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DEVELOPMENT OF A MATERNAL CHILD HEALTH DEPARTMENT-WIDE NEONATAL RESUSCITATION CART EDUCATIONAL PROJECT

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PURPOSE

Inefficiencies and inefficacies in the performance of certain Neonatal Resuscitation Program (NRP) skills, including the assembly and checking of resuscitation supplies and equipment, as well as behavioral and team work skills, were identified as an opportunity for improvement within the Providence Holy Cross Medical Center's (PHCMC) Maternal Child Health (MCH) areas.

TARGET AUDIENCE

Although both MCH nursing and respiratory services staff attend the NRP, implementation and adherence to the "Code Preemie" system has been challenging. Effective communication and collaboration, including optimization of emergent procedural roles and expectations among the clinical team, have not been seamless processes. An evidence-based approach is essential to optimize patient safety during the delivery of emergent care to newborns at birth and prevent failure to rescue (Delong, et al, 2013). Education and training was provided to assist MCH staff members gain familiarity and proficiency with resuscitation cart utilization, decrease their stress, and improve their ability to provide crucial initial steps in treating the newly born infant requiring resuscitation (Sawyer, Umoren, & Gray, 2017).

SIGNIFICANCE

The American Academy of Pediatrics (AAP) and American Heart Association (AHA) remind us of the importance of neonatal resuscitation skills. Most newborn infants make their cardiorespiratory transition to extrauterine life without any need for intervention. However, many infants will still require assistance to begin breathing, and some infants will require extensive resuscitative intervention.

Approximately 4% to 10% of term and late preterm newborns will require positive-pressure ventilation (PPV) to assist their breathing after birth. It has been estimated that 1 to 3 newborns per 1,000 infants will require chest compressions or emergency medications for resuscitation and stabilization.

As the need for neonatal resuscitation cannot always be predicted, MCH staff members need to be prepared to provide lifesaving interventions quickly and efficiently at every birth (AAP & AHA, 2015).

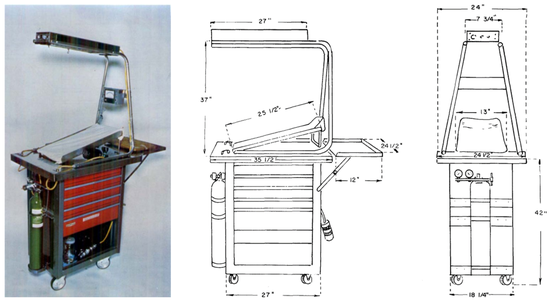

Figure 1. The Resuscitation Cart.

Reprinted from R.B. Clark, C.V. Holland, J.B. Hein & N.M. Strand. An improved infant resuscitation cart for the delivery room. JOGN Nursing 1975 (4), pp. 33-36. DOI: (10.1111/j.1552-6909.1975.tb02278.x) Copyright © 1975 AWHONN, the Association of Women's Health, Obstetric and Neonatal Nurses

DISCUSSION

- The use of scene organization, including cognitive aids, has been shown to be a critical component that can facilitate or impede resuscitation workflow and teamwork. Elements include the layout of equipment, representing the anticipation and planning of resuscitation; room organization, including retrieval and placement of the code cart so the resuscitation team members can quickly access equipment; and role allocation, with role clarification contributing to better organization and physical workflows (McLanders, Sanderson & Liley, 2017).
- Although the NRP has standardized the steps and identified the equipment needed during neonatal resuscitation, there have been no recommendations on the organization of equipment to minimize errors or improve ergonomics and performance. Human factors principles were used to redesign and optimize the neonatal resuscitation cart (Grundgeiger, et al, 2014). The number of neonatal resuscitation carts were increased, and their locations identified to ease staff access and acquisition of resuscitation equipment (Chitkara, et al, 2013). Storage of resuscitation equipment in the cart was standardized to optimize identification and retrieval times, increasing accuracy in the selection of life-sustaining supplies (Chitkara, et al, 2013; Law, et al, 2017). A resource binder containing the daily cart log, neonatal code sheet, debriefing form, NRP reference chart, "Code Preemie" emergency telephone numbers, resuscitation cart drawer content lists with pictorial illustrations of equipment, emergency drug medication dosage chart, and other NRP references were also provided with each neonatal resuscitation cart.

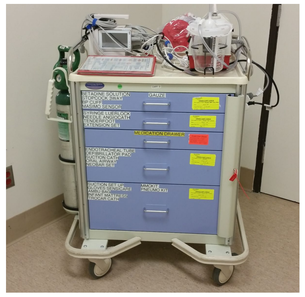

Figure 2. Neonatal Resuscitation Cart

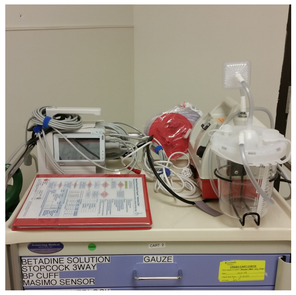

Figure 3. Top of Neonatal Resuscitation Cart

Figure 4. Drawer in Neonatal Resuscitation Cart

COURSE DESIGN

The educational course was provided as just-in-time training in order to meet the immediate needs of staff members, and was tailored to the learners' characteristics. A conceptual approach was used, consisting of active learning strategies, i.e., problem-based learning (PBL), with concept integration of NRP woven throughout the course design. Curricular content, including objectives (Table 1), were drawn from major concepts from the NRP guidelines.

- Lecture included visual aids; handouts were distributed.
- Small group discussions were initiated after introduction of each topic to assist in the integration of new knowledge and facilitate staff member feedback.
- Group discussion of case problems during neonates' resuscitation is a known effective method for directing clinical practices, peer sharing, and reflection of experiences. These techniques assisted in making the new knowledge their own, into a knowledge base of which the MCH staff already possesses.
- Low fidelity simulation, via a "Scavenger Hunt" activity using the neonatal resuscitation cart, allowed realism by having the MCH staff demonstrate the correct location and selection of neonatal resuscitation supplies and treatments. This approach assisted in psychomotor skill development and acquisition, and provided MCH staff members with opportunities to integrate critical thinking, problem solving, and decision-making skills.

Table 1

Content Outline

Content
I. Introduction
A. Neonatal Crash Cart optimization
B. Learning objectives
C. Teaching strategies & learning activities
1. Lecture
2. Discussion
3. "Low stakes" simulation (Scavenger hunt)
II. Body of lecture
A. Neonatal Crash Cart
1. Neonatal resuscitation guidelines
a. Assembly and checking of supplies and equipment
b. Quick equipment checklist
2. Effective communication
3. Focus on teamwork
B. Neonatal Crash Cart binder
1. Neonatal resuscitation algorithm
2. Neonatal Crash Cart log
3. Code Preemie documentation record
4. Debriefing form
4. Emergency telephone numbers
5. Neonatal Crash Cart list & pictorials
6. Emergency resuscitation medications
7. Blood gas and laboratory values references
8. Hypoxic ischemic encephalopathy (HIE) resources
9. ECG lead placement guide
10. Defibrillator pad placement and use recommendations
III. Review
IV. Conclusion
A. Summary
B. Questions & answers
C. References
D. Evaluation

- A 5-item verbal quiz required staff to respond in order to demonstrate their knowledge, identify misconceptions, struggles, and learning gaps. It assisted in gathering objective data about staff learning, specifically in memory, recall, and comprehension.

This type of experiential learning also facilitated nursing communication and care practices, with the end goals of ultimately improving patient care, safety, and health outcomes. The design utilized for this educational course offered the advantage of an efficient use of resources, requiring less cost and minimal time commitment while providing the MCH staff with needed evidenced-based training that ultimately will improve neonatal patient population outcomes.

EVALUATION METHOD

A formative evaluation process was used throughout the learning activities, and questioning techniques were used throughout the lecture and simulation in order to identify and correct any difficulties the staff may have had understanding concepts related to utilizing the optimized neonatal resuscitation cart.

After the lecture, staff participated in a group 5-question verbal quiz, as well as low-stakes simulation "scavenger hunt", as a means to assess their knowledge for problem solving, decision-making, locating and familiarizing themselves with neonatal resuscitation resources, as well as provide validation of their outcomes of learning.

Figure 5. Neonatal resuscitation cart simulation.

EVIDENCE-BASED REFERENCES

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