A cost-utility analysis of medium vs. high-fidelity human patient simulation manikins in nursing education.

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Abstract

AIMS AND OBJECTIVES:

This study presents a cost-utility analysis that compared medium- vs. high-fidelity human patient simulation manikins in nursing education. The analysis sought to determine whether the extra costs associated with high-fidelity manikins can justify the differences, if any, in the outcomes of clinical reasoning, knowledge acquisition and student satisfaction.

BACKGROUND:

Investment in simulated learning environments has increased at an unprecedented pace. One of the driving forces is the potential for simulation experiences to improve students' learning and engagement. A cost-effectiveness analysis is needed to inform decisions related to investment in and use of simulation equipment.

METHOD:

Costs associated with the use of medium- and high-fidelity manikins were calculated to determine the total cost for each. A cost-utility analysis using multiattribute utility function was then conducted to combine costs and three outcomes of clinical reasoning, knowledge acquisition and student satisfaction from a quasi-experimental study to arrive at an overall cost utility.

RESULTS:

The cost analysis indicated that to obtain equivalent clinical reasoning, knowledge acquisition and student satisfaction scores, it required $AU1·21 (US$ 1·14; €0·85) using medium-fidelity as compared with $AU6·28 (US$6·17; €4·40) for high-fidelity human patient simulation manikins per student.

CONCLUSION:

Based on the results of the cost-utility analysis, medium-fidelity manikins are more cost effective requiring one-fifth of the cost of high-fidelity manikins to obtain the same effect on clinical reasoning, knowledge acquisition and student satisfaction.

RELEVANCE TO CLINICAL PRACTICE:

It is important that decision-makers have an economic analysis that considers both the costs and outcomes of simulation to identify the approach that has the lowest cost for any particular outcome measure or the best outcomes for a particular cost.

The use of high-fidelity manikins for advanced life support training--A systematic review and meta-analysis.

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Abstract

OBJECTIVES:

The objective of this study was to evaluate the effectiveness of high versus low fidelity manikins in the context of advanced life support training for improving knowledge, skill performance at course conclusion, skill performance between course conclusion and one year, skill performance at one year, skill performance in actual resuscitations, and patient outcomes.

METHODS:

A systematic search of Pubmed, Embase and Cochrane databases was conducted through January 31, 2014. We included two-group non-randomized and randomized studies in any language comparing high versus low fidelity manikins for advanced life support training. Reviewers worked in duplicate to extract data on learners, study design, and outcomes. The GRADE (Grades of Recommendation, Assessment, Development and Evaluation) approach was used to evaluate the overall quality of evidence for each outcome.

RESULTS:

3840 papers were identified from the literature search of which 14 were included (13 randomized controlled trials; 1 non-randomized controlled trial). Meta-analysis of studies reporting skill performance at course conclusion demonstrated a moderate benefit for high fidelity manikins when compared with low fidelity manikins [Standardized Mean Difference 0.59; 95% CI 0.13-1.05]. Studies measuring skill performance at one year, skill performance between course conclusion and one year, and knowledge demonstrated no significant benefit for high fidelity manikins.

CONCLUSION:

The use of high fidelity manikins for advanced life support training is associated with moderate benefits for improving skills performance at course conclusion. Future research should define the optimal means of tailoring fidelity to enhance short and long term educational goals and clinical outcomes.

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Comparison of high- and low-fidelity mannequins for clinical performance assessment.

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Abstract

OBJECTIVE:

A pilot study exploring the differences between high- and low-fidelity mannequins in the assessment of clinical performance.

METHODS:

Standardized clinical scenarios were used to test 12 intensive care paramedics (ICP). Each ICP was randomly assigned to a scenario using either a high-fidelity (SimMan) or low-fidelity mannequin (Laerdal Heart Start 2000), followed by a crossover assessment using the alternative scenario. We examined both the objective and subjective outcomes. Objective performance was assessed by three independent assessors, all accredited Advanced Paediatric Life Support instructors. Subjective outcomes were measured by assessment questionnaires and a rating scale.

RESULTS:

The overall proportion that passed the high-fidelity mannequin scenario was 0.47 compared with 0.58 in the low-fidelity mannequin scenario. The difference was -0.11 (95% CI -0.32-0.11). The subjective outcomes were charted and presented within the article. The ICP preferred the use of high-fidelity mannequin for assessment purpose.

CONCLUSION:

There was no significant objective difference between the two mannequins