Pilot RCT of Technology Enhanced vs. Face to Face External Cardiac Compression Training

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Background

• Health care professionals provide poor quality external cardiac compression (ECC)
• Training in ECC skills improves survival rates
• Technology enhanced ECC training is more effective than traditional, face to face training\(^1\)
• Current annual ECC retraining cycles do not maintain competence\(^1\)
• High frequency, low dose training is required to prevent skill degradation\(^2-4\)
• Few studies have examined the trajectory of skills degradation
Questions

Does technology enhanced ECC training improve skills?

At what time point do ECC skills decline below the level of competence?

Does more frequent ECC training result in skill retention?
Design

RCT – 3 armed

2 elements - Effectiveness of ECC training and skill retention; Intensity of skills practice

Inclusion - hospital based doctors, nurses, health practitioners and operational staff whose roles might involve ECC; permanent or temporary employees, with contracts ending after October 2017; worked in any unit in the regional Hospital; over 18 years

Exclusion - planning extended leave during the study; on a modified return to work program that excluded them from performing ECC; or, were unable to perform ECC due to pregnancy, injury or ill health
Diagram

Publicity and Recruitment n=502

Baseline Assessment all Participants

Participants grouped into appropriate professional stream

Medical (n=88)
Nursing (n=273)
Allied Health (n=75)
Operational (n=66)

Web based stratified randomisation conducted

Study 1 Effectiveness of CPR Training (traditional) Control Group n=168

Study 1 Effectiveness of CPR Training (RQI) Access to RQI Cart for one off CPR Training Intervention Group n=165

Study 2 Training Intensity (RQI) Continuous access to RQI Cart Intervention Group n=169
Outcome Measures

1° Competence in ECC (% score baseline & follow-up Ax)

2° Proportion passed Ax (75%+)

2° Time to skill degradation

2° Number of times ECC skills practised

Sample size
n= 475: 132 required in each arm to reject null hypothesis (power 0.9; α 0.05). Allowing for 20% attrition
Results

Recruitment

Baseline assessment

Follow-up assessment

Trial completion

502 participants recruited

Group A n=168
Face to face training control

Attrition: 36 (21.4%)
Left HHS 24
Unable to perform CPR 3
Withdrew - no reason 5
Extended leave 3
Workload pressure 0
Moved to rural 1

Follow-up data n=132

Completed trial n=393

Group B n=169
Unlimited access to the RQI system

Attrition: 36 (21.3%)
Left HHS 21
Unable to perform CPR 5
Withdrew - no reason 3
Extended leave 2
Workload pressure 3
Moved to rural 2

Follow-up data n=133

Group C n=165
One off access to the RQI system

Attrition: 37 (22.4%)
Left HHS 18
Unable to perform CPR 5
Withdrew - no reason 4
Extended leave 5
Workload pressure 3
Moved to rural 2

Follow-up data n=128
Results

- 502 participants recruited (22% attrition)
- Baseline - 21% competent at ECC (16% HPs)
- Re-a_x - 38% competent between 3 & 12 months post training (47% HPs)
- HPs showed the greatest increase in skill level following training
- No statistically significant differences between groups in ECC skill level on re-a_x (F=0.061, p=0.94)
- 73% of participants attended ECC training
- Those who received training achieved higher competency scores than those who didn’t (U=12041, p<0.01)
- No statistically significant differences between groups in time to skills degradation (X^2=0.361, p=0.84)
- 32 weeks mean time to any decline in skill score
- Participants who practised ECC skills had a statistically significant higher mean score than those who didn’t (U=16609, p=0.02)
Conclusion

- ECC training increased health care staff skill levels
- Neither training modality was significantly more effective than the other
- High frequency, low dose training regime required
- Forcing function – cancellation of access card if ECC training out of date

