WORKSHEET for Evidence-Based Review of Science for Emergency Cardiac Care

Worksheet author(s)

Yasuhiro Kuroda

Date Submitted for review: 31 Jan 2010

Clinical question.

For BLS providers (lay or HCP) (P), does a longer-duration instructor-based course (I), compared with a shorter course (C), improve skill acquisition and retention (O)?
Is this question addressing an intervention/therapy, prognosis or diagnosis? Intervention/therapy
State if this is a proposed new topic or revision of existing worksheet: Revision

Conflict of interest specific to this question

Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet? No

Search strategy (including electronic databases searched).

PubMed ("basic life support"[All Fields] OR "cardiopulmonary resuscitation"[All Fields] OR "heart arrest"[All Fields]) AND ("training"[All Fields] OR "instruction"[All Fields]) AND ("retention"[All Fields] OR "skill acquisition"[All Fields]) AND "duration"[All Fields]
EMBASE search using text words (all fields) (basic life support OR cardiopulmonary resuscitation OR heart arrest) AND (training OR instruction) AND (retention OR skill acquisition) AND duration
Cochrane database for systemic reviews, AHA Endnote Master library, Central Register of Controlled Trials, Review of references from articles
Forward search using SCOPUS and Google scholar

- State inclusion and exclusion criteria

The following studies were excluded: Not training course

- Number of articles/sources meeting criteria for further review: search 10 May 2009

5 studies met criteria for further review. Of these were three LOE 1 (RCTs), no LOE 2 (non-randomized, concurrent controls), no LOE 3 (retrospective controls), two LOE 4 (no controls), and no LOE 5 (not directly related).

Summary of evidence

Evidence Supporting Clinical Question

Good					
Fair					
Poor					
	1	**2**	**3**	**4**	**5**
Level of evidence					

A = Return of spontaneous circulation
B = Survival of event
C = Survival to hospital discharge
D = Intact neurological survival
E = Other endpoint
Italics = Animal studies

Evidence Neutral to Clinical question

Good	Andresen, 2008 E				
Fair				Durojaiye, 2002 E Beckers, 2007 E	
Poor					
	1	**2**	**3**	**4**	**5**
Level of evidence					

A = Return of spontaneous circulation
B = Survival of event
C = Survival to hospital discharge
D = Intact neurological survival
E = Other endpoint
Italics = Animal studies

Evidence Opposing Clinical Question

Good					
Fair	De Regge, 2008 E Assar, 2000 E				
Poor					
	1	**2**	**3**	**4**	**5**
Level of evidence					

A = Return of spontaneous circulation
B = Survival of event
C = Survival to hospital discharge
D = Intact neurological survival
E = Other endpoint
Italics = Animal studies

REVIEWER'S FINAL COMMENTS AND ASSESSMENT OF BENEFIT / RISK:

DISCUSSION:

Studies that teach BLS (chest compression and ventilations)

How to assess the decay of skill

De Regge M, et al. reported that for hospital nurses from non-critical care wards, there was no difference of skill acquisition and retention in individual training (one instructor to one trainee) and group training (one instructor to five trainees) immediately and 10 months after training. The median duration of group training was 90 min. Training time per trainee was similar between two groups (20 min for individual training and 19 min for group training). They concluded that individual training may be a cost-effective alternative for group training.
This study shows, for one trainee, not for one instructor or not for course itself, short duration course (20 min) is cost-effective alternative.
[skill, PC recording for chest compression depth/rate and ventilation volume, immediately vs. 10 month, individual training 20 min vs. group training:19 min, LOE 1, 20 min course]

Assar D, et al. investigated a method of teaching community CPR and compared the performance in tests immediately after instruction of those who had received a conventional course (2 hr) and those who had the simple course (opening of the airway and chest compression: initial part of staged CPR training course) by a controlled randomised trial. The mean delay to first compression and the mean duration of pauses between compressions was shorter in simple course. Average chest compression rates were higher in the simple course than those in conventional course. They concluded the disadvantage of attempting to teach the very complex routine of conventional CPR in a single 2-h period.
This study is specific designed study and does not estimate long-term skill retention (6 and/or 12 months).
[skill, video recording, compression rate, immediately, 2 hr vs. simple, LOE 1, simple course (airway opening and chest compression)]

How to assess the decay of knowledge

Durojaiye L. et al. assessed the effect of a one-day paediatric life-support course on the knowledge of paediatric trainees (junior doctors) and reported that there was a significant improvement in this knowledge after the course, and this was maintained for 4 months.
This study only examined the knowledge (but not skill acquisition or retention) about paediatric life-support. They do not compare different duration of course.
[knowledge, test scores by telephone survey, pediatric, 4 month, LOE 4, one-day course, neutral]

Studies that look at AED skill acquisition for lay persons

How to assess the decay of skill

Andresen D, et al. performed randomized trial to evaluate how laypersons retained CPR skills and skills in using the AED by comparing CPR/AED-training courses of 2 h, 4 h or 7 h duration. On immediate and 6 month test, 7-hr program showed significant better skill retention than those in the 2- and 4h groups. After 12 month, skill retention is similar to those at the 6 month. However, the absolute values about skill retention appear to be inconsequential. They reported that a 2-h class is sufficient to acquire and retain CPR and AED skills for an extended time period (12 months) provided that a brief re-evaluation is performed after 6 months.
This study shows the importance of the combination of re-evaluation after 6 months and 2 hr course for BLS for layperson.
[skill, test protocol, 6 month, 2hr vs. 4 hr vs. 7 hr, LOE 1, neutral]

How to assess the decay of knowledge

Beckers SK, et al. reported that first year medical students (students who passed any medical emergency training were excluded) with minimal instruction are able to use semiautomatic as well as fully automatic AED sufficiently fast and safe without prior training. A significant improvement in time to first shock can be detected up to 6 months after receiving non-specific instructions of 15 min duration.
This study does not compare skill retention between long and short course duration, however fifteen minutes instruction is meaningful to handle AED better.
[Knowledge, measurement of time interval to use AED, 6 month, 15 min, LOE 4, 15 min, neutral]

The definition of "course duration", content of course, and interval to re-evaluation of the skill were not uniform among five studies. Andresen' study and Assar's study are designed for lay volunteer.

Acknowledgements:
Nil

Citation List

Andresen D, Arntz HR, Gr¨afling W, et al. Public access resuscitation program including defibrillator training for laypersons: A randomized trial to evaluate the impact of training course duration. Resuscitation 2008; 76: 419-24

Level 1 study, Good

Assar D, Chamberlain D, Colquhoun M, et al. Randomised controlled trials of staged teaching for basic life support. 1. Skill acquisition at bronze stage. Resuscitation. 2000; 45: 7–15

Level 1 study, Fair

Beckers SK, Fries M, Bickenbach J, et al. Retention of skills in medical students following minimal theoretical instructions on semi and fully automated external defibrillators. Resuscitation 2007; 72: 444-50

Level 4 study, Fair

De Regge M, Calle PA, De Paepe P, et al. Basic life support refresher training of nurses: Individual training and group training are equally effective. Resuscitation 2008; 79: 283-7

Level 1 study, Fair

DUROJAIYE L, O'MEARA M. Improvement in resuscitation knowledge after a one-day paediatric life-support course. *J. Paediatr. Child Health* 2002; 38: 241–245

Level 4 study, Fair