Effective Cardiopulmonary Resuscitation in Prone Position- A Training Program for Operating Room Professionals

Aimee Kurtzman, MSN, RN; Denise Bourassa, DNP, RN, CNL, CNE; Thomas Van Hoof, MD, EdD, FACMQ; Mary Sukumar MD, CPHQ, ABAIM

Purpose

- Conduct a structured, simulation-based, educational intervention to address the gaps in knowledge, skills and attitudes related to the initiation and implementation of cardiopulmonary resuscitation (CPR) in the prone position.
- The target audience for this intervention is an interdisciplinary cohort of operating room (OR) staff.

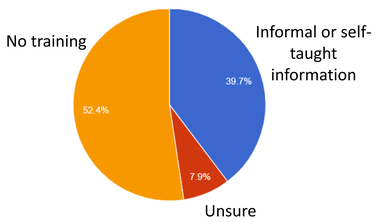
Background

- Prone positioning is utilized for procedures on the spine, the head, either by orthopedics, neurosurgery, colorectal or vascular procedures and in ICU patients with acute respiratory distress syndrome (ARDS) (McGraw et al, 2022).
- This article brings to light the rare occurrence and the need for more research on cardiac arrest in the prone position. Only successful cases of CPR in this position were reported in this study. Causes of arrest in prone position include hypoxemia, hypovolemia, gas/air embolism, and arrhythmias (Brown et al, 2001).
- Rapid CPR, with the recommended correct techniques, is vital to maintain organ perfusion and improve resuscitation outcomes (McGraw et al, 2022).
- Recommendations of hand placement are over T7–T9 area between the scapulae, avoiding surgical incisions (Ramirez & Tubog et al, 2024), and compressions are to be implemented at the rate of 100–120/min, to a depth of 4-5cm, utilizing a counter pressure below the sternum (Bhatia et al, 2022).
- Alternative placements for defibrillator pads are antero-posterior, posterio-lateral, or bi-axillary (Moscarelli et al, 2020).
- Out of 3,376 chest compressions in the prone position, only 34.6% achieved adequate depth; participants reported increased physical fatigue during prone CPR (Moscarelli et al, 2020).

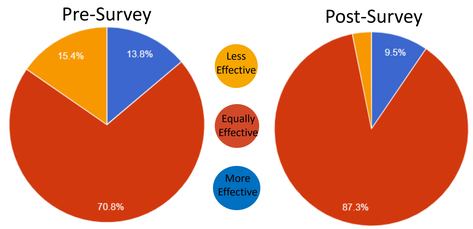
Methods

- Educational intervention made available to an interdisciplinary group of operating room staff.
- Used CPR manikin (Resusci Anne) with CPR metric capability.
- **A pre –training evaluation**
  - Surveyed prone CPR baseline knowledge, skills and attitudes.
  - Provided a simulation activity allowing participants to deliver CPR in the prone position on a manikin.
  - Information gathered from this pretraining evaluation allowed for a targeted educational intervention.
- **Educational Intervention –** hands on instruction using metric capability manikin allowing educators to compare data (compression rate, depth and recoil) pre and post instruction. This allowed participants to have measurable indicator of their learning.
- **A post-training evaluation** compared pre and post prone CPR knowledge, skills and attitudes.

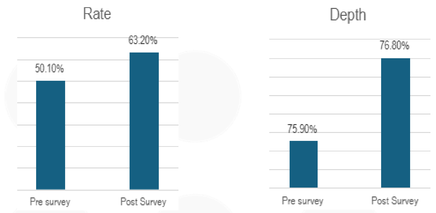
Have you ever received training in prone CPR?



Is prone CPR more, less or equally effective as supine CPR?



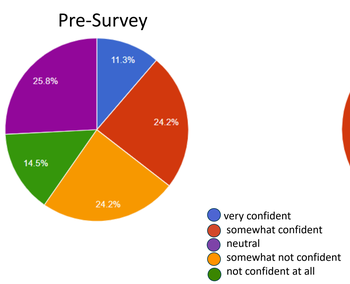
Prone CPR Compression Rate and Depth Before and After Training



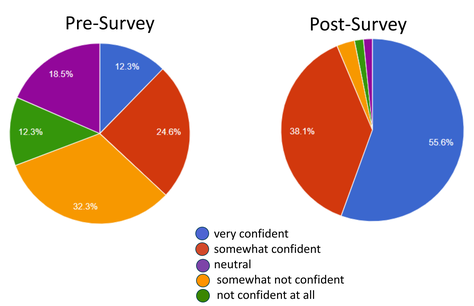
Results

- 65 participants including nurses, surgical technologists, nurse anesthetists, anesthesiologists, operating room aides.
  - 50.8% had never received formal training
  - 38.5% received informal/self-taught training
  - 7.7% were unsure if they had training
- Knowledge of the anatomical landmarks T7-T9 improved from 18.5% to 81%.
- Level of confidence in performing prone CPR improved pre and post education. Very confident category increased from 11.3% to 49.2%.

Participant confidence when performing prone CPR



Confidence levels on hand positioning for prone CPR



Conclusion

- Prone CPR simulation-based training effectively improved the knowledge and skills of OR staff.
- Confidence levels improved pre and post education and hands on simulation.
- Hands on skills data showed improvement pre and post education and training.
- This targeted education was highly effective. Increased confidence level, knowledge of T7-T9 markers and improved hands-on performance.

References

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