TRANSVAGINAL ULTRASOUND SIMULATION: CAN IT REPLACE INTITIAL PATIENT TRAINING FOR DOCTORS?

Image: Adapted from: MedaPhor, n.d.

Presented by Cathy Williams – Advanced Practitioner in Ultrasound, Royal Sussex County Hospital, Brighton.

CO-AUTHORS

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➢ **Becky Mulloy** – Advanced Practitioner in Ultrasound and Ex-Lecturer at City University.

➢ **Gill Harrison** – Programme Leader, Ultrasound, City University London.

➢ **Jennifer Edie** – Senior Lecturer, City University London.

➢ **Dave Flinton** – Programme Manager, Radiography, City University London.

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THE COLLEGE OF RADIOGRAPHERS
INDUSTRY PARTNERSHIP SCHEME
SUPPORTING RADIOGRAPHY RESEARCH

RESEARCH QUESTIONS

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Primary Question:

Secondary question:

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- **How does simulation compare with traditional clinical training for learning basic TVUS?**

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Primary Question:

- **How does simulation compare with traditional clinical training for learning basic TVUS?**

Secondary question:

- **Does simulation affect confidence to progress to TVUS scanning in the clinical situation?**

Operator dependent examination

Lack of time/ capacity to train doctors

New TVUS simulator unveiled in 2010 (Medgadget, 2010)

WHY?

UK wide shortage of Sonographers (The Society and College of Radiographers, 2009)

Simulation has been successful in other industries (Donaldson, 2009, p. 51)

TVUS most requested gynae imaging exam (Heer et al, 2004, p. 440)

ScanTrainer

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METHODOLOGY

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Mixed Method Study Design

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Quantitative

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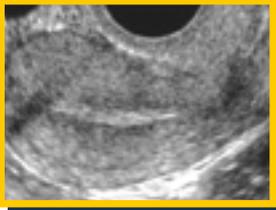**Mixed Method Study Design**

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Qualitative

Non equivalent control group pre-test-

Questionnaire

Semi-structured Interviews

Primary Research Question = PART 1

design

Secondary Research Question = PART 2

QUANTITATIVE RESULTS

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- **SAMPLE** – 11 doctors, 9 completed study.

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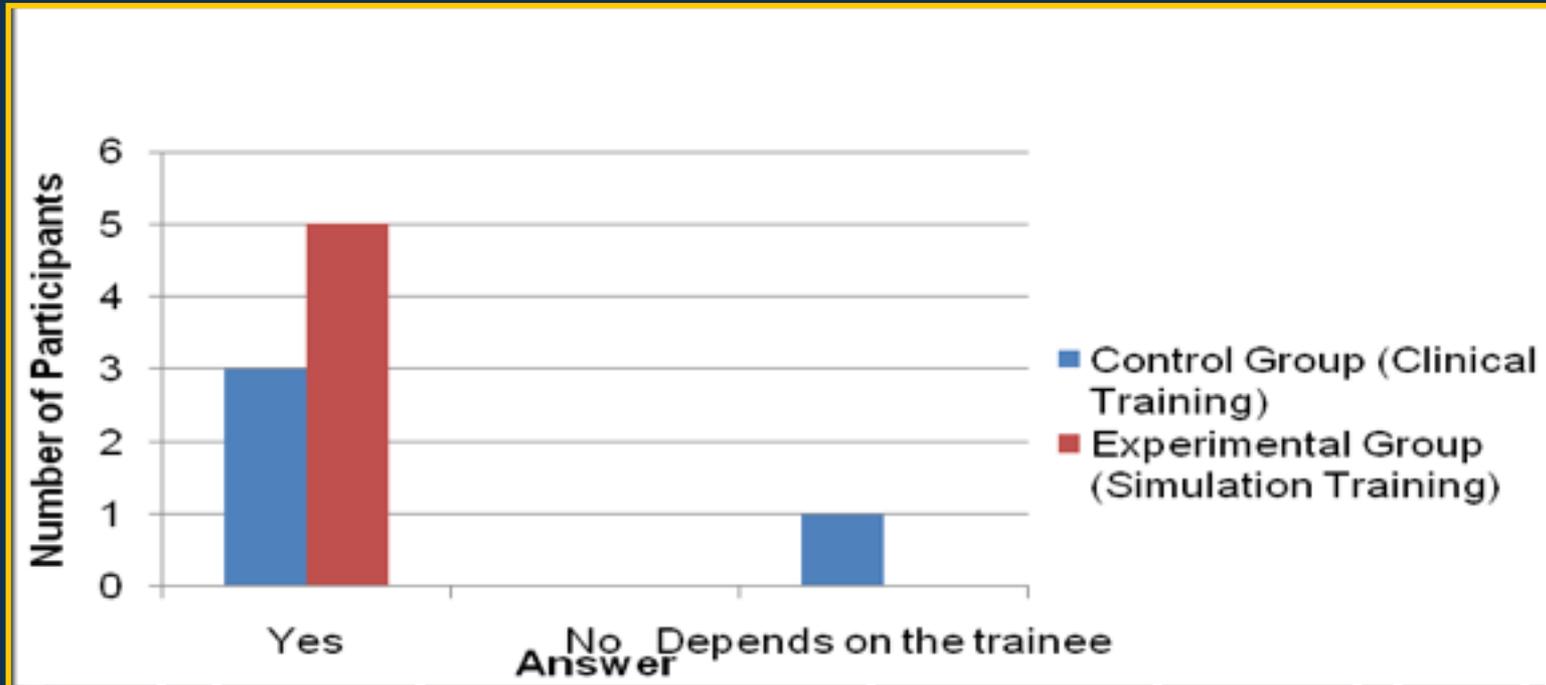
QUANTITATIVE RESULTS

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- **PRE-TEST** – No significant difference in the average scores of the two groups ($u = 12$, $p = 0.6623$).

- **POST-TEST** – Simulator group had a higher average for overall assessment score (by 8%) and each of its five sections (by 3 – 21%). None of these results were statistically significant ($p = 0.0556 – 1$).

QUALITATIVE RESULTS

Participants' answers to the question asking if use of the ScanTrainer could help increase a trainee's confidence
level prior to attempting a real TVUS scan.

ANALYSIS

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- **No significant differences** – similar conclusions reached by Knudson and Sisley (2000) and Stather et al (2011).

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- **Comparison of average scores indicates simulation may be more effective than clinical training** – replicates findings of studies investigating virtual reality simulators ability to teach laparoscopic skills (Gurusamy et al; 2009, Larsen et al, 2009; Lucas et al 2008).

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- **Improved patient experience due to reduced anxiety of trainee and possible reduction in**

CONCLUSION

- **Study lacks power.**
- **Statistical results suggest the two methods are equal in teaching ability.**
- **Comparison of average scores suggests initial simulation training may be more effective than clinical training.**
- **Training on the ScanTrainer was found to positively affect novice scanners confidence.**
- **Increased confidence may positively affect the patient's experience of being scanned by a trainee.**

RECOMMENDATIONS
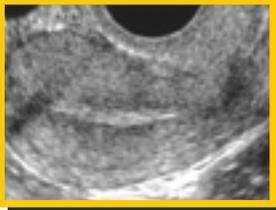
RECOMMENDATIONS

1. **Repeat multiple centre trials**

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2. **Research assessing the effect on patient outcomes of prior training on the ScanTrainer.**

REFERENCES

- Donaldson, L. (2009). 150 years of the Annual Report of the Chief Medical Officer: On the State of Public Health 2008. London: Department of Health.
- Gurusamy, K. S., Aggarwal, R., Palanivelu, I. & Davidson, B. R. (2009). Virtual Reality Training for Surgical Trainees in Laparoscopic Surgery (Review). The Cochrane Library. 1: 1–77.
- Harder, B. N. (2010). Use of Simulation in Teaching and Learning in Health Sciences: A Systematic Review. Journal of Nursing Education. 49(1) January: 23–28.
- Heer, I. M., Middendorf, K., Muller–Egloff, S., Dugas, M. & Strauss, A. Ultrasound Training: The Virtual Patient. Ultrasound in Obstetrics & Gynecology. 24(4) September: 440–444.
- Knudson, M. M. & Sisley, A. C. (2000). Training Residents Using Simulation Technology: Experience with ultrasound for trauma. Journal of Trauma–Injury Infection & Critical Care. 48(4) April: 659–665.
- Larsen, C. R., Soerensen, J. L., Grantcharov, T. P., Dalsgaard, T., Schouenborg, L., Ottosen, C., Schroeder, T. V. & Ottesen, B. S. (2009). Effect of Virtual Reality Training on Laparoscopic Surgery: Randomised controlled trial. British Medical Journal. 338(7705) May: 1253–1256.
- Lucas, S., Tuncel, A., Bensalah, K., Zeltser, I., Jenkins, A., Pearle, M. & Cadeddu, J. (2008). Virtual Reality Training Improves Simulated Laparoscopic Surgery Performance in Laparoscopy Naïve Medical Students. Journal of Endourology. 22(5) May: 1047–1052.

REFERENCES

- MedaPhor (n.d.). *ScanTrainer* [Online] *Available:* http://www.scantrainer.com/ [Accessed [6 December 2012].
- MedGadget. (2010). Transvaginal Haptic Ultrasound Simulator Unveiled [Online]. Available: http://www.medgadget.com/archives/2010/04/transvaginal_haptic_ultrasound_simulator_unveiled.html [Accessed 7 March 2011].
- Oestergaard, J., Bjerrum, F., Maagaard, M., Winkel, P., Larsen, C. R., Ringsted, C., Gluud, C., Grantcharov, T., Ottesen, B. & Soerensen, J. L. (2012). Instructor Feedback Versus No Instructor Feedback on Performance in a Laparoscopic Virtual Reality Simulator: A randomized educational trial. BMC Medical Education. 12:7.
- Stather, D. R., Maceachern, P., Rimmer, K., Hergott, C. A. & Tremblay, A. (2011). Assessment and Learning Curve Evaluation of Endobronchial Ultrasound Skills Following Simulation and Clinical Training. Respirology. 16(4) May: 698–704.
- The Society and College of Radiographers. (2009). Developing and Growing the Sonographer Workforce: Education and Training Needs. London: SCoR.
- Traynor, M., Gallagher, A., Martin, L. & Smyth, S. (2010). From Novice to Expert: Using Simulators to Enhance Practical Skill. British Journal of Nursing. 19(22): 1422–1426.
- Wagner, D. Bear, M. & Sander, J. (2009). Turning Simulation into Reality: Increasing student competence and confidence. Journal of Nursing

Any questions?