shown in Figure 3. Of the physicians, 65 specified perceived lack of time in the ED as the primary barrier to scanning; 38 attributed this to lack of trained personnel; 34 stated the lack of ultrasound equipment as the cause for not resorting to this procedure in the ED; 32 identified a lack of experience as the reason for not performing ultrasound scans; and six felt a lack of interest was a hurdle to scanning. All physicians expressed their interest to further enhance their ultrasound skills through various learning methods (Figure 4), such as hands-on training ($n = 84$), bedside teaching ($n = 79$), use of videos ($n = 46$), and lectures ($n = 36$).

DISCUSSION

In the last decade, there has been a significant increase in interest in the use of POCUS in emergency departments across the world.⁹ Various credible organizations such as the American College of Emergency Physicians (ACEP), the American Institute of Ultrasound in Medicine (AIUM), the American Medical Association (AMA), and International Federation of Emergency Medicine (IFEM) have devised policies for the training and use of bedside ultrasound.^{10-12,13} Guidelines and curriculum have also

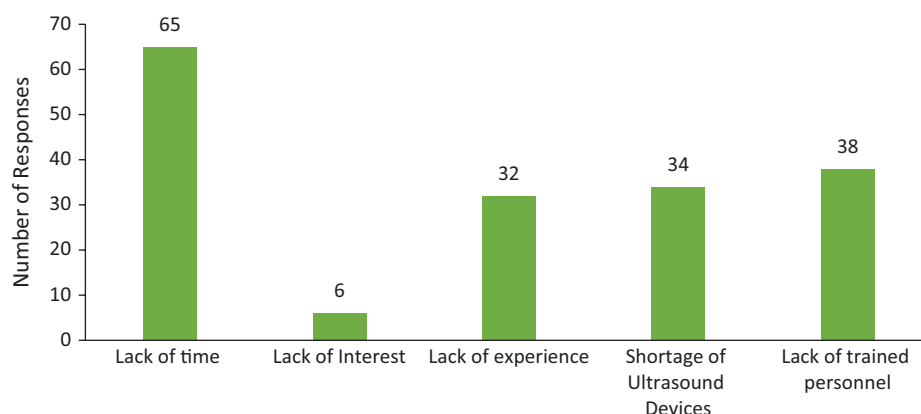


Figure 3. Perceived obstacles to POCUS use in the ED.

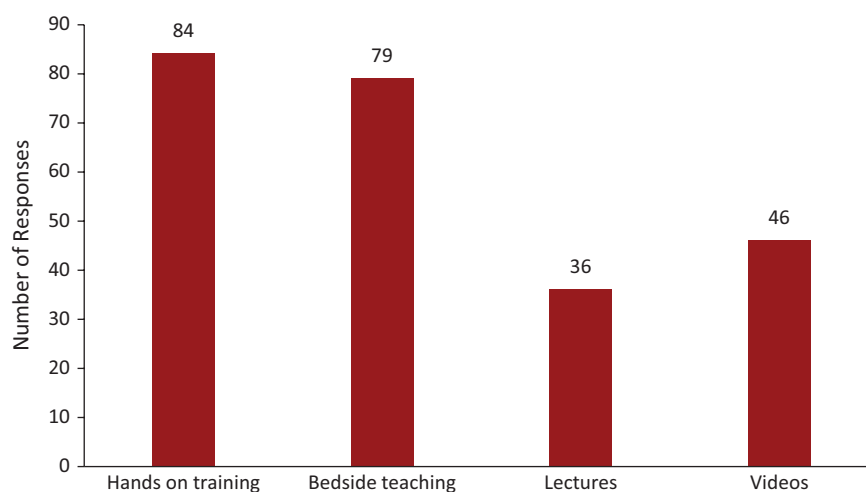


Figure 4. Learning methods to enhance POCUS skills.

been developed and are being included in many training programs.^{14,15} Acquiring ultrasonography skills has been made mandatory in many emergency medicine training programs. The Accreditation Council for Graduate Medical Education (ACGME) has made it a compulsory milestone in the assessment of trainees in emergency medicine.^{16,17} Outside the USA, there has been a slow uptake of ultrasound by emergency department physicians. One study reported that only 54% of the more experienced ED physicians were utilizing POCUS despite 24-hour availability of ultrasound machines. It was observed that non-users were mostly newly trained emergency physicians.¹⁸ In contrast, the non-users in our study were more experienced physicians. This could be attributed to the varied level of ultrasound training received by these physicians during their residency program outside of Qatar. All residents in our study had completed an approved course in POCUS.

Traditional obstacles to the widespread application of emergency ultrasound have been investigated previously. Most credible guidelines encourage a certain number of examinations to be undertaken by a physician to maintain skills, and this may be difficult to complete by a busy emergency physician.¹⁹ In our study, most physicians stated that they perform less than five scans per week. The busy nature of the ED and the deficiency of formal training in ultrasonography have been cited as reasons for the small number of bedside scans being performed by our study physicians. Given that most of the respondents were physicians trained from various parts of the world, there is a high need for the introduction of a local ultrasound course or IFEM POCUS training program, which is based on international guidelines already being practiced around the world.¹³

Various obstacles stated in our study could be overcome through the use of available technology. One way of learning POCUS is by reviewing images obtained from different cases. Given the number and diversity of cases presenting to our ED, we can use a large number of the images for educating

physicians. However, recording and saving of images for training purposes has been inconsistent, and currently there is no system in place to review these images. It is important to store these ultrasound images for quality control, educational, and medico-legal purposes. There is a local need to have a dedicated Emergency Ultrasound Director or an equivalent position to oversee the educational and quality improvement process. The American College of Emergency Physicians and the International Federation of Emergency Medicine have published guidelines on keeping skills up to date, and on ways to meet ultrasound quality assurance requirements.¹³

The strength of our study is that 87% of the physicians working in our ED responded to the questionnaire. A limitation is that this was a survey reflecting the perceived opinion of the individuals and therefore may not mirror actual practice.

CONCLUSION

Point-of-care ultrasound is an extended component of the clinical examination. Our survey identified lack of time, appropriate training, and availability of qualified personnel as obstacles to using POCUS. There is a need for improved training and quality assurance of POCUS in our emergency department. We foresee that our results will help to develop an emergency POCUS curriculum, training, and local credentialing for emergency physicians in Qatar.

Acknowledgements

We extend our gratitude to Dr Prem Chandra from the Medical Research Center at Hamad Medical Corporation for his assistance in analyzing the descriptive data and creating the graphs.

Conflicts of interest

There is no conflict of interest involved in this study. PC is a senior editor of JEMTAC.

REFERENCES

- [1] Solomon SD, Saldana F. Point-of-care ultrasound in medical education – stop listening and look. *N Engl J Med*. 2014;370(12):1083–1085.
- [2] Moore CL, Copel JA. Point-of-care ultrasonography. *N Engl J Med*. 2011;364:749–757.
- [3] Powell JT, Mink JT, Nomura JT, Levine BJ, Jasani N, Nichols WL, Reed J, Sierzynski PR. Ultrasound-guidance can reduce adverse events during femoral central venous cannulation. *J Emerg Med*. 2014;46(4):519–524.
- [4] Peabody CR, Mandavia D. Deep needle procedures: Improving safety with ultrasound visualization. *J Patient Saf*. 2014. DOI:10.1097/PTS.000000000000110.
- [5] Durston W, Carl ML, Guerra W. Patient satisfaction and diagnostic accuracy with ultrasound by emergency physicians. *Am J Emerg Med*. 1999;17(7):642–646.
- [6] Bobbia X, Hansel N, Muller L, Claret PG, Moreau A, Genre Grandpierre R, Chenaitia H, Lefrant JY, de La Coussaye JE. Availability and practice of bedside ultrasonography in emergency rooms and prehospital setting: A French survey. *Ann Fr Anesth Reanim*. 2014;33(3):e29–e33.
- [7] Henwood PC, Beversluis D, Genthon AA, Wilson CN, Norwood B, Silva D, Foran M, Romero MG, Martinez YB, Vargas LE, Ocampo AC, Vallejo CE, Arbelaez C. Characterizing the limited use of point-of-care ultrasound in Colombian emergency medicine residencies. *Int J Emerg Med*. 2014;7(1):7.
- [8] Cook T, Hunt P, Hoppman R. Emergency medicine leads the way for training medical students in clinician-based ultrasound: A radical paradigm shift in patient imaging. *Acad Emerg Med*. 2007;14(6):558–561.
- [9] Epstein R, Hundert E. Defining and assessing professional competence. *JAMA*. 2002;287:226–235.
- [10] Cardenas E. Emergency medicine ultrasound policies and reimbursement guidelines. *Emerg Med Clin North Am*. 2004;22(3):829–838, x–xi.
- [11] American College of Emergency Physicians. Use of ultrasound by emergency physicians. *Ann Emerg Med*. 2001;38:469–470.
- [12] American Medical Association. *Privileging for Ultrasound Imaging*. Chicago, IL: American Medical Association; 2001. Policy H-230.960. Accessed October 25, 2015.
- [13] International Federation for Emergency Medicine. Point-of-Care Ultrasound Curriculum Guidelines. 2014 (Accessed October 25, 2015). Available from <http://www.ifem.cc/wp-content/uploads/2016/07/IFEM-Point-of-Care-Ultrasound-Curriculum-Guidelines-2014.pdf>
- [14] American Institute of Ultrasound in Medicine. *Training Guidelines for Physicians Who Evaluate and Interpret Diagnostic Ultrasound Examinations*. Laurel, MD: American Institute of Ultrasound in Medicine; 2008. (Accessed October 5, 2015). <http://www.aium.org/publications/statements.aspx>
- [15] Mateer J, Plummer D, Heller M, Olson D, Jehle D, Overton D, Gussow L. Model curriculum for physician training in emergency ultrasonography. *Ann Emerg Med*. 1994;23:95–102.
- [16] American College of Emergency Physicians. Emergency ultrasound standard reporting guidelines. 2011 (Accessed November 2, 2016). Available from <https://www.acep.org/workarea/DownloadAsset.aspx?id=104378>
- [17] Counselman FL, Sanders A, Slovis CM, Danzl D, Binder LS, Perina DG. The status of bedside ultrasonography training in emergency medicine residency programs. *Acad Emerg Med*. 2003;10(1):37–42.

[18] Moore CL, Gregg S, Lambert M. Performance, training, quality assurance, and reimbursement of emergency physician performed ultrasonography at academic medical centers. *J Ultrasound Med.* 2004;23(4):459–466.

[19] American College of Emergency Physicians. ACEP policy statement: Emergency ultrasound imaging criteria compendium. 2006 (Accessed November 2, 2016). Available from: <https://www.acep.org/content.aspx?id=80127>

Appendix A: Questionnaire completed by emergency physicians

Survey Questionnaire, Please circle your responses:

1. I am a:
Resident Specialist/Fellow Consultant/Sr. Consultant
2. I have completed the following course(s) in point-of-care ultrasound:
The Essentials of Emergency Department Ultrasound – Canada (basic/advanced)
College of Emergency Medicine Ultrasound Course – UK (Level 1/Level 2)
Others (Please specify):
3. Average number of diagnostic/therapeutic ultrasound scans performed by me in a week:
None Less than 5 Between 5 and 10 More than 10
4. I consider myself confident with the controls/knobs on the ultrasound device:
Strongly agree Agree Neutral Disagree Strongly disagree
5. I consider myself confident in detecting pericardial effusion using ultrasound:
Strongly agree Agree Neutral Disagree Strongly disagree
6. I consider myself confident in detecting pneumothorax using ultrasound:
Strongly agree Agree Neutral Disagree Strongly disagree
7. I consider myself confident in assessing cardiac contractility in the subxiphoid view using ultrasound:
Strongly agree Agree Neutral Disagree Strongly disagree
8. I consider myself confident in detecting free fluid in Morrison's pouch using ultrasound:
Strongly agree Agree Neutral Disagree Strongly disagree
9. I consider myself confident in detecting free fluid at the splenorenal angle using ultrasound:
Strongly agree Agree Neutral Disagree Strongly disagree
10. I consider myself confident in detecting free fluid in the pelvis using ultrasound:
Strongly agree Agree Neutral Disagree Strongly disagree
11. I feel that the use of ultrasound for large vein cannulations has improved my success rate:
Strongly agree Agree Neutral Disagree Strongly disagree
12. Obstacles faced in using ultrasound in the emergency department (Select all that apply):
None
Lack of time
Lack of interest
Lack of experience
Shortage of ultrasound devices
Lack of trained personnel for guidance
Others (Please specify):
13. In order to enhance my ultrasonography skills, I feel I would benefit from (Select all that apply):
Hands-on courses
Bedside teaching
Lectures
Videos
Others (Please specify):