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Learning Objectives

1. Discuss factors associated with the need for low-cost simulation experiences in developing countries.

2. Describe the development of a low-cost simulation tool for teaching needle cricothyrotomy procedures.

3. Identify outcomes related to the use of a low-cost, low fidelity simulation tool for teaching needle cricothyrotomy procedures.

The following applies for Brett Morgan, Virginia C. Muckler, and Sylvanus Kampo:
The presenters received no sponsorship nor have financial or commercial support for this project.
Background of Collaboration

• 2013: First BSc program for Nurse Anesthetists in Ghana at University for Development Studies (UDS) in Tamale

• 2013: Collaboration between UDS and Duke University established

• 2014: Distance-based program begins at UDS in collaboration with Duke

• 2017: 40 graduates of the distance-based program
Background on Project

• As part of a collaborative between Duke University and UDS, simulation was introduced

• Simulation training requests from UDS aligned with their students’ current coursework

• Management of a difficult airway that progressed to needle cricothyrotomy was identified as curricular need

• There were concerns with equipment inventory and needs

• The distance-based students were currently practicing anesthetists but had no previous simulation experience before our visit
Rationale for the Project

• Simulation is used to train healthcare professionals on cognitive, motor, critical thinking, and communication skills, all of which contribute to role development

• The nurse anesthesia profession commonly uses the empirical knowledge gained from simulation as an integral component of training

• The lofty cost associated with high-fidelity simulation is a limiting factor to its use

• Because of scarce resources, faculty in developing countries are challenged to provide their students with simulation experiences
Aims of the Project

1. Develop a low-cost method for teaching students how to perform a needle cricothyrotomy and use a retrograde wire for securing a difficult airway

2. Incorporate the method into the curriculum of the distance-based nurse anesthesia program

3. Evaluate the method and make recommendations for continued use
Innovation

• In the UDS classroom, anesthesia students were oriented to the materials and taught to construct the simulated trachea

• The total cost of supplies for 20 simulated tracheas was less than 12 USDs

• Participants were encouraged to consider what inexpensive resources were readily available in their own country if equipment substitutions were necessary

• Participants were then guided through the steps of performing a needle cricothyrotomy and a retrograde wire intubation using the simulated trachea
Evaluation of the Experience

• Students were asked to complete an anonymous survey to assess their simulation experience

• The Student Satisfaction and Self-Confidence in Learning survey consisted of 13 questions:
  – satisfaction with the learning experience
  – perception of self-confidence in the skill taught using simulation

• Demographic information was gathered from surveys conducted during associated projects
Project Participants

- A total of 15 UDS students participated in the simulation activity
  - 9 were men and 6 were women
  - The average age was 35.6 years (range, 30-54 years)
  - The average years of experience as a nurse anesthetist was 5 (range, 2-12 years)
Survey Results

• Overall, the students in this group reported the experience as a positive learning opportunity

• When addressing satisfaction with the simulation, all students:
  - Reported that the teaching methods were helpful and effective (93.3% strongly agree, 6.7% agree)
  - Believed that they were provided with a variety of learning materials to promote learning (73.3% strongly agree, 26.7% agree)
  - Felt that the simulation was taught suitable to the way they learned (66.7% strongly agree, 33.3% agree)
  - Reported increased confidence in mastering content (33.3% strongly agree, 66.7% agree)
  - Felt they were developing skills useful for clinical practice (73.3% strongly agree, 26.7% agree)

• Most students:
  - Enjoyed the experience (66.7% strongly agree, 26.7% agree)
  - Found the materials motivating and helpful (80.0% strongly agree, 13.3% agree)
Discussion

- In settings where resources limit the availability of high fidelity simulation equipment, low cost techniques can be used to offer meaningful and beneficial learning experiences.

- Even in the case of high acuity, low frequency interventions, such as the emergency cricothyrotomy, students in lower resource settings can benefit from the opportunities associated with simulation.

- By using low cost, easily obtainable items, faculty in nursing programs can create access to these opportunities that are easily replicated and sustained.
Selected References


