Research Week 2022

Simulation Training to Improve Skill Proficiency and Confidence in Neonatal Resuscitation Program (NRP)

Northeast Georgia Health System

Background

Over 4 million infants die in the neonatal period, about 75% occur in the first week of life, and of those it was noted by the World Health Organization (WHO) that 25% of the deaths were a result of ineffective ventilation and breathing at birth (Bookman et al, 2010). Infants requiring chest compressions are rare.

The American Academy of Pediatrics (AAP) and the American Heart Association (AHA) developed the Neonatal Resuscitation Program (NRP) to train healthcare providers on the skills and knowledge to initiate and manage an infant resuscitation, immediately following birth. Even with this standardized management approach it is estimated that it is not applied accurately 50% of the time (Cepeda-Brita et al, 2017).

Though empirical evidence supports simulation as an effective means of maintaining competency and improving teamwork, the impact of implementation standardized mock simulation for all staff responding to infant codes is not known. Retention of skill declines at a more increased rate than the retention of knowledge (Melesse & Ashagrie, 2022). Knowledge gained from this study could be used by the leadership for future development of standardized scheduled NRP simulation for healthcare staff responding to infant codes to improve both the retainment of individual skills and improve teamwork.

Methods

Research Question: Does implementation of semi-annual standardized NRP simulations improve NRP skill proficiency and confidence for registered nurses (RNs) and respiratory therapists (RTs) responding to infant resuscitation?

Hypothesis: Scheduling semi-annual mandatory mock codes will improve the overall performance of NRP guidelines and improve the confidence of the NRP provider.

Recruitment: Convenience sampling. Participants were 22 RNs and 2 RTs that were recruited during their scheduled semi-annual NRP simulation date.

Setting: RNs and RTs from a level II neonatal intensive care unit, from a birthing hospital that has approximately 1,100 deliveries annually. All simulations were conducted at an offsite simulation center, utilizing high fidelity simulation equipment and video recording for debriefing.

Design: A descriptive design was used to evaluate NRP skill proficiency and performance during standardized NRP simulation with RN and RT staff that respond to infant resuscitation. Confidentiality was maintained throughout the study. No names were placed on Data Collection Form or Confidence Scales.

Tools: Research team developed a Mock Code Data Collection Form which was based on the NRP algorithm. Items were scored as follows: (0) =not done (1) =done but not per NRP algorithm (2) =done per NRP algorithm (3) =N/A – simulation did not require. Items were scored based on the time from birth to the time the skill was performed. Each category was averaged # of steps done correctly over total number of steps in scenario. Participants' Confidence Scale was administered and averaged via survey monkey pre and post simulations.

Results

Participant Confidence Scale

I am confident in initiating effective positive pressure ventilation (PPV).

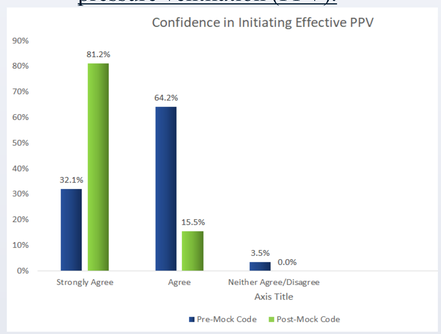

Figure 1: Strongly agree responses increased from 32.1% (pre) to 81.2% (post). Neither Agree/Disagree decreased from 3.5% (Pre) to 0% (post). There were zero Disagree/Strongly Disagree responses.

I am confident in the initial steps of infant assessment and identification of apnea that would require the initiation of PPV.

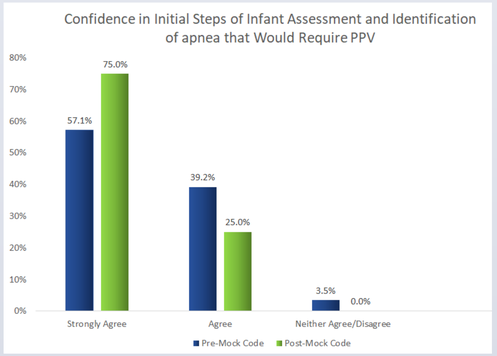

Figure 2: Strongly Agree responses increased from 57.1% to 75%. Neither Agree/Disagree decreased from 3.5% to 0%. There were zero Disagree/ Strongly Disagree responses.

I know the steps to take if PPV is not effective- MRSOPA.

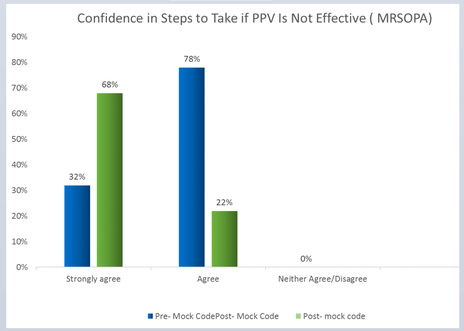

Figure 3: Strongly Agree responses increased from 32% to 68%. There were zero Neither Agree/Disagree or Disagree/ Strongly Disagree responses.

NRP Simulation

Percentage of Correct Steps Performed by NRP Guidelines

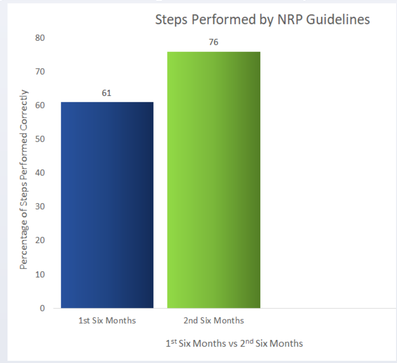

Figure 4: Comparison of the averaged percentage of the steps performed correctly for the 1st attempt of the mock code for the 1st and 2nd six-month period.

Time to Initiate Positive Pressure Ventilation

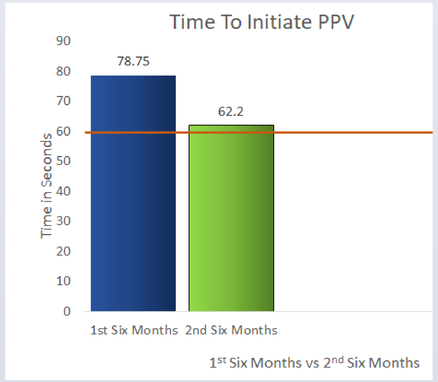

Figure 5: Overall time to recognize apnea and initiate PPV improved from an average of 78.75 seconds to 62.2 seconds. Per NRP guidelines, effective PPV should be initiated by 60 seconds.

MR SOPA Performed Prior to Chest Compressions

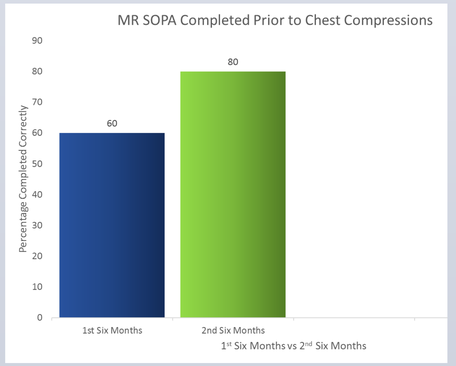

Figure 6: Performance of MR SOPA prior to chest compressions improved from 60% to 80%.

Discussion

This study showed an overall improvement in the retention and performance of NRP steps when scheduled mock codes were attended semi-annually by staff. To determine retention of skill, the study compared only 1st attempts from the 1st six-month period to the 1st attempt of the second six-month period. If an infant is not breathing at birth, the goal is for PPV to be initiated by 60 seconds of life. By implementing semi-annual mock codes, time to initiate PPV decreased by 16.55 seconds to the average of 62.2 seconds (Figure 5). The strongly agree answers increased in all 13 questions of the confidence scale pre versus post, indicating improved confidence. The researchers were not able to discern between 1st six-month period and 2nd six-month period, however, the amount of strongly agrees post-simulations show that confidence in skills improve with simulation.

This study identified that implementing mandatory semi-annual mock codes improves retention of skills and increases confidence. The implementation of the mock codes does require an investment and support from unit leadership to accommodate off-unit working hours and staff accountability. However, leadership's priority was the return of investment to improve patient outcomes. Future implications of this study are to evaluate effectiveness of interdisciplinary and in-situ mock codes.

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