



The Effect of Simulation Training For the Implementation of Nurse Co-led Cardiopulmonary Resuscitation in the ED

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Introduction

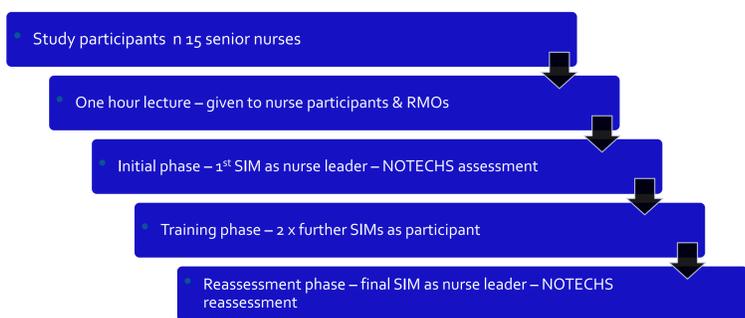
Empowering a senior nurse as a co-team leader has been proposed as a more efficient set up for the cardiac arrest team in ED. We hypothesised that a structured simulation training program that focussed on implementing a nurse co-led CPR model, would improve teamwork quality in the setting of nurse co-led cardiac arrest as measured by a validated teamwork scale (NOTECHS).

The aim of this investigation was to determine whether this simulation program could be implemented in the ED. In this model, a senior nurse leads the cardiac arrest algorithm which allows cognitive off-loading of the lead emergency physician (EP). The EP is then more available to perform tasks such as echocardiography and exclude reversible causes. Hi fidelity simulation was used for training and evaluation.

Lead nurse responsibilities	Lead doctor responsibilities
Ensure adherence to NZRC ALS algorithm	Identify reversible causes for cardiac arrest
Assign roles	Direct treatment of Cause
Direct defibrillation	Liaise with specialty doctors
Direct administration of ALS drugs	Provide oversight to airway doctor.
Liaise with lead doctor	Assume full lead on ROSC/ Special circumstances
	Liaise with family

Methods

15 senior ED nurses participated in this pre-intervention-post observational study. Training consisted of a didactic course on leadership and critical resource management (CRM) followed by 4 x 10 minute resuscitation scenarios each followed by a structured debrief focusing on team leadership skills and CRM.



EPs involved in the study also underwent similar training in tandem. Primary outcomes were measured on scenarios 1 and 4 using a modified NOTECHS teamwork scale. Training took place in the Wellington Simulation and Skills Centre and in Wellington Hospital ED.

SCORE: 5	SCORE: 3	SCORE: 1
Leadership		
Clearly defined team leader Good time management All tasks completed Non-hierarchical	Individual defined but some tasks not complete	Identity of team leader not clear
Co-operation and resource management		
All team members clearly fill a role and perform designated tasks	Identity of all team members not clear Some do not perform assigned tasks	Unable to discern role/identity of team members
Communication and interaction		
Clear communication with team leader as a hub, relayed to the scribe	Communication not always through team leader or not relayed rapidly to scribe	Unorganised or incoherent communication on many different levels
Assessment and decision-making		
Full adherence to NZRC ALS algorithm	Mild deviation from NZRC ALS algorithm	Major deviation from NZRC ALS algorithm
Situational awareness/ coping with stress		
Untoward findings and distraction did not upset systematic and orderly flow. Team is calm and plans ahead	Untoward findings caused disruption but did not preclude task completion	Untoward findings or interruptions completely upset orderly assessment and task completion. Not anticipatory

Results

	Initial Mean	Assessment Mean	Mean difference (95% Confidence Interval)	Paired t-test results
Leadership	3.0	4.3	1.33 (0.53, 2.13)	t(14)=3.568, p=0.0031***
CRM	2.8	4.4	1.60 (1.02, 2.18)	t(14)=5.870, p<0.0001***
Communication and interaction	3.0	3.7	0.67 (-0.16, 1.50)	t(14)=1.726, p=0.1064
Adherence to NZRC ALS algorithm	3.1	4.3	1.20 (0.41, 1.99)	t(14)=3.263, p=0.0057***
Situational Awareness, Coping with stress	2.9	4.5	1.60 (0.79, 2.41)	t(14)=4.262, p=0.0008***

A statistically significant increase in the NOTECHS scale was detected for the measures of leadership (p=0.0028), CRM (p=0.0001), adherence to NZRC ALS algorithm (p=0.0088), and Situational Awareness (p=0.0002). On average, scores for communication also increased but this difference was not statistically significant. From informal, written feedback collected about the training program.



Discussion

Our results confirmed the hypothesis that simulation is an effective training tool for improving team work in the novel setting of nurse co-led CPR.

Nurses and the EP's universally agreed this was a better process to manage a cardiac arrest. Junior doctors commented the co-led model allowed them to be able to make complex decisional processes in a short period of time. EP's felt they had more time to analyse the data and make informed complex treatment decisions. The lead-nurses enjoyed the leadership, autonomy, and added responsibility. Whilst Advanced Life Support is in their scope of practice and they all are required to be current, they would normally not have the chance to lead the algorithm in a real clinical situation. Additional comments demonstrated that that the teamwork feelings of enhanced team dynamics were maintained in non-simulated non-cardiac arrest resuscitation situations. Nurses felt more empowered to contribute clinically and doctors were more receptive to their input.

Conclusion

This study shows that a short simulation training programme improved teamwork performance in the setting of nurse co-led CPR in the ED which could easily be replicated in other departments.