Improving Healthcare Outcomes with Simulation-Based Learning: From Local to International Impact

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Simulation

• A technique that creates a situation or environment to allow persons to experience a representation of a real event for the purpose of practice, learning, evaluation, testing, or to gain understanding of systems or human actions.

Basic Skills: The Building Blocks

1910: Bandaging  Epidural  Airway

https://basicmedicalkey.com/simulation-in-nursing/
To Putting it all Together

Sterile Technique

Basic Anesthesia Inductions
UIHC Team Crisis Management Training

Code Hemorrhage

Operating Room Fire

Team Simulation Design and Debriefing (TSDD) Course
Changing Culture: Decreasing Human Error

Crisis Resource Management

- Call for Help Early
- Designate Leadership
- Anticipate and Plan
- Establish Role Clarity
- Distribute the Workload
- Communicate Effectively
- Use Cognitive Aids
- Use All Available Information
- Mobilize Resources
- Allocate Attention Wisely

Cognitive Key Points

- Know the Environment
- CRM

Cognitive Aids

Asystole / PEA ........................................ 1
Bradycardia ........................................... 2
SVT - Unstable and Stable ....................... 3
VFB / VTACH ........................................ 4
Anaphylaxis .......................................... 5
Bronchospasm ....................................... 6
Delayed Emergence ................................ 7
Difficult Airway / Cric ......................... 8
Embolism - Pulmonary ......................... 9
Fire - Airway ........................................ 10
Fire - Non-Airway ................................. 11
Hemorrhage ........................................ 12
High Airway Pressure ........................... 13
High Spinal .......................................... 14
Hypertension ....................................... 15
Hypotension ........................................ 16
Hypoxemia ......................................... 17
Local Anesthetic Toxicity ..................... 18
Malignant Hyperthermia ................. 19
Myocardial Ischemia ............................. 20
Oxygen Failure .................................... 21
Pneumothorax ..................................... 22
Power Failure ....................................... 23
Right Heart Failure ......................... 24
Transfusion Reaction ....................... 25
Trauma .............................................. 26
Crisis Resource Management ............ 27
Emergency Manual Use .................... 28
Infusion List ........................................ 29

Implementing the Stanford Emergency Manual Using Simulation
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Introduction

- Critical events in the operating room create a stressful environment that affects team performance and leads to human error.
- The Stanford Emergency Manual (SEM) is a cognitive aid that helps providers recall key information and results in more effective execution of critical interventions during emergency situations.
- Simulation improves provider familiarity, acceptance, and likelihood of utilization of the SEM during critical anesthesia events.
- Implementing the SEM in multiple rural hospitals may have an increased benefit since they encounter emergency situations infrequently.

Purpose

To integrate the SEM into practice in rural Iowa community-based and critical access hospitals.

Objectives:
1. Increase awareness of the SEM among perioperative staff.
2. Familiarize staff on how to effectively use the SEM.
3. Increase accessibility to the SEM.
4. Integrate SEM into practice utilizing in-situ team simulation.

Methods

- Projects were deemed not human subjects research at each hospital site.
- Educate perioperative staff on human error, content, design, and the use of cognitive aids.
- Specific simulations were designed for each rural Iowa facility including LAST, amniotic fluid embolism, MH and anaphylaxis.
- All facilitators completed the University of Iowa Team-based Simulation Design and Debriefing workshop to gain expertise in designing and conducting team simulation.
- Confidentiality agreement to assure simulation integrity and participant privacy.
- Post-simulation debriefing sessions.
- A full day of simulation sessions utilizing the SEM was held at the Iowa Association of Nurse Anesthetists meeting for over 100 attendees.

Outcomes

- SEMs have been implemented using in-situ simulation in 11 rural and critical access hospitals in Iowa.
- 37 separate simulation sessions were completed.
- Data from one project site.

Conclusions

- Staff who participated in simulations confirmed they are more likely to use the SEM during an emergency situation.
- Consistent data collection from each site allows for cumulative data analysis.
- External funding is needed to continue implementation of the SEM to more rural Iowa communities.

References


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Across Iowa

Doctor of Nursing (DNP) Projects

SIM-IA

Iowa Association of Nurse Anesthetists (IANA)
Across the Nation

American Association of Nurse Anesthetists (AANA)
Boston 2018, Chicago 2019, Chicago 2022, Seattle 2023
International Meeting on Simulation and Healthcare (IMSH)
Research: Does it Work?

Simulation Using Manikins and Standardized Patients (SPs) Reproduces Communication Patterns Similar to Actual Clinical Practice

Heather Bair DNP, CRNA, CHSE, Katie Knox PhD, RN, CHSE, Clarissa Shaw PhD, RN

Methods & Materials

Participants

Ten nursing staff:
N=5 nursing assistants
N=5 nurses

Control: Conversations in actual practice (Naturalistic)

Simulation: Bed bath + manikin with voiceover (Sim Manikin Bath)

Simulation: Vitals + untrained Healthcare Provider (HCP) SP (Sim HCP Vitals)

Simulation: Glucose check + older trained SP (Sim SP Glucose)

Participants were audio-recorded in four conditions

Simulation Design

Utilized National League for Nursing (NLN) Simulation Design Template

Simulations validated for relevance by 8 interdisciplinary experts.

Debriefings were completed following all simulations using PEARLS Framework

Data Analysis

Iowa Coding of Elderspeak (iCodE) (Shaw et al., 2021) scheme was used to assess elderspeak in the audio recordings of all 4 conditions.

The proportion of elderspeak in each simulation was compared to the control condition using paired T-tests.

Results

<table>
<thead>
<tr>
<th>Communication State</th>
<th>Naturalistic Mean (SD)</th>
<th>Sim Manikin Bath Mean (SD)</th>
<th>Sim HCP Vitals Mean (SD)</th>
<th>Sim SP Glucose Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Elderspeak</td>
<td>0.296 (0.205)</td>
<td>0.291 (0.137)</td>
<td>0.289 (0.121)</td>
<td>0.286 (0.247)</td>
</tr>
<tr>
<td>Semantics</td>
<td>0.139 (0.120)</td>
<td>0.325 (0.238)</td>
<td>0.329 (0.125)</td>
<td>0.326 (0.146)</td>
</tr>
<tr>
<td>Discourse</td>
<td>0.475 (0.309)</td>
<td>0.322 (0.238)</td>
<td>0.329 (0.125)</td>
<td>0.326 (0.146)</td>
</tr>
<tr>
<td>Procedic</td>
<td>0.352 (0.315)</td>
<td>0.291 (0.137)</td>
<td>0.288 (0.247)</td>
<td>0.286 (0.247)</td>
</tr>
</tbody>
</table>

The average amount of elderspeak used by nursing staff in the Naturalistic environment was 29.9% (SD=20.9%). This was not significantly different from the average amount of elderspeak used across the three simulations which ranged from 29.1% elderspeak to 30.4% elderspeak (p>.05).
The Future
Thank you