Implementation and Evaluation of a Team Simulation Training Program

Y. Rice, DNP, APRN; L. Fryman, DNP, RN;
C. Talley, MD, FACS;
University of Kentucky HealthCare
March 31, 2016
## Conflict of Interest Disclosure

<table>
<thead>
<tr>
<th>Author</th>
<th>Disclosure</th>
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<tbody>
<tr>
<td>Yvonne Rice, APRN</td>
<td>No disclosure</td>
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<tr>
<td>Lisa Fryman, RN</td>
<td>No disclosure</td>
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<tr>
<td>C. Talley, MD</td>
<td>No disclosure</td>
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</tbody>
</table>
Background/Problem

• Golden hour of trauma
• Trauma leading cause of mortality
• Identified need for specialty trauma care
  • Trauma Teamwork
  • Improved communication
  • Role delineation
  • 5000 trauma patients evaluated
  • 3000 trauma patients admitted

Centers for Disease Control- Fast stats (2015);
Marquis (1918); Mowery et al, 2010; University of Kentucky Trauma Services (2014)
Background/Problem
Team Training

• Poor communication is one of the leading causes of medical errors in the United States (ARQH)

• Team training improves:
  • Team performance
  • Patient outcomes
  • Error rate
  • Leadership and communication skills
  • Confidence in leaders’ skills
  • Role delineation for team members

ARQH, (2010); Capella et al. (2010); Colacchio, Johnson, Zigmont, Kappus, and Sudikoff (2012); Deering et al. (2011); Edwards, Seggie, and Murphy, (2012); Figuero, Sepanski, Goldberg, Shah (2012); Frengley et al. (2011); Laird-Fick et al. (2010); Mayer et al. (2011); Maxson et al. (2011)
Background/Problem
Simulation Training

• Simulation in health care creates a safe and effective learning environment.

• Benefits
  • Realism of scenarios
  • Prompts realistic responses
  • Familiarity with equipment

• Outcomes
  • Satisfaction with training
  • Improved self-confidence
  • Improved critical thinking
  • Increased communication skills

ARQH (2010); Bambini, Washburn, and Perkins (2009); Brown and Chronister (2009); Gordon and Buckley (2009); Reznek et al. (2003); Roh, Lee, Chung, and Park (2011); Smith and Roehrs (2009); and Wehbe-Janek et al. (2011)
Hypothesis

Implementing a simulation-based team-training component as part of a comprehensive trauma nurse-training program will improve team behaviors while providing an enriching educational experience.
Setting

• **UK Medical Center**
• 700 Beds and growing
• Only Level I Trauma Center in central/eastern KY
• 5,000 trauma patients evaluated, 3,000 trauma patients admitted

• **TSICU**
• 24 beds
• 60-person RN Staff (most with BSN)
• Most ≤ 10 years experience

• **ED → TSICU**
• Synergistic relationship
• Communication is paramount

University of Kentucky Trauma Services (2014)
Intervention

• Team training
  Didactic
  Simulation
• Training added to an existing comprehensive Trauma Boot Camp
• Based on modified TeamSTEPPS™ training method
Methods

Pre-testing
• Teamwork Attitudes
• Teamwork Perceptions
• Team Performance (observed)

Trauma Boot Camp
• Modified TeamSTEPPSTM Team Training
• Team Simulation

Post-testing
• Teamwork Attitudes
• Teamwork Perceptions
• Team Performance (observed)
• Nurses’ Satisfaction
• Nurses’ Self-confidence
TeamSTEPPSTM Teamwork Attitudes Questionnaire (T-TAQ)

- 30-item Likert Scale instrument
  - 1 = strongly disagree → 5 = strongly agree

- Lower scores → negative attitudes
- Higher scores → positive attitudes

- Reliability
  - Previous Cronbach’s alpha = .80
  - Current sample Cronbach’s alpha
    Pre = .88  Post = .92

TeamSTEPPS™ Teamwork Perceptions Questionnaire (T-TPQ)

- 35-item Likert Scale instrument
  - 1 = strongly agree → 5 = strongly disagree
- Lower scores → positive perceptions
- Higher scores → negative perceptions

- Reliability
  - Previous Cronbach’s alpha = .90
  - Current sample Cronbach’s alpha
    Pre = .92 Post = .90

Battles & King, (2010)
Trauma Team Performance Observation Tool (TTPOT)

• 21 item 35-item Likert Scale instrument
  – 1 = very poor → 5 = excellent

• Lower scores → poor demonstration
• Higher scores → excellent demonstration

• Reliability
  – Previous Cronbach’s alpha = .83
  – Current sample Cronbach’s alpha
    Pre = .80 Post = .66

Baker, Capella, Hawkes, & Gallo (2011)
Student Satisfaction and Self-Confidence in Learning survey

- 13-item Likert Scale instrument
  - 1 = strongly disagree → 5 = strongly agree

- Satisfaction Subscale
  - Satisfaction with team training and simulation as a form of learning
  - Reliability
    - Previous Cronbach’s alpha = .94
    - Current sample Cronbach’s alpha = .91

- Confidence Subscale
  - Confidence with mastery of the material presented in the Trauma Boot Camp and in translating the simulation experience to real life
  - Reliability
    - Previous Cronbach’s alpha = .87
    - Current sample Cronbach’s alpha = .83

Jeffries and Rizzolo, (2006)
Implementation: November 4, 2014

- Completion of pre-test instruments
- Trauma Boot Camp
  - Trauma Care
  - Simulation (with observation)
  - Team Training
  - Simulation (with observation)
  - Simulation debriefing
- Completion of post-test instruments
# Study Population

$N=7$

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
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<td></td>
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<tr>
<td></td>
<td>Male</td>
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<tr>
<td>Education</td>
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<table>
<thead>
<tr>
<th>Variable</th>
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<tr>
<td>Age</td>
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<tr>
<td>Years with License</td>
<td>$1.42 \pm .53$</td>
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<tr>
<td>ICU RN Experience</td>
<td>$1.14 \pm .37$</td>
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<tr>
<td>TSICU Experience</td>
<td>$1.14 \pm .37$</td>
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Outcomes Evaluated

- Teamwork perceptions
- Teamwork attitudes
- Participants satisfaction and confidence
- Observed teamwork attributes
Data Analyses

- Descriptive statistics
- Paired t-tests
- Overall and mean summed scores
- $p < 0.05$ statistically significant
# T-TAQ Scores

## Pre- and Post-TBC

<table>
<thead>
<tr>
<th></th>
<th>Mean ± SD</th>
<th>df</th>
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<tr>
<td><strong>T-TAQ Total</strong></td>
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<tr>
<td>Pre</td>
<td>131.1 ± 8.8</td>
<td>6</td>
<td>2.59</td>
<td>.04</td>
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<tr>
<td>Post</td>
<td>121.4 ± 7.6</td>
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<tr>
<td><strong>T-TAQ Mutual Support</strong></td>
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<tr>
<td>Pre</td>
<td>25.85 ± 4.14</td>
<td>6</td>
<td>2.62</td>
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<tr>
<td>Post</td>
<td>19.71 ± 2.36</td>
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<tr>
<td><strong>T-TAQ Communication</strong></td>
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<tr>
<td>Pre</td>
<td>26.14 ± 1.95</td>
<td>6</td>
<td>5.68</td>
<td>.001</td>
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<tr>
<td>Post</td>
<td>23.00 ± 1.29</td>
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## T-TPQ Scores
### Pre- and Post-TBC

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<td><strong>T-TPQ Total</strong></td>
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<tr>
<td>Pre</td>
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<td>3.10</td>
<td>.021</td>
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<td>Post</td>
<td>69.00±10.13</td>
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<td><strong>T-TPQ Team Structure</strong></td>
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<tr>
<td>Pre</td>
<td>13.71±.95</td>
<td>6</td>
<td>-15.48</td>
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<tr>
<td>Post</td>
<td>12.57±2.82</td>
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<td><strong>T-TPQ Communication</strong></td>
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<tr>
<td>Pre</td>
<td>14.85±2.26</td>
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<td>3.80</td>
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<tr>
<td>Post</td>
<td>12.14±.37</td>
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## TTPOT Scores Pre- and Post-TBC

<table>
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<tr>
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<tr>
<td>Post</td>
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<tr>
<td>Pre</td>
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<tr>
<td>Post</td>
<td>25.28±2.62</td>
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<tr>
<td><strong>TTPOT Mutual Support</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>12.57±1.51</td>
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<td>-7.09</td>
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<tr>
<td>Post</td>
<td>18.57±.97</td>
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<td><strong>TTPOT Communication</strong></td>
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<tr>
<td>Pre</td>
<td>15.42±.97</td>
<td>6</td>
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<tr>
<td>Post</td>
<td>25.0±3.87</td>
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Nurse Satisfaction Self-confidence
Positive Outcomes from Trauma Team Simulation Training

- Team work perceptions
  - Team structure
  - Communication

- Simulated team performance
  - Situation Monitoring
  - Mutual support
  - Communication
Conclusions

• Team training (didactic and simulation-based) was successful

• Findings consistent with literature

• Findings support IOM and TJC recommendations

• Expect continued positive impact on TSICU and ability of UK Chandler Hospital to implement bypass of Emergency Department for seriously injured patients.
Limitations

• Small sample size
• Single observer
• Simulation is replica, not actual clinical situation
References


References


