IMPACT OF MULTIPLE IN-SITU SIMULATIONS ON THE NURSING TEAM AMONG MEDICAL-SURGICAL UNITS: LESSONS LEARNED

CAROLINE CANTRALL, MSN, RN-BC
NAOMI FULHORST, BSN, RN
KELLY MAYER, MSN, RN
YVONNE SCHMUDDE, MS, RN-BC
LEIGHANN STANDEFER, BSN, RN, TNS, CCRN
JILL CHAMBERLAIN, PHD, RN
ANCC

Continuing Nursing Education

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DISCLOSURES

Conflict of Interest

• Carrie Cantrall (Author) reports no conflict of interest
• Naomi Fulhorst (Author) reports no conflict of interest
• Julia Greenawalt (INACSL Conference Administrator & Nurse Planner) reports no conflict of interest
• Leann Horsley (INACSL Lead Nurse Planner) reports no conflict of interest

Successful Completion

• Attend 90% of session
• Complete online evaluation
ACKNOWLEDGEMENTS

This research was supported by a generous grant from the Memorial Medical Center Foundation from Springfield, IL.
OBJECTIVES

Upon completion of this presentation, participants will be able to:

1. Discuss importance of medical-surgical nursing team members ability to perform first-responder skills.
2. Describe the challenges of in-situ simulation.
3. Identify lessons learned that emerged from the research study.
BACKGROUND

Cardiac arrests outside the ICU are low frequency high risk events

34% of all codes are outside ICU

First responders’ roles are critical in obtaining optimal patient outcomes (Roh, Issenberg, Chung, & Kim, 2012).

Lack of confidence, knowledge, and experience with these events can delay CPR standards of care (Arnold et al., 2013; 2009; Delac et al., 2013).
GAP IN LITERATURE

How to expand the benefits of in-situ simulation to reach the entire nursing unit and not just the participants present for the actual scenario.
PURPOSE

• Would repetitive in-situ simulations and disseminated debriefing through e-mail increase self-efficacy and knowledge levels of resuscitation among the entire nursing unit?

• Objectives:
  ▫ Decrease responder time to CPR
  ▫ Increase quality of CPR
  ▫ Increase self-efficacy and knowledge of resuscitation for the entire nursing unit
METHODS/APPROACH

Institutional Review Board approval

Key stakeholder buy-in

Mixed methods, quasi experimental one-group pre-test/post-test design

Convenient sample:
  • 160 nursing team members
  • 4 medical-surgical nursing units
  • Nurses and nursing assistants
Based on American Heart Association guidelines:

1. How soon should chest compressions begin from recognition of cardiac arrest?
2. How deep should a rescuer compress during CPR for an adult victim?
3. How fast should compressions be delivered to an adult victim during CPR?
4. What can a provider do to increase quality of chest compressions during CPR at the hospital? (select all that apply)
5. Choose the correct defibrillator pad placement(s) from the options below.
6. The rescuer should deliver breaths by squeezing the ventilation bag until the rescuer sees ________.
**Resuscitation Self-efficacy Scale**

Resuscitation self-efficacy is defined as a judgment of perceived capability to organize and execute the process of care during resuscitation. Read each statement and then select the response that best indicates your level of agreement.

<table>
<thead>
<tr>
<th>Item</th>
<th>1 Least confident</th>
<th>2 Neutral</th>
<th>3 Very confident</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recognition</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Demonstrates correct measurement, interpretation and documentation of vital signs</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Initiates relevant patient monitoring (electrocardiogram, pulse oximeter)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. Recognizes signs and symptoms of a critical event</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. Demonstrates a focused assessment following the ABC (Airway, Breathing, Circulation) principles</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Debriefing and recording</strong></td>
<td></td>
<td></td>
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<tr>
<td>5. Performs debriefing or problem solving after the event</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>6. Completes quality improvement documentation</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7. Demonstrates staying calm and focusing on required tasks</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>8. Performs re-assessment or re-evaluation</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Responding and rescuing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Performs cardiopulmonary resuscitation according to resuscitation algorithm</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10. Demonstrates effective chest compressions (hand placement, depth, speed)</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>11. Demonstrates effective bag valve mask ventilations (volume, minute volume, pressure, etc.)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12. Demonstrates correct management of defibrillator</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13. Explains clinical findings and critical lab values</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Reporting</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>14. Provides appropriate messages and information to resuscitation team members</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>15. Utilizes resources and external experts</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16. Demonstrates use of appropriate means of communication according to the hospital’s policy</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>17. Understands when to call for help</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**PRE-TEST/POST-TEST TOOLS:** **RESUSCITATIVE SELF-EFFICACY SCALE (RSES)**

- Created by Roh et al., 2012
- 17 Items
- Cronbach’s α coefficient = .921
TOOL USED DURING SIMULATION: PERFORMANCE MEASUREMENT TOOL

- Concepts from Roh et al., 2012 & Arnold et al., 2009
- Tracks performance & latent threats

<table>
<thead>
<tr>
<th>Observed Skill</th>
<th>Time Performed</th>
<th>Did Not Perform</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsiveness Assessed</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Call for Help</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airway &amp; Breathing Assessed</td>
<td></td>
<td></td>
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<tr>
<td>Pulses Assessed</td>
<td></td>
<td></td>
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<tr>
<td>Fada Attached</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Responding &amp; Rescuing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obtain Crash Cart</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apply Back Board</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest Compressions Initiated</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
| Oxygen Applied/Bag Valve Mask Ventilations | | | |%
| Chest Compressions Maintained |           | See 3D Simulator Print Out |       |
|                           |                |                 |       |
| Reporting                 |                |                 |       |
| Conveys pertinent information to team | | | |
| Utilizes resources and external experts | | | |

Immediate Debriefing Points:

- What went well for the team?
- What felt confusing?
- What lessons from today should be shared with the rest of the unit team?
- *Latent Threats Identified by Team:
ORIENTATION TO MANNEQUIN

ATTENTION Nursing Team: During the months of January through June simulations will take place on 2EOncology, 3General, 4B and 5B

Get to know your patient now!

Name: Mega Code Kelly
Diagnosis/medical problem: This will be shared with you at the start of the simulation.

- ECG lead placements
- Defib pad placements
- Insert IVs in right arm
- Check a pulse here! (bilateral carotids & left radial)
- Check a Blood Pressure here!
- Check a pulse here! (bilateral carotids & left radial)

What if you need to know other information? Just ask! I can say basic words.

What CAN you do to me?
- Intubation
- Chest compressions
- Catheter insertion
- IV start – RIGHT ARM ONLY
- NG placement
- Auscultate lung, heart, and bowel sounds

What CAN’T you do to me?
- Can NOT insert catheter or tubes without lubrication
- Can NOT insert IV catheter anywhere other than my right arm

Simulations may occur on anyshift. If you have any questions or concerns please contact your Nurse Manager.
DEBRIEFING FLYER

• Disseminated after each round of mock codes
• Highlighted performance data and lessons learned

Mock CODE Debriefing Lessons - July 17th

Overall trends this Month from all four nursing units:

All codes had great teamwork, obtained the crash cart, and utilized the backboard. Be sure to call a code even if you are unsure it is actually a code. The second person who enters the room should take over compressions for the primary RN so he/she can better communicate to the team. Familiarize yourself with the ventilation equipment and begin to ventilate the patient as soon as someone is able prior to the code team’s arrival.

Performance Markers among nursing units:

- Average time to start compressions after calling code: 10 seconds
- Percent of mock CODEs that utilized backboard: 100%
- Percent of time adequate compression depth was achieved: 39.1%
- Percent of time adequate compression rate was achieved: 36.6%
- Percent of time adequate ventilation was achieved: 0%

Take Home Points

- Equipment:
  - Utilize CPR release lever on side of bed to lower head quicker
  - Open crash cart by pulling down hard on zip tie
  - To open ambu bag, pull both ends apart so it inflates all the way

- Performance:
  - Interrupt chest compressions for less than 10 seconds
  - Start chest compressions as soon as a code is called
  - Begin ventilations before the code team arrives if you have time
  - Review correct ECG lead placement
  - Take over CPR for primary RN so he/she can communicate easier

Questions? Please Contact Carrie Cantrall at Cantrall.Caroline@mhsl.com or 8-4443

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DATA PROCESSING/DATA ANALYSIS

Paired t-test to determine significance between pre and post surveys

Performance data was collected from the mannequin’s software and analyzed to calculate mean performance measures

Open-ended questions on the post-test survey were themed by the research team to draw conclusions and organizational implications

• “Simulation helped with my comfort level”
• “Debrief flyer helped with my comfort level”
• “Willingness to participate in another simulation”
• “Preferred location of simulation”
## RESULTS: DEMOGRAPHICS

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size (response rate)</td>
<td>N = 48 (30%)</td>
<td>N = 31 (19%)</td>
</tr>
<tr>
<td>Average Age</td>
<td>Under 30</td>
<td>Under 30</td>
</tr>
<tr>
<td>Average Years of Experience</td>
<td>3.38</td>
<td>5.36</td>
</tr>
<tr>
<td>Nurses</td>
<td>77%</td>
<td>71%</td>
</tr>
<tr>
<td>Number of live codes</td>
<td>1.15</td>
<td>4.37</td>
</tr>
</tbody>
</table>
RESULTS: PRE-TEST/POST-TEST COMPARISON

Knowledge

• No significant difference among roles between pre-test ($p=0.53$) and post-test knowledge ($p=0.85$)

• No significant difference between pre-test and post-test scores overall within roles ($p=0.37$)
RESULTS: PRE-TEST/POST-TEST COMPARISON

Self-efficacy

• No significant difference among roles between pre self-efficacy score ($p=0.61$) & post self-efficacy score ($p=0.56$)
• No difference between pre and post self-efficacy scores overall within roles ($p=0.92$)
RESULTS: AVERAGE FIRST RESPONDER PERFORMANCE

Average performance markers achieved in CODEs each month

- Backboard
- Adequate Chest Compression Rate
- Adequate Chest Compression Depth

Average time to start chest compressions

- Seconds
RESULTS: POST-TEST QUESTIONS

“Simulation helped with my comfort level”

• Majority (51%) reported it helped “a lot” or “somewhat”

“Debrief flyer helped with my comfort level”

• Majority (61%) reported it helped “a lot” or “somewhat”

“Willingness to participate in another simulation”

• Majority (90%) will participate in another simulation

“Preferred location of simulation”

• Majority (55%) prefer both simulation center AND in-situ
LATENT THREATS IDENTIFIED

• Unfamiliar with crash cart (5)
• Participants identified "staffing" as a barrier to code participation (3)
• Defibrillator not delivered to room (on separate cart from main crash cart) (2)
• Code called over Vocera communication device. Did not reach everyone (2)
• Participants reported not knowing recommended depth and rate of compressions
• No oxygen regulator in room, unaware oxygen regulator is in crash cart
• Defibrillator plugged into wrong location
• Unfamiliar with how to work stretcher
• Pediatric ambu bag located in bottom drawer of crash cart
• Disengagement from nursing team
• Unfamiliar with steps to take before code team arrives
DISCUSSION

Challenges identified by participants

• Perception that mock codes interfered with patient care needs (only away from bedside for 5 minutes)
• Unfamiliar with equipment (need to review orientation plan)
• Lack of communication that a mock code was occurring (fear of unknown – lack of engagement because of fear)

Challenges identified by research team

• Lack of baseline resuscitative knowledge (concern with retention of knowledge)
• Lack of participant engagement (despite early discussions with Unit Managers)
• Cancellation Criteria (Is it feasible in today’s units?)
LESSONS LEARNED

- Stair-Step Simulation Education to Build Comfort Levels
- In-Situ Most Valuable to Identify Latent Threats – Not For Skill Building
- Repetition, Repetition, Repetition = Retention
- Making Resuscitative Skills a Priority at Every LEVEL
- Unit Ownership – Peer to Peer Education
- Real Thirst for Immediate Feedback and Re-Do
FUTURE RESEARCH RECOMMENDATIONS

How can an entire department benefit from simulation with limited resources?

What is the best way to increase nursing team engagement in skill retention interventions?
REFERENCES


CONTACTS

For further Information, contact:

Carrie Cantrall, MSN, RN-BC
Clinical Nurse III
Memorial Medical Center
701 N. 1st Street
Springfield, IL 62781-0001
cantrall.caroline@mhsil.com

Naomi Fulhorst, BSN, RN
Clinical Nurse
Memorial Medical Center
701 N. 1st Street
Springfield, IL 62781-0001
fulhorst.naomi@mhsil.com