Evaluation of simulation-based education in the management of medical emergencies.

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Abstract

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Introduction

The traditional approach to medical education is changing and simulation is increasingly being incorporated into the curriculum, particularly in the context of emergency care.

Simulation takes many forms, but this thesis refers only to whole patient simulators, where a computerised mannikin placed in a clinically appropriate environment is used to recreate a realistic clinical encounter. The focus of this work is the management of medical emergencies.

Aim

The overall aim of this body of work is to evaluate the effectiveness of simulation-based education across a range of different learners, and to investigate the properties of simulation-based assessment.

In particular:

- To review the literature on the effectiveness of simulation, and its use in assessment.
- To evaluate the current status and effectiveness of CME interventions and the relative usefulness of simulation courses in this context.
- To determine if simulation-based courses in crisis management can lead to changes in physician behaviour.

- To evaluate student perceptions of learning in a simulator environment.
- To assess students' ability to manage simulated emergencies, and their opinion of simulation-based assessment.
- To define the psychometric properties and feasibility of simulation-based assessment in anaesthesia, the accuracy of self-assessment and the impact on learning.

Methods and Results

A number of different methods were used, which will be described in detail in the subsequent chapters. Overall, the results provide evidence for the effectiveness of simulation across a range of applications. Simulation-based assessment is acceptable, likely to have a positive impact on learning, and evidence support aspects of validity. Reliable scores can be generated but large numbers of cases are required.

Conclusions

There is sufficient evidence to recommend incorporating simulation-based courses into the acute care curriculum of medical undergraduates. Simulation is effective in CME in the context of anaesthesia crisis management and this is likely to apply to other acute care specialties. Like other clinically based assessments, extended testing time is required to generate reliable scores, limiting the feasibility of large scale, simulation-based exit examinations.

Preface and Acknowledgements

This thesis is a synthesis of the following series of publications around the theme of simulation in medical education:

Weller, J. and A. Woodward, Continuing Medical Education: What for? How? And how much is it worth. New Zealand Medical Journal, 2004. 117(1193): p. U876.

Weller, J. and M. Harrison, Continuing education and New Zealand anaesthetists: an analysis of current practice and future needs. Anaesthesia and Intensive Care, 2004. 32(1): p. 59-63.

Weller, J., L. Wilson, and B. Robinson, Survey of change in practice following simulation-based training in crisis management. Anaesthesia, 2003. 58(5): p. 471-473.

Weller, J., A. Dowell, M. Kljakovic, and B. Robinson, Simulation training for medical emergencies in general practice. Medical Education, 2005. in press.

Weller, J., Simulation in undergraduate medical education: bridging the gap between theory and practice. Medical Education, 2004. 38: p. 32-38.

Weller, J., B. Robinson, P. Larsen, and C. Caldwell, Simulation-based training to improve acute care skills in medical undergraduates. New Zealand Medical Journal, 2004. 117(1204).

Weller, J., B. Robinson, B. Jolly, L. Watterson, M. Joseph, S. Bajenov, A. Houghton, and P. Larsen, Psychometric characteristics of simulation-based assessment in anaesthesia and accuracy of self-assessed scores. Anaesthesia, 2005. 60(3): p. 245-50.

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