Systematic review

Simulation training appears to improve nurses' ability to recognise and manage clinical deterioration

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Implications for practice and research

- Evidence suggests that simulation training improves nurses' clinical knowledge and performance in recognising and managing clinical deterioration in simulated environments.
- More research is required to establish the most effective models of simulation training and the impact on patient outcomes in real clinical settings.
- The development of a valid and reliable standardised evaluation tool could improve the comparability and consistency of simulation training in the recognition and management of clinical deterioration.

Context

The importance of education has been highlighted to support nurses' role in recognising and responding to clinical deterioration.[1] Simulation is increasingly used as a teaching modality in both academic and clinical settings to improve nurses' ability to recognise and manage clinical deterioration.[2] This meta-analysis is very timely in quantitatively synthesising the effectiveness of simulation education in the recognition and management of clinical deterioration.

Methods

Six databases were searched until June 2016, including randomised controlled trials (RCTs) or quasi-experimental studies using pretest–posttest designs that evaluated the effect of simulation-based interventions on student nurses' and/or nurses' knowledge and performances in recognising and managing clinical deterioration. For each study, a standardised mean difference (d) effect size was computed for the reported outcomes. Due to the vast heterogeneity across studies, random-effect analyses were conducted to examine the effect sizes for knowledge and performance. Moderator analyses were conducted to determine whether effect sizes were influenced by simulated-based intervention characteristics.

Findings

The meta-analyses included 19 empirical research studies. Although the effect sizes for both knowledge and performance increased significantly across both single-group pretest–posttest and two-group posttest analyses, simulation-based interventions have stronger effects on performance. In single-group pretest–posttest, moderator analysis suggested that length of session had a larger positive impact on knowledge scores as compared with increasing the number of clinical scenarios utilised during simulation. Face-to-face simulation was also observed to be significantly associated with an increase in effect size for knowledge compared with web-based simulation programs, but not so for performance.

Commentary

This is the first meta-analysis to examine the effectiveness of simulation on nurses' knowledge and performance in recognising and managing clinical deterioration. The findings suggest that simulated-based learning has a positive effect on nurses' knowledge and performance to recognise and manage clinical deterioration. However, the results must be interpreted with caution.

As acknowledged by the authors, there was significant heterogeneity in each analysis. Heterogeneity was influenced by the considerable variability among simulation intervention characteristics and implementation procedures, as well as study design and outcome measurements used. To improve the comparability of simulation-based programs, the authors recommended the development of standardised simulation-based education programme, but did not elaborate further. Such standardisation could include the application of evidence-based concepts or tools such as Airway, Breathing, Circulation, Disability and Exposure (ABCDE) or Situation, Background, Assessment and Recommendation (SBAR) into simulation programme for nursing assessment, management and reporting of clinical deterioration.[3] These concepts were also utilised in the development of a simulation-based evaluation tool, known as RAPIDS-tool, to measure simulation performance on clinical deterioration.[4] A valid and reliable standardised tool could be used in future studies to evaluate and compare nursing education programs in clinical deterioration.

Only one study in the review evaluated the impact of simulation on nurses' actual practice in the clinical setting.[5] More robust outcome evaluation on the transfer of simulation learning to clinical practice, such as evaluating the impact of simulation on patient outcomes is needed.

The outcomes associated with web-based versus face-to-face delivery also require further research. Given the resource-intensive nature of face-to-face simulation, web-based simulation provides a more viable learning option, especially for institutions with large number of learners. A comparative study of the clinical and financial impact between face-to-face simulation and web-based simulation on clinical deterioration could be considered for future studies.[6]

Overall, this review strengthens the case for simulation providing an effective method for improving nurses' knowledge and performance related to clinical deterioration. However, the question of how best to deliver training requires further investigation.

Competing interests None declared.

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