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TRAINING AND EDUCATIONAL PAPER

Advanced Cardiac Life Support Courses: Live actors do not improve training results compared with conventional manikins☆

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Summary
Primary objective: To determine whether using live actors to increase the reality of the scenario improves knowledge retention in Advanced Cardiac Life Support (ACLS) Courses.
Main secondary objectives: To determine the effects of age, time since graduation from nursing or medicine, sex, medical specialty, and workplace in knowledge retention.
Methods: From December 2004 to October 2005, 19 selected ACLS courses were divided at random in two groups: group A (ACLS courses with conventional manikins plus live actors) and group B (ACLS courses with conventional manikins). The live actors vocalized appropriately to create more realistic scenarios. The participants' relevant theoretical knowledge was assessed before the course (pre-test), immediately after the course (post-test), and 6 months after the course (final-test).
Results: Four hundred and thirty-five participants were recruited and allocated at random allocated to either group A or B. Overall, the data of 225 participants (51.7%; 111 in group A and 114 in group B) who completed the entire sequence of pre-, post-, and final-tests were analysed. On univariate analysis, the use of live actors, workplace, gender, and healthcare provider profession did not affect pre-, post-, and final-test results ($p > 0.1$). The results in all three tests correlated negatively with time since medical or nursing graduation (95% C.I. −0.53 to −0.17, −0.43 to −0.2, and −0.42 to −0.11, respectively, $p < 0.05$) and age (and 95% C.I. −0.56 to −0.21, −0.42 to −0.2, and −0.38 to −0.07, respectively, $p < 0.05$).

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Conclusion: The use of live actors did not affect knowledge retention in this group. Older age and a longer period since graduation were associated with the worst scores and the lowest levels of knowledge retention.

Introduction

The Advanced Cardiac Life Support (ACLS) is a course dealing with the treatment of cardiac emergencies. It was created by the American Heart Association and is used in many countries to train medical and nursing staff to improve sudden cardiac arrest survival.[1] It is a hands-on, practical course that includes the use of manikins and interactive clinical scenarios.[2] Although improvements in skills and knowledge are evident immediately after participants complete the course, the retention of skills (psychomotor capabilities) is poor and declines as early as 2 weeks after taking a cardiopulmonary resuscitation (CPR) course in both healthcare providers and lay persons.[3–7] Knowledge (cognition) retention also declines, but not as fast as skill retention.[8] The same findings have been observed after Paediatric Advanced Life Support (PALS) and Advanced Trauma Life Support courses; thus, though paediatricians and surgeons can learn and improve their knowledge and skills, both knowledge and skills decline quickly if no refresher courses are taken within a short period of time.[9,10]

The mortality and morbidity of cardiac arrest victims are directly affected by the ability of healthcare providers or lay persons to use CPR knowledge and skills appropriately. It is virtually impossible to separate knowledge from skills, since they are interdependent.

During the last few years, many new educational models have been tested in an attempt to improve skill retention; however, no specific teaching method has been successful, except for periodic refresher courses at short intervals.[11] In nursing and medical education, simulation studies have shown that manikin simulation is better than traditional lectures and even better than problem-based learning for the acquisition of critical assessment and management skills.[11,12] Studies using high-performance manikins that allow a greater degree of clinical interaction and permit the participant to attain clinical competence after training improve overall skills and critical assessment.[12] All of these studies assume that the more realistic the scenario, the more the skills improve, and the more knowledge is retained.

The primary purpose of the present study was to determine whether the use of live actors to create realistic scenarios could improve knowledge retention. The secondary purpose was to determine if medical specialty, sex, work at hospital facilities, age, and time since graduation from medicine or nursing affected knowledge retention.

Methods

From December 2004 to October 2005, 19 ACLS courses were divided at random into two groups: group A (ACLS courses with conventional manikins plus live actors), and group B (ACLS courses with conventional manikins). After obtaining their written informed consent, healthcare providers were allocated at random to one of these courses without knowing which kind of course would be offered. All courses followed the ACLS instructor manual.[2] The participants' characteristics are summarised by group in Table 1.

Group A: the training scenarios involved live actors who provided vocal feedback and interacted with the healthcare providers to create a more realistic scenario; in some cases, simple manoeuvres, such as checking for open airways and breathing, were permitted. During the ACLS courses, the live actors had critical roles in respiratory arrest, acute coronary syndromes, stable and unstable tachycardia, bradycardia, pulseless electrical activity, ventricular fibrillation, and tachycardia arrest stations. All invasive procedures that are usually taught during ACLS courses were done on conventional manikins (Ambuman®) to prevent harming the actors. In order to avoid any methodological bias, the scenarios and simulations were similar in both groups and followed the cases and scenarios from the ACLS provider manual.[2]

Before and immediately after the courses, participants answered 33 multiple choice questions (pre-test and post-test, respectively) to assess their baseline knowledge and their improvement with training. Six months after the course, the participants completed another test with 33 multiple choice questions (final-test) to evaluate their knowledge retention. All three tests used the same questions, but in a different sequence, and followed the American Heart Association-recommended test used in the regular ACLS course (Fig. 1).

Ethics

This study was approved by the Ethics Committee of the Federal University of Minas Gerais, Belo Horizonte, Brazil.

Statistical analysis

Pre-test, post-test, and final-test scores were compared in both groups A and B. Age subgroups, time since graduation from nursing or medicine, sex, medical specialties, and whether the participants were working in hospital facilities were also compared.

The data were analysed initially using descriptive statistics; all data were summarised in tables and graphs. Continuous variables were analysed using Student's *t*-test, ANOVA, and the Kruskal-Wallis non-parametric test. Time since graduation from nursing or medicine and age were evaluated by linear regression. $p < 0.05$ was used to indicate statistical significance for all variables.

Results

A total of 435 participants was recruited and allocated at random allocated to either group A or B. Overall, the data of 225 participants (51.7%; 111 in group A and 114 in group B)