

Simulation use in paediatric student respiratory therapy training

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C Walsh, KS Reise, R Correia. Simulation use in paediatric student respiratory therapy training. *Can J Respir Ther* 2017;53(4):62–63

At SickKids it is a perennial challenge for clinical leads and preceptors to ensure that student respiratory therapists (SRTs) acquire the entire scope of the paediatric skill set as set out by the 2016 National Competency Profile. As such, simulation has historically been used to supplement the clinical experience for SRTs at Sick Kids; however, the extent to which simulation-based education can replace clinical experience is not clearly established in the literature. At SickKids, we have created an alternative paediatric rotation where the percentage of time spent in the simulation environment is greater than in the traditional, clinical-based rotation. We hypothesize that there should be comparable levels of performance in a simulated setting between students in clinical and simulation-based rotations, as well as comparable measures of self-reported values for cognitive load, self-appraisal, and self-efficacy. Thus far, we have enrolled 59 students, with 54 completing postclinical rotation testing. Follow-up retention testing has been complicated by geographical factors. Following data analysis, we will publish our findings.

Key Words: *paediatric care; respiratory therapy; clinical education; simulation; performance*

Some of the most challenging clinical competencies to acquire for student respiratory therapists (SRTs) are competencies (skills) in the paediatric population. In Ontario, over the last decade, there has been a consistent struggle for paediatric hospitals to find paediatric training placements as respiratory therapy (RT) programs increase their class sizes and/or new academic centres launch RT programs. Competition for the limited paediatric sites is high. RT departments in paediatric hospitals have attempted to accommodate growing SRT numbers but in doing so have shortened the clinical placement and/or have added more SRTs into the environment. This has decreased the opportunities for SRTs to gain skills in less frequent events (such as intubation). Challenges that further compound the issue are: patient safety or improvement initiatives that may limit student involvement, the movement of the Canadian Medical Association to a competency-based objectives program [1], and the growth of interprofessional education requests at paediatric teaching hospitals. Competition for SRT clinical training in the paediatric population is a perennial challenge.

At SickKids (Toronto, Ontario), we are the busiest and largest paediatric centre in Canada. In the 41-bed critical care unit, 90% of patients receive a form of respiratory support; 50%–60% are supported by non-invasive or invasive ventilation [2]. SRTs spend 2 or 3 weeks at SickKids in paediatrics exclusively; those that complete 2 weeks of training at SickKids also complete additional paediatric training at Holland-Bloorview Kids Rehabilitation Hospital. Despite the large volume of patients and acuity, SRTs continue to struggle to complete the paediatric skills set out in the 2011 National Competency Profile. For many competencies, SRTs may encounter only one clinical opportunity to participate in care during their training. On occasion, skills can be missed due to no current opportunity and/or specific skills may not even be practiced at a site due to preferences in clinical management strategies. The reality is that low-frequency, high-stakes clinical skills and events require SRTs to be at the right place, at the right time, and with the right people. Guaranteeing clinical opportunities to practice all skills is simply not feasible. The 2016 National Competency Framework looks to address these limitations with iterative changes [3], though many of the paediatric skills still required to be evaluated in the clinical setting will continue to pose challenges.

Given the role of RTs in high-stakes clinical situations and in life-sustaining treatments, it is a natural fit for simulation to have a key role in SRT education and to be used to better prepare SRTs for clinical duties. For nursing students, simulation has been shown to provide an avenue in which students can safely encounter situations where patient safety is compromised, and where they can foster the development of patient safety competencies [4]. Many institutions offering an RT program have made simulation an essential component of their training to prepare for clinical practice; a literature review has shown that the use of simulation in paediatrics has been successfully integrated in curriculums that lead to increased opportunity for trainees to deliberately practice skills and foster mastery learning across a spectrum of clinical situations [5]. The next progressive step would be to have greater integration of SRTs in simulation training during their clinical practice at the in-situ (hospital) level. At SickKids, simulation has been used as an education tool during SRT paediatric training for 10 years, typically in a half-day session at the mid-point of the clinical rotation. The session is hosted largely in keeping with key recommendations from the practice guideline *Advisory workgroup recommendations on the use of clinical simulation in respiratory therapy education*, which are: fostering a safe place to make mistakes, establishing trust within the circle of participants, and encouraging rich debriefing discussion [6]. The session is often perceived to add additional value by both instructors and SRTs alike. From the instructor standpoint, the Canadian Association of Schools of Nursing guidelines highlight why simulation is most beneficial for specialty rotations: planned, predictable, and controlled by the instructor; delivered consistently from one student to another within a learning group; communication can be practiced among a limited number of healthcare providers; and allows students to make errors and learn from them without harm to patients [7]. For SRTs, many enjoy it as an experience that promotes additional areas for clinical review and self-reflection. These experiences are captured on an 18-item survey questionnaire and 4 open-ended questions that students complete following their simulation-based education session [8] as well as feedback that is received from academic institutions who send their students to SickKids. Often, SRTs comment that their clinical experience allows them to apply a better “perceived reality” to the scenarios and role-play in a more genuine manner than they could previously at their school.

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Considering the limits of clinical time and success with simulation training at SickKids, a 2-week program was created for SRTs that uses a larger proportion of in-situ simulation. This has been provided for SRTs who otherwise would not have a major paediatric centre placement when maximum clinical training capacity was reached at SickKids. In the first week, SRTs are integrated into the clinical environment intermittently and complete a structured paediatric curriculum that integrates simulation at both low-fidelity and high-fidelity levels. The curriculum and simulations were designed with attentiveness to ensure that the 2011 competencies were broadly being addressed. This training model applies the principles of just-in-time-training that promote higher levels of learner engagement [9], learner confidence, and performance once working with patients [10]. The training provided in week 1 allows faster integration of the SRTs during week 2 into the clinical training environment and subsequent achievement of competencies. Specifically, for low-frequency, high-stakes skills that are challenging to achieve in a clinical rotation, simulation is an alternative method to provide training to SRTs for paediatric skills.

In medical education and training, simulation is now a widely accepted educational strategy used to supplement the curriculum of students and trainees; however, the impact of simulation on clinical performance, and to what extent simulation should supplement actual clinical experience, is still up for debate [11]. In nursing, a large, multi-institutional study across 10 undergraduate nursing programs compared 3 groups of nursing students: a standard 100% clinically based practicum, a practicum replacing 25% of clinical time with simulation, and a practicum replacing up to 50% of clinical time with a high-quality simulation program, maintaining careful simulation standards. Academic scores of the participants and clinical evaluations of the participants by preceptors were the same across all groups [12]. Furthermore, longitudinally their success as clinicians and perceptions of readiness for practice by their employers (managers) was unchanged [12]. Beyond clinical outcomes, there is also an emerging point of view that there is an ethical responsibility to use simulation rather than live patients to hone skills [13].

The literature related to simulation in RT practice is limited to respiratory therapists participating in simulations as an emergency response in the context of a team. At SickKids, we saw an opportunity to evaluate and compare SRT performance at the end of the 2 differing clinical training models previously described: a simulation-based training and a traditional, clinically based training model. Our study aims to measure performance of these 2 groups in basic paediatric airway management skills in a simulated setting; knowledge with respect to airway management using multiple-choice questions; and perceived self-efficacy, cognitive load, and self-appraisal. We chose to evaluate SRTs in airway skills since these skills are among the more likely paediatric skills that RTs working in a general hospital would be expected to perform and the ones that potentially have the greatest risk of adverse patient outcomes if not performed adequately. To date, we have enrolled 59 participants and completed simulations with 54 of them immediately after their clinical rotation. We have followed up with retention data collection with approximately half of the students; a significant obstacle and factor has been securing both time and travel for students to complete the retention (many students are located more than 200 km from SickKids).

We hypothesize that the SRTs who complete a simulation-based paediatric training curriculum will demonstrate comparable performance to SRTs who receive clinical-based training when evaluating basic paediatric airway management skills, as well as similar knowledge, self-efficacy,

cognitive load, and self-appraisal. We hope that the results open the door to additional study and acceptance that simulation must be considered an alternative and acceptable training method, particularly for low-frequency skills. Simulation time replacing clinical time becomes an irrelevant point of discussion if the clinical opportunities are encountered inconsistently or rarely by SRTs in their clinical training course. There is little reason to presume that the outcomes achieved in other health professions would not result in similar outcomes with SRTs.

DECLARATION OF INTEREST

The authors report no conflicts of interest.

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