High Fidelity Human Patient Simulators in Undergraduate Nursing Programmes: Are they justified and do they improve student learning outcomes?

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Introduction

Simulated learning in undergraduate nursing programmes has escalated at an unprecedented rate over the last decade with many Institutions boasting high fidelity state of the art simulation labs and high fidelity human patient simulators (HFHPS) (Lapkin & Levett-Jones, 2011; Schiavenato, 2009; Wordsworth, 2013).

Simulation, defined by Jeffries (2005) as an activity mimicking the reality of the clinical environment is used to demonstrate procedures, decision-making, and critical thinking and encompasses a wide range of techniques from role-play and scenario setting to computerised manikins. Delivery techniques in simulation are categorised depending on their fidelity or the degree to which they simulate the reality of the real-world (Dunnington, 2014)

High technology in simulation undoubtedly attracts students but hard to ascertain is whether high fidelity simulation equipment is justified in terms of cost and student learning outcomes compared to low or medium fidelity (Brown et al., 2012; Handley & Dodge, 2013; Schiavenato, 2009). Norman, Dore & Grierson, (2012) aptly remind us that while studies involving HFHPS show beneficial outcomes for students (Glidewell & Conley, 2014; Liaw et al., 2013; Norman, 2012; Wordsworth, 2013) they commonly include a non-intervention control group thereby failing to acknowledge the relationship between fidelity and student learning.

Discussion

In an aim to determine whether the cost of HFHPS was justified in student outcomes of knowledge acquisition, clinical reasoning, and satisfaction, Lapkin and Levett-Jones (2011) did a cost-effectiveness analysis study in an Australian Nursing Institution. A total of 352 second and third year undergraduate nursing students from three campuses in Australia participated in the study. Results showed that medium-fidelity simulation was the most cost effective approach, requiring only 20% of the cost of high fidelity simulation to produce the same effect on the outcomes of skill acquisition, clinical reasoning and student satisfaction. The cost of high fidelity simulation was attributed mostly to the mannequin and staff training (Lapkin & Levett-Jones, 2011). These results were further echoed in a study by Iglasias-Vazquez et al. (2007) who acknowledged a modest increase in student learning

outcomes but conceded that the cost of the HFHPS which was approximately four times the cost of a standard mannequin did not justify its use.

Studies with medical students also raised concerns about fidelity and student learning outcomes in relation to costs (Norman, 2012) focussing specifically on the transference of learning between HFHPS and low fidelity simulation in an American medical institution reported similar findings to nursing studies. The research involved 24 studies and included learning in auscultation skills, complex management skills and surgical techniques. Results showed that the differences in transferred learning between HFHPS and low fidelity simulation was on average between one and two percent. de Giovanni, Roberts, and Norman (2009) also working with 37 medical students sought to evaluate the difference between hearing heart sounds using high and low fidelity simulation methods. Results in this study showed that there was no difference between the groups in diagnostic accuracy or clinical skills.

Conclusion

Available evidence suggests that the level of simulation fidelity does not translate to learning in nursing education, nor does it justify the cost. Furthermore, given the passive adoption of simulation technologies specifically HFHPS (Lapkin & Levett-Jones, 2011), the paucity of literature justifying their use and showing commensurate increases in student learning compared to lower fidelity simulation equipment is somewhat surprising (Handley & Dodge, 2013; Schiavenato, 2009). It is therefore important for Nursing Institution investors to consider equipment for simulation environments based on student learning needs, available budgets and simulation objectives.

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