


The effectiveness of high-fidelity compared to low-fidelity simulation in resuscitation training: a systematic review

Mohamed Sultan¹ 

1. University Hospital Limerick, Limerick, Ireland

Correspondence to: Mohamed Sultan

*University Hospital Limerick, Limerick, Ireland.

Email: MohamedSultan@MSMS.ie

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Introduction:

Resuscitation simulation-based education plays a vital role in the modern education of medical and nursing students. This systematic review explores the merits of high-fidelity and low-fidelity simulation in medical education, specifically focusing on resuscitation training for nursing and medical students.

Methods:

The MEDLINE, CINAHL, EMBASE, and Cochrane Library were searched. The last search was updated in June 2023. Studies were screened according to inclusion and exclusion criteria.

For quality evaluation, the Medical Education Research Study Quality Instrument and the Cochran Collaboration's Risk of Bias tool were used.

Results:

Eleven randomized control trials were ultimately included. The total number of participants was 796 students (399 high-fidelity and 397 low-fidelity). The majority were medical students. The MERSQI showed a median score of 13 for the included studies, the maximum percentage was 80%, and the minimum was 67%. Performance bias exists in all the included studies. On the one hand, six studies ($n = 374$) demonstrated improvement in favor of the HF simulation group. On the other hand, four studies ($n = 320$) failed to show any improvement in skill performance between both groups. One study showed slight improvement in skill performance at the conclusion. Six RCTs examined knowledge improvement as an outcome, and five ($n = 332$) showed no difference at the report's conclusion. In three ($n = 235$) out of the four studies that examined the retention of skills performance and knowledge over different follow-up periods, the results showed no observed advantage of high-fidelity manikins over low-fidelity manikins.

Conclusion:

The review suggests that high-fidelity and low-fidelity simulation training yield similar effects, primarily in knowledge acquisition and skill retention. Low-fidelity simulation can provide valuable learning opportunities and effectively address specific educational goals, particularly in settings with limited resources or funding. Trainees at a lower academic level, such as medical or nursing students, are more likely to benefit from lower levels of simulation training; this may explain or support findings from reports that conclude HF simulation is unnecessary for undergraduate trainees.

Keywords:

High-fidelity manikins, simulation-based education, medical education, cardiopulmonary resuscitation.