Simulation-Based Education in an Academic Pediatric Hospital Post-Anesthesia Care Unit: A Quality Improvement Project

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BACKGROUND
- PACU nurses at our hospital voiced concerns over lacking experience with emergencies
- Simulation-based education has become a valuable strategy for health care systems to improve teamwork, communication, and patient safety (1,2).
- Evidence showing improvement in:  
  • provider and team self-efficacy  
  • competence  
  • operational performance in clinical settings  
  • improving cognitive and non-technical skills associated with crisis resource management

HYPOTHESIS
A single simulation training session will:  
- increase PACU nurses’ self-confidence of knowledge, diagnosis & treatment of post-surgical emergencies  
- Increase comfort in code team roles

METHODS
- PACU nurses attended a single simulation session, consisting of participation in two different PACU-relevant scenarios, post-simulation debriefings, and educational simulation.
- Pre-simulation survey completed  
  • Self-assessment of confidence of knowledge and skills critical to patient safety in the PACU  
  • Completed same survey later in the year
- Simulation topics: Laryngospasm, Anaphylaxis, Narcotic overdose, PEA & hypoglycemia, shock, SVT, hyperkalemia

RESULTS
- 19 nurses participated  
  • Collectively, participants’ time as a nurse spanned a wide range (Mean 16.4 ±11.2 years, Range 4-43)
  • Time as a PACU nurse was shorter (Mean 7.8 ± 8.5 years, Range <1-28)
  • After training, participants’ confidence significantly increased on 20 of the 34 items assessed (p’s ≤ .005 - .05)
  • Confidence increased in 3 critical areas: recognizing (p=.05) and treating hypoxemia (p=.01), and performance of one-person mask ventilation/CPAP (p=.004).

PRE-SIMULATION SURVEY

**On a scale from 1 to 5 (1= not at all confident and 5=extremely confident), How comfortable are you with:**

**AIRWAY SKILLS**
- Recognizing airway obstruction?
- Simple airway maneuvers?
- Oral airway insertion?
- One-person mask ventilation/CPAP?
- Knowing intubation equipment?
- Recognizing hypoxemia?
- Treating hypoxemia?

**DRUG DOsing AND ADMINISTRATION**
- Dosing of Epinephrine for PALS?
- Dosing of Atropine for PALS?
- Dosing of Naloxone for PALS?
- Dosing administration of succinylcholine?
- Dosing of 20% Lipid Emulsion?
- Dosing of IV Glucose?
- Dosing and administration of Adenosine?

**CARDIAC PATHOPHYSIOLOGY AND TREATMENT**
- Operation of defibrillator machine itself?
- Correct placement of paddles & ECG leads?
- Joulas to set for cardioversion & defibrillation?
- Recognizing and treating arrhythmias?
- Recognizing and treating hypotension?
- Recognizing and treating local anesthetic toxicity?
- Recognizing and treating anaphylaxis?

**CODE TEAM ROLES**
- Team Leader?
- Chest compressions (frequency & depth)?
- Defibrillation?
- Airway Management?
- Drawing up Medications?
- Documentation during a Code?

Do you think your participation in the PACU Nurses Simulation Program has changed your approach to your patients in your personal clinical practice?

- "Being prepared is crucial. Being confident in recognizing pre-code symptoms allows us as PACU nurses to safely care for this patient population"
- "I feel that each nurse should do this twice a year to keep their emergency preparedness skills fresh given emergency events are few and far between but could honestly happen at any moment"

DISCUSSION
- One simulation training session may increase Pediatric PACU nurses’ self-reported confidence in PACU related skills, knowledge and comfort in code team roles.
- Confidence did not increase across all areas assessed.
- Future research should examine whether nurses would benefit from additional training sessions.

REFERENCES

Item | Pre-Test | Post-Test | P-Value
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Oral Airway Insertion | 2.67 ± 1.24 | 3.28 ± 1.07 | .002
One-Person Mask Ventilation/CPAP | 3.53 ± 0.51 | 4.05 ± 0.71 | .004
Recognizing Hypoxemia | 4.00 ± 0.82 | 4.05 ± 0.61 | .004
Treatig Hypoxemia | 3.84 ± 0.77 | 4.37 ± 0.60 | .013
Correct Placement paddles/EGC leads | 3.32 ± 0.95 | 3.89 ± 0.74 | .043
Joulas to set for cardioversion | 2.64 ± 0.21 | 3.11 ± 0.17 | .017
Joulas to set for defibrillation | 2.50 ± 0.04 | 3.01 ± 0.33 | .029
Recognizing arrhythmias | 2.68 ± 0.82 | 3.21 ± 0.79 | .020
Recognizing hypertension | 4.00 ± 0.75 | 4.53 ± 0.43 | .019
Recognizing local anesthetic toxicity | 1.94 ± 0.73 | 2.67 ± 0.77 | .019
Treating/local anesthetic toxicity | 1.79 ± 0.63 | 2.42 ± 0.69 | .006
Recognizing succinylcholine | 3.11 ± 0.05 | 3.68 ± 0.75 | .017
Treating anaphylaxis | 2.95 ± 0.13 | 3.65 ± 0.62 | .007
Dosing of epinephrine for PALS | 2.67 ± 0.84 | 3.22 ± 0.94 | .021
Dosing for atropine for PALS | 2.33 ± 0.97 | 2.94 ± 0.70 | .005
Dosing of naloxone for PALS | 2.39 ± 0.91 | 2.89 ± 1.13 | .007
Dosing of IV glucose for hypoglycemia | 1.89 ± 0.83 | 2.50 ± 0.92 | .012
Team Leader | 2.53 ± 0.87 | 2.94 ± 0.90 | .020
Defibrillation | 2.71 ± 0.77 | 3.35 ± 0.06 | .005
Airway management | 3.53 ± 0.72 | 4.12 ± 0.70 | .004