Thieme

Dansk Ultralyddiagnostisk Selskab

Pia Iben Pietersen, MD, defended the PhD thesis entitled "Education, training and assessment in clinical thoracic ultrasound" on February 28th, 2020

Several guidelines and training recommendations have been established in order to ensure competence of the clinical ultrasound operators. The guidelines are often arbitrary and fixed, e. g. the trainee must perform *specific* number of examinations under supervision and attend a *specific* hour theoretical course. There are no evidence behinds these fixed numbers, and this method does not ensure competence of the operators because of individuals' different learning paces, previous experience with ultrasound, 3D understanding, and eye-hand coordination. Additionally, the numbers and requirements differ widely from one society/federation to another.

The overall aim of the PhD project was to create an evidence-based curriculum in clinical thoracic ultrasound that can be implemented on an institutional level. The content was made based on a Delphi-method with international experts in thoracic ultrasound from five specialties; radiology, emergency medicine, thoracic surgery, anesthesiology and intensive care, and respiratory medicine. The created ultrasound course includes a theoretical test and a practical simulation-based test with proven gathered validity evidence. Furthermore, the study aimed to explore the effect of simulation-based training compared to conventional training. In collaboration with 3D healthcare systems a lung module was created and tested, since training on healthy simulated patients does not create the sonopathological patterns that is to be assessed when performing a thoracic ultrasound examination. Using simulation, it is possible to train acute and high-stake cases as well as pathologies with low incidence but that is possible to establish and diagnose using ultrasound.

The four studies and work related to the PhD thesis was primarily based on Odense University Hospital, Denmark but was a broad collaboration between the simulation centers in Denmark and several national and international clinical and radiological departments.

From left; Supervisor, professor in Medical Education Lars Konge, Copenhagen Academy for Medical Education and Simulation. Supervisor, clinical associate professor Ole Graumann, Department of Radiology, Odense University Hospital. Opponent, clinical associate professor, Laurence M. M. Crombag, Department of Respiratory Medicine, Amsterdam University Medical Center. PhD-fellow Pia Iben Pietersen, Department of Respiratory Medicine and Regional Center for Technical Simulation, Odense University Hospital. Opponent, clinical professor Rahul Bhatnager, Department of Respiratory Medicine, University of Bristol's Academic Respiratory Unit, Bristol University. Main supervisor, clinical associate professor Christian B. Laursen, Department of Respiratory Medicine, Odense University Hospital. Head of assessment committee, clinical associate professor Malene Grubbe Hildebrandt, Department of Nuclear Medicine, Odense University Hospital and University of Southern Denmark.

Three out of four papers are published at the present moment:

Pietersen PI, Madsen KR, Graumann O et al. Lung ultrasound training: a systematic review of published literature in clinical lung ultrasound training. Crit Ultrasound J 2018; 10(1): 23. Published 2018 Sep 3. doi:10.1186/s13089-018-0103-6

Pietersen PI, Konge L, Graumann O et al. Developing and Gathering Validity Evidence for a Simulation-Based Test of Competencies in Lung Ultrasound. Respiration 2019; 97(4): 329–336. doi:10.1159/000493758

Pietersen PI, Konge L, Madsen KR et al. Development of and Gathering Validity Evidence for a Theoretical Test in Thoracic Ultrasound. Respiration 2019; 98(3): 221–229. doi:10.1159/000500146

For information about the study, please contact: Pia Iben Pietersen, pia.iben.pietersen3@rsyd.dk