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Prospective, randomized trial of the effectiveness and retention of 30-min layperson training for cardiopulmonary resuscitation and automated external defibrillators: The American Airlines Study☆

Lynn P. Roppolo[a,*], Paul E. Pepe[a,b], Linda Campbell[c], Kimberly Ohman[d,1], Himani Kulkarni[d,2], Ronna Miller[a], Alison Idris[b], Lawrence Bean[a,3], Thomas N. Bettes[c], Ahamed H. Idris[a,b]

[a] *Department of Surgery/Division of Emergency Medicine, University of Texas Southwestern Medical Center, Dallas, TX, USA*
[b] *Dallas Center for Resuscitation Research, University of Texas Southwestern Medical Center, Dallas, TX, USA*
[c] *Office of the Medical Director, American Airlines Medical Department, AMR Corporation, Ft. Worth, TX, USA*
[d] *University of Texas Southwestern Medical School, Dallas, TX, USA*

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Summary
Objective: A head-to-head trial was conducted to compare laypersons' long-term retention of life-saving psychomotor and cognitive skills learned in the traditional multi-hour training format for basic cardiopulmonary resuscitation and automated external defibrillator use to those learned in an abbreviated (30 min) course.
Methods: Laypersons were randomized to either: (1) the traditional multi-hour *Heartsaver-Automated External Defibrillator®* (*Heartsaver-AED®*) group; or (2) the

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* Corresponding author at: University of Texas Southwestern Medical Center, 5323 Harry Hines Boulevard, Mail Code 8579, Dallas, TX 75390-8579, USA. Tel.: +1 214 590 1350; fax: +1 214 590 4079.
E-mail address: Lynn.Roppolo@utsouthwestern.edu (L.P. Roppolo).
[1] Present address: Emergency Medicine Resident, Department of Emergency Medicine, Residency Program: CDW-EM, Oregon Health & Science University, 3181 S. W. Sam Jackson Park Road, Portland, OR 97201-3098, USA.
[2] Present address: Emergency Medicine Resident, Department of Emergency Medicine, New York Methodist Hospital, 506 Sixth Street, Brooklyn, NY 11215-9008, USA.
[3] Present address: Department of Emergency/Urgent Care, Trinity Mother Francis Health, 800 East Dawson Street, Tyler, TX 75701, USA.

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Rescue;
First aid

30-min course group (cardiopulmonary resuscitation, choking, and automated external defibrillator use). Immediately after training, and at 6 months, participants were provided identical individual testing scenarios. In addition to audio—video recordings, computerized recordings of compression rate/depth, ventilation rates, and related pauses were obtained and subsequently rated by blinded reviewers.

Results: Performance following 30-min training was either equivalent or superior ($p < 0.007$) to the multi-hour *Heartsaver-Automated External Defibrillator* training in all measurements, both immediately and 6 months after training. Although retention of certain skills deteriorated over the 6 months among a significant number of participants from both groups, 84% of the 30-min training group still was judged, overall, to perform cardiopulmonary resuscitation adequately. Moreover, 93% still were performing chest compressions adequately and 93% continued to apply the automated external defibrillator and deliver shocks correctly.

Conclusions: Using innovative learning techniques, 30-min cardiopulmonary resuscitation and automated external defibrillator training is as effective as traditional multi-hour courses, even after 6 months. Thirty-minute courses should decrease labor intensity, demands on resources, and time commitments for cardiopulmonary resuscitation courses, thus facilitating more widespread and frequent retraining.

Introduction

The American Heart Association (AHA) basic life support *Heartsaver*® course is the most widely recognized traditional model for training laypersons to perform basic adult cardiopulmonary resuscitation (CPR).[1] To support the CPR techniques being taught, the AHA has based the course on both scientific research and international consensus.[2] Also, to support quality assurance, AHA-certified instructors are required for both didactic and skills practice portions of the course.[3] Enough instructors are made available so that, during the hands-on skills training, an AHA-certified trainer is assigned to work with no more than six to eight trainees per session. While the AHA *Heartsaver*® course, its predecessors, and other similar training efforts have led to life-saving effects worldwide,[1,4] these traditional courses have often been considered both lengthy and labor intensive.[3,5] Typically lasting 3 to 4 h, much of the course time is consumed with didactics, leaving little time for skills practise. In addition, considering the number of certified instructors and specialized manikins required, traditional CPR courses can pose significant logistical and even financial barriers, especially when large groups are being trained.[5,6]

Although the didactic information is relatively simple and often cognitively related to CPR practice, it may also dilute and even confuse the central mission of CPR skills acquisition.[7] In addition, because up to eight trainees can be assigned to one skills practise instructor, each of the students must take turns at practising on the manikins, leading to inefficient use of time.

Recognizing these issues, alternative methods of CPR instruction have been proposed in recent years, including video-based self-instruction (VSI) using contemporary adult learning techniques.[8,9] Preliminary studies comparing VSI to traditional CPR training have all found VSI training to be at least as effective as, if not better than, traditional CPR training in terms of learning skills.[8,9] Such courses not only deal with the problem of labor intensity for training personnel, but they also require much less time to conduct.[7,9,10–13] For example, a recent study by Lynch et al.[9] demonstrated that a 22-min AHA VSI course resulted in better overall CPR performance compared to the standard AHA *Heartsaver*® course.

Although the abbreviated CPR courses clearly show promise, the long-term retention of CPR skills has not yet been evaluated sufficiently and the key skills of first aid for the choking victim and automated external defibrillator (AED) operation also were not included in those preliminary studies.

Therefore, the purpose of the present study was to conduct a prospective, randomized, head-to-head trial that compared the effectiveness and retention of the traditional 3 to 4 h *Heartsaver-Automated External Defibrillator*® (*Heartsaver-AED*®) course for adult CPR and AED use to a 30-min course that includes a 20-min VSI for basic life support CPR skills and a 5-min demonstration of AED operation. Specifically, the two training methods were to be evaluated not only in terms of skills performance immediately after the training, but also at retesting 6 months later, a time-line considered to be critical for indicating the retention of CPR skills.