Comparison of Rapid Cycle Deliberate Practice Simulation to Traditional Simulation in a Resource-Limited Setting

Samantha L. Rosman*, MD, MPH1, Rosine Nyirarsafari, MD2, Hippolyte Bwiza, MD3, Christian Umuhoro, MD4, Elizabeth A. Camp, PhD5, Mariedeth C. Rus, MD, MED1

Boston Children’s Hospital, Division of Pediatric Emergency Medicine1, University of Rwanda, Pediatrics Residency2, Bayline College of Medicine, Department of Pediatrics, Section of Pediatric Emergency Medicine3

Introduction

- High-fidelity simulation-based education has shown improved resident knowledge and performance in high-resource settings.1,2
- There is little research on low-fidelity simulation to teach complex scenarios, particularly in resource-limited settings.
- In traditional post-simulation debriefing, participants complete a scenario before discussing areas for improvement, leaving no time to return to the scenario to apply this new knowledge.
- Rapid Cycle Deliberate Practice (RCDP) utilizes repeated rounds of a scenario with intermittent feedback allowing for immediate practice of newly obtained knowledge and skills.
- No studies exist comparing the use of RCDP and traditional post-scenario debriefing in a resource-limited setting.

Objectives

- Develop a six-month simulation-based curriculum for pediatric residents on the care of acutely ill children.
- Compare the effectiveness of traditional post-simulation debriefing vs debriefing with RCDP both using low-fidelity simulation based on pre- and post-intervention performance on a simulation.

Methods

- Pediatric residents at the Kigali University Teaching Hospital (KUTH) were randomly assigned to traditional or RCDP group.
- Basic demographic data and data regarding prior training were collected.
- Residents were tested in a simulated resuscitation pre-intervention.
- Residents completed all simulation sessions during the intervention period according to their assigned group (RCDP or traditional).
- Cases focused on management of shock, respiratory failure, and cardiac arrest.
- A mid-fidelity mannequin was used for simulations, with feedback regarding physical exam and vital signs given verbally by the instructor.
- An iPhone/iPad app was used to enhance realism of the scenario utilizing an iPad to serve as the patient monitor.
- Following the study period, residents were retested in a similar simulated resuscitation.
- Videos of the resuscitations were scored by 2 investigators, with the blinded investigator’s scores used for data analysis, and the non-blinded investigator’s scores used to calculate the intraclass correlation coefficient (ICC).
- A modified version of the Simulation Team Assessment Tool (STAT) was used to score videos.
- Sub-analysis was performed to compare RCDP and traditional groups on early basic life-saving interventions and leadership skills.

Results

- Both groups showed a statistically significant improvement from pre- to post-intervention performance on a simulated resuscitation of 21% (p<0.001).
- ICC for video review was 0.95 (95% CI 0.90-0.98; p<0.001).
- No statistically significant difference between groups in overall performance, or on sub-analysis comparing performance on early lifesaving skills or leadership skills.

Table 1. Comparison of Pre and Post STAT Scores Stratified by Study Group (N = 33)

Table 2. Comparison of Pre and Post STAT Scores Stratified by Study Group (N = 33)

Table 3. Differences in Paired STAT Test Scores and Study Group (N = 33)

Limitations

- Small sample size may have limited our ability to detect differences on sub-analysis.
- No data on how performance on our simulated scenarios translates into performance in actual resuscitations.

Conclusions

- Completion of a six month simulation-based curriculum for pediatric residents in Rwanda led to a statistically significant improvement in performance in a simulated resuscitation.
- Residents randomized to receive instruction utilizing RCDP vs traditional debriefing demonstrated similar improvement.
- RCDP and traditional simulation-based instruction may both be valuable tools to improve resuscitation skills in pediatric residents.

References