Effects of Simulation-Based Education on Interprofessional Teamwork Skills in Cardiac Arrest Scenarios

NGR 6813: EVIDENCE-BASED NURSING PRACTICE

UNIVERSITY OF CENTRAL FLORIDA

MARY BAERTLEIN
Research Question:

Do interprofessional healthcare providers who participate in simulation-based resuscitation education demonstrate an increase in teamwork skills?
Significance and Background:

- Why IP education?
  - IOM (2000) - “To err is human: Building a safer health system”
  - $17 billion - estimated annual cost of medical errors
  - IP collaboration becomes healthcare priority
  - 2013 – IPE endorsed by NLN, Joint Commission, AHRQ

(Institute of Medicine, 2000; Institute of Medicine, 2003; Garbee et al., 2013a; Neumar et al., 2015)
Significance and Background:

Why focus on resuscitation scenarios?

- Breakdown of IP teamwork during cardiac arrest resuscitation:
  - Adverse effect on ROSC
  - Detrimental patient outcomes / safety practices
  - Negative impact on patient survival to discharge
- Degradation of resuscitation knowledge and skills within 6 months
- 2015 AHA - course curriculum updated - team concepts / simulation

(Brock et al., 2013; Figueroa et al., 2013; Neumar et al., 2015 Yang et al., 2012 Zhu & Zhang, 2016)
Significance and Background:

- Why use simulation-based education?
  - SBTT – identified as effective educational methodology
    - Crisis-Resource Management (CRM)
    - Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS)
    - Emergency Team Coordination Course (ETCC)
  - Challenge - prepare IP healthcare providers to effectively respond to high-risk clinical events

(Andel et al., 2012; Dillon, Noble, & Kaplan, 2009; Garbee et al., 2013a; Garbee et al., 2013b; Shapiro, 2004)
## Methods

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Methods

Inclusion Criteria:

- Focus on teamwork
- IP healthcare participants
- Cardiac arrest events
- In-hospital setting
- Simulation-based training
- Published in English

Exclusion Criteria:

- Computer-based simulation only
- Evaluation of participant confidence
Methods

- Search retrieved 170 articles: 8 articles retained + 2 hand search = 10 articles

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Total Sample Size = 903

(202 Physicians; 297 RNs; 9 Nurse Anesth.; 51 RT; 8 PT; 36 non-category; 300 non-specified)

(Dearholt, Dang, Sigma Theta Tau International, & Institute for Johns Hopkins Nursing, 2012)
Findings: Teamwork

Summary - 9 out of 10 Studies Demonstrated Improvement in Teamwork Skills:

- Paired t-test: 8 Studies \((p < 0.001\) to \(p < 0.05\))
  - Participant mean Team Based Behavior (TBB) 4.74 to 5.62 \((p < 0.05)\)
  - Observer results (5 studies) - increased from 3.56 to 4.75 \((p < .05)\)

Retention: (1) none; (1) 2 weeks; (2) 3 months; (3) 6 months; (1) year

(Figueroa et al., 2013; Frengley et al., 2011; Garbee et al., 2013a; Garbee et al., 2013b; Gilfoyle et al., 2017; Mahramus et al., 2016; Shapiro et al., 2004; Wong, Gang, Szyld, & Mahoney, 2016)

- Cohen’s d / Pearson’s r test: 1 study - large effect size \((d = 0.84\) and \(r = 0.39)\)

Retention: None

(Sawyer et al., 2013)
Findings: Communication

Summary - 7 Studies Demonstrated Improvement in Communication Skills:

- Paired t-test: 6 Studies (p ≤ 0.004 to p < 0.05)
  - Participant mean increased from 2.5 to 3.8 (p < 0.05)

  Retention: (2) 3 Months; (1) 1 Year

  (Figueroa et al., 2013; Frengley et al., 2011; Garbee et al., 2013a; Garbee et al., 2013b; Gilfoyle et al., 2017; Wong, Gang, Szyld, & Mahoney, 2016)

- Cohen’s d / Pearson’s r test: 3.0 vs 4.4 (95% CI; p < 0.001)

  Retention: None

(Sawyer et al., 2013)
Findings: Situational Awareness

Summary - 3 Studies Demonstrated Improvement in Situational Awareness:

- Paired t-test: 3 studies (p < 0.001 to p < 0.05)
  - Mean observer scores increased 86.77 to 90.75
  - Mean percentage score increased from 0.55 to 0.75

Retention: (1) none; (2) 6 months

(Garbee et al., 2013a; Garbee et al., 2013b; Gilfoyle et al., 2017)
Gaps and Limitations:

- Lack of a standardized medical simulation evaluation tool
- Inability to blind study participants
- Variation related to retention timeframe measures
- Convenience sample – voluntary participation
- Attrition of study participants - retention
- Technical / ethical issues - video recording / debriefing in clinical setting
Recommendations:

Implications for Practice:  Level II / Quality B

- Development of a quality improvement strategy
  - Implement standardized IP SBTT for in-hospital cardiac arrest scenarios
  - Mock Codes to occur at least every 3 - 6 months (less than 1 year)
  - Duration of practice - (1) hour including pre- and post-debrief
  - Improve patient outcomes (i.e. ROSC, morbidity and mortality, LOS, reduce readmission rates)
Recommendations:

Implications for Future Research: Level II / Quality B

- Develop a standardized / validated medical simulation evaluation tool
  - Teamwork / communication / situational awareness
- Standardize retention timeframe measures
- Larger studies needed to assess impact on quality measures
  - Does IP SBTT improve ROSC, LOS, readmission rates, costs?
- Pilot studies
  - Measure teamwork and performance outcomes of similar units
  - Consider using blinded assessors
Conclusion:

Evidence supports IP simulation-based resuscitation education:

- Simulation-based education is a valid methodology to improve skills
  - Teamwork
  - Communication
  - Situational awareness

- Ongoing IP healthcare provider resuscitation team education to improve retention of knowledge and skills

- Additional research
  - Need to develop a validated medical simulation evaluation tool
  - Larger studies needed to assess IP SBTT on patient quality measures and healthcare costs


References


References


Any Questions?