



Implementation of an *In Situ* High Fidelity (INHFS) Mock Code Program in a Level IV Neonatal Intensive Care Unit (NICU)

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Background

- ❖ 10% of newborns will require resuscitation at birth.
- ❖ Successful resuscitation outcomes depend on staff ability to recognize declining patient status, evaluate and establish an airway, perform correct chest compressions, identify and treat lethal cardiac rhythms and administer resuscitation medications correctly.
- ❖ A 2016 NICU Staff survey revealed that staff lacked self-confidence regarding neonatal resuscitation knowledge and skills and were unfamiliar with emergency cart content.

Purpose

- ❖ To improve staff confidence and quality performance of knowledge and skills during a code by implementing an INHFS Mock Code Program.

Objectives

- ❖ Increase staff confidence in ability to recognize critical situations, familiarity with code cart contents, and increase awareness of resuscitation roles as measured by Grundy's Confidence Scale (C-Scale) at 12 months post implementation.
- ❖ Observe and evaluate leadership, teamwork, closed loop communication, and task management during the mock codes using the Team emergency assessment measure (TEAM) for 12 months.
- ❖ Provide staff opportunities for deliberate practice of resuscitative knowledge and skills as evidenced by attendance at 12 months.
- ❖ Use Neonatal Resuscitation Protocol (NRP) checklist to evaluate NICU staff performance of NRP 7th edition guidelines.

Setting

- ❖ 47 bed Level IV NICU with 130 RNs, 17 RTs, 27 NNPs/Fellows
- ❖ Approximately 35% of NICU staff <3 years' experience



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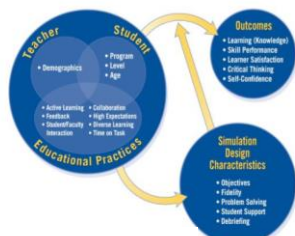
Literature Review

- ❖ Institute of Medicine (IOM) supports high fidelity simulation including prebriefing, simulation, and immediate debriefing to prevent errors and increase patient safety.
- ❖ Psychomotor skills deteriorate more rapidly than knowledge requiring ongoing deliberate practice to maintain skill and confidence in clinical situations.
- ❖ Clinical simulation should occur in the clinical area using a high fidelity computerized manikin with realistic scenarios followed immediately by objective led debriefing.
- ❖ Using INHFS followed by reflective debriefing improves knowledge, skill retention and participant satisfaction.

Conceptual Framework

NLN/Jeffries Simulation Framework (Jeffries 2007)

- ❖ Knowledge and skills gained in simulation translate to the clinical environment.
- ❖ Guided the creation of realistic patient based scenarios and implementation of the Mock Code Program.

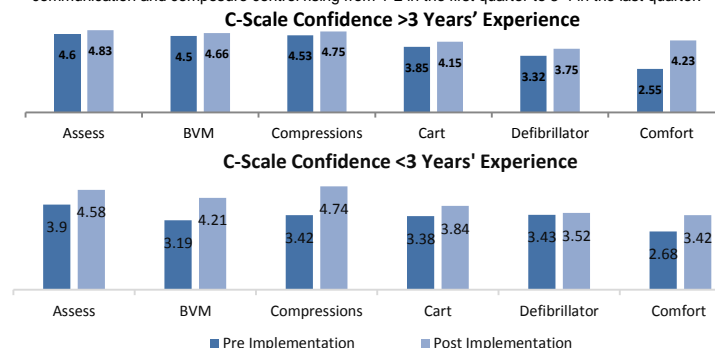


Methods

- ❖ Mock Code Committee formed, members assisted in planning/implementation of program, completed required simulation lab training, education regarding TEAM tool use and review of Mock Code data.
- ❖ Staff education regarding mock code process and timeline.
- ❖ Mock codes
 - ❖ Scheduled 2/day shift and 1/night shift per month.
 - ❖ NICU open room setup with SimBaby and resuscitation equipment.
 - ❖ Use of created patient-based scenarios.
 - ❖ Lasted 20-25 minutes including debriefing.
 - ❖ Facilitated by 3 committee members with roles of scenario presentation and debriefing management, recording mock code times and actions, and management of SimBaby.
- ❖ **NRP Checklist:** Evaluated NICU staff performance of NRP Guidelines.
- ❖ **C-Scale:** Valid and reliable instrument to measure confidence in six (6) psychomotor skill areas:
 - 1) Recognizing a critical situation.
 - 2) Using a BVM.
 - 3) Performing chest compressions.
 - 4) Using code cart equipment.
 - 5) Identifying lethal rhythms/defibrillator.
 - 6) Overall confide code.
 - ❖ Given pre and 12 month post implementation.
 - ❖ Likert type scale
 - ❖ Scored 1 – (not confident at all) to 5 – (completely confident).
- ❖ **Team Emergency Assessment Measure (TEAM):** Valid and reliable instrument used during simulated codes situations to evaluate:
 - 1) Leadership skill and execution.
 - 2) Closed-loop communication.
 - 3) Hand-off report.
 - 4) Collaboration/management.

Results

- ❖ **27 Mock Codes** held over 12 months: 18 on day shift and 9 night shift (11% staff rotate shifts).
- ❖ **Overall staff participation:** 74% (with: 100% RTs and NNPs, 53% Nurses).
- ❖ **NRP Checklist:** 1) Staff followed **NRP protocol 92%** - speeds varied according to experience level
2) Time to establish airway varied greatly depending on staff experience level:
 - a. beginning with the longest time at 3 minutes and 30 seconds the first month.
 - b. ending with the shortest time at 48 seconds in month 12.
- ❖ **Grundy's C Scale:** 1) Self reported self confidence for staff **increased from 2.55 to 4.23 out of 5.**
2) Self reported self confidence for staff with <than 3 years experience **increased from 2.68 to 3.42 out of 5.**
- ❖ **TEAM Scores: Small incremental changes** with greatest improvement in closed loop communication and composure control rising from 1-2 in the first quarter to 3-4 in the last quarter.



- ❖ **System improvements:** Repaired code alert system in the step down area and currently reviewing code pager alert functionality.
- ❖ **Established a NICU Resuscitation Bundle (12/2017)** includes:
 - ❖ Just-in-time training – monthly review of skills.
 - ❖ INHFS Mock Codes – monthly on all shifts.
 - ❖ Monthly Resuscitation Review Conference.
 - ❖ Standardized bedside debriefing immediately following a code event.
- ❖ **Positive Comments from participants:**
 - ❖ "More Mock Codes, The more practice the better"- RN.
 - ❖ "Great opportunity to see what area needs improvement"- RN.
 - ❖ "The more you do, the more familiar/comfortable you become!"- RN.
 - ❖ "Excellent opportunity to improve communication/skills you don't already have"- NNP.

Conclusions

- ❖ The use of INHFS mock codes in the NICU can provide an effective mechanism to improve NICU staff confidence with neonatal resuscitation knowledge and skill competency.
- ❖ When designing an INHFS NICU mock code program, plan should consider: 1) using realistic patient based scenarios that increase with difficulty, 2) timing/scheduling in relationship to unit acuity, 3) space/equipment availability and 4) available personnel to assist in mock code delivery.

Implications for Practice

- ❖ Implementing regularly scheduled NICU INHFS mock codes promotes staff confidence, decreases anxiety and increases resuscitative event preparedness.
- ❖ The benefits of simulation technology support the continued use of ongoing INHFS training to further improve team performance, maintain confidence, and assure quality

Abstract

Title: Implementation of In Situ High Fidelity Simulation (INHFS) Mock Codes in a Level IV Neonatal Intensive Care Unit (NICU)

Background

Recent evidence affirms that regularly conducted INHFS mock codes improve response times, equipment familiarity, and staff comfort levels. A 2016 Level IV NICU staff survey revealed a lack of self-confidence regarding neonatal resuscitative knowledge and unfamiliarity with emergency cart contents. These deficiencies can lead to poor skill execution, reduced teamwork during resuscitative events, and poor patient outcomes.

Purpose

The purpose of the program was to develop and implement a sustainable in situ high fidelity simulation (INHFS) mock code program in the CMCD NICU providing staff opportunities for deliberate practice of resuscitative knowledge and skills, assessing response times. The secondary goals include evaluating teamwork and collaboration during resuscitative events and improving self-reported staff confidence.

Evaluation Methods and Implementation

Monthly interdisciplinary INHFS Mock Codes were implemented in a Level IV NICU. The nurse was pre-briefed and responsible for initial patient assessment, therapy, and activating the NICU alert system. A Neonatal Resuscitation Program (NRP) based checklist was used to evaluate resuscitative skill performance. Grundy's C-Scale was administered to measure individual self-confidence. The Team Emergency Assessment Measure (TEAM) was used to evaluate leadership, closed loop communication, and role delineation.

Results

C-Scale pre-implementation revealed staff lacked self-confidence with resuscitation skills. Twelve months' post implementation showed a significant improvement in knowledge and skill. TEAM data revealed increased level of comfort with being part of a resuscitative team, improved closed loop communication and a more functional atmosphere following participation in the INHFS NICU mock codes.

Conclusions

The use of INHFS mock codes in the NICU can provide an effective mechanism to improve NICU staff confidence with neonatal resuscitation knowledge and skill competency. When designing an INHFS NICU mock code program, plan should consider using realistic patient based scenarios that increase with difficulty. For positive outcomes it is important to consider timing and scheduling of the mock codes in relationship to unit acuity. Space and high fidelity equipment needs to be readily available and accessible with adequately trained personnel to assist in mock code delivery. The benefits of simulation technology support the continued use of ongoing INHFS training to further improve team performance, maintain confidence, and assure quality patient care.

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See Handouts for References

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