Comparison of basic life support (BLS) video self-instructional system and traditional BLS training in first year nursing students

Nikandish R, MD[1]; Askaree AR[2] ; Karamad T[2]

[1]Associate professor of anesthesiology, Fasa School of Medicine
[2] Medical student, Fasa School of Medicine

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Abstract

Background. *For several years, educators have criticized the lecture-based approach to teaching and learning. Experts have rightly stressed on acquisition of a number of critical skills rather than focusing on lectures.*

Purpose. *To compare students' performance after self-education with VCD and manikin, with thei performance after standard BLS training.*

Methods. *In this randomized controlled study, twenty first-year nursing students were divided into two groups randomly, and were provided with basic life support (BLS) instruction either in the traditional format of lecturing or with VCD and manikin without tutor. The students' Performance was evaluated on a manikin with a checklist including all steps in BLS.*

Results. *With traditional instruction, students' mean score was 42.2±3.91, while it was 46.3±3.86 with self-education, showing no significant difference.*

Conclusion. *In nursing students with no previous BLS training, access to VCD and manikin facilitates immediate achievement of educational objectives similar to those of a standard BLS course. Self-learning BLS with VCD should be enhanced with a short period of hands-on practice.*

Keywords: *Cardiopulmonary Resuscitation (CPR), Nursing students, CPR skills, Education*

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Introduction

Millions of people including medical and paramedical students around the world are currently trained in basic life support (BLS). It seems therefore important to secure and facilitate the possibility of learning good CPR. Quality assurance of the education is therefore of great importance and ought to be included as a routine procedure. Including quality assurance as a routine procedure necessitates easily conducted performance tests.

Corresponding author: *Nikandish R., MD Fasa, Ebnesina Square, Fasa School of Medicine*
Tel:07313336200
Fax:07313336200
Email:nikandishr@fums.ac.ir

In order to optimize CPR education, it is of great value to compare various training methods, in terms of quality of performance after training. The general disappointment in skills acquisition and retention after conventional resuscitation training programs has demonstrated the need for a change in teaching methods and reduced reliance on instructors. Ideally, instructors should be replaced by facilitators who complement the new educational technology.

Method

This randomized, controlled study examined 20 first year nursing students at Fasa University of Medical Sciences. None of the students attended any BLS course before the study. The students

were divided randomly into two groups, each containing 10 participants. The students were unaware of the methods planned for BLS instruction before beginning the courses. BLS training was provided for one group in a traditional method with students attending a class and training theoretical and practical aspects of BLS by an instructor. In this 3 hour course, all of the students practiced on the manikin under the instructor's supervision and received feedbacks for correction of their performance.

In the other group, BLS training was provided by self-instruction with a VCD prepared by the same instructor as in the standard group, containing the same educational content. Also, a manikin and a computer were easily available for students to practice for up to one week. Standard group participants did not have access to VCD and manikin after their standard course.

A modified Brennan checklist was designed to evaluate each student's performance. The checklist included the following skills:

1- Checking unresponsiveness;
2- Calling for help;
3- Opening airway;
4- Checking breathing;
5- Checking carotid pulse;
6- Attempting two breathing;
7- Locating compression position; and
8- Chest compression (15 times).

Each skill received a specific score according to its importance in BLS. The cumulative score was 50. Every one of the participants was assessed by three examiners for skills in BLS according to the checklist. During evaluation no directions or information was provided. Mean score of each student and then mean score of each group was determined and analyzed by paired T-test.

Results

Mean score and standard deviation of each group is shown in the following table.

There was no statistically significant difference between two groups regarding mean skill score ($p>0.05$).

Group	standard	Self-instruction
Number	10	10
Mean score and Standard deviation	46.3±3.86	45.2±3.91

Discussion

Numerous studies have shown that health care professionals are not uniformly competent in BLS skills (1). Their level of skills retention is variable and generally poor (2-6). For several years, educators have criticized the lecture-based approach for teaching and learning CPR. Education experts have rightly criticized loosely scheduled courses packed with information about diverse topics and focused on lectures rather than on acquisition of a small number of critical skills (7-9). To acquire CPR skills, participants needs hand-on practice; excessive lecture time reduces skills practice time. Principles of adult education and evidence documenting the success of video-based learning have led to endorsement and acceptance of video-based teaching techniques (10-13). These "practice-as-you-watch" and "watch-then-practice" techniques promote acquisition of skills in skill-based educational programs for students. The American Heart Association (AHA) has adopted a "watch-then-practice" video-based medium, having it documented as the most effective didactic method for skill acquisition. This focus on skill acquisition represents a dramatic shift in the approach to teaching CPR. Instructors frequently fail to achieve satisfactory results from conventional courses of CPR, partly because they lack the necessary skills, but also because they allow insufficient time for practice. This has led to development of strategies that minimize the role of the instructor, who might be more appropriately called the facilitator (15-17). These strategies include video-based techniques: the so-called watch-then-practice or practice-as-you-watch synchronous self-instructional learning (12-13, 18-25). From the outset, immediate hands-on practice meets students' expectations for training, helps prevent anxiety

about skills performance that can be a barrier to learning, and increases the relevance of any necessary verbal information so that answers do not preempt questions. But all innovative educational programs should be pilot-studied and evaluated on objective criteria. The programs` success at teaching should be measured by the percentage of participants who can demonstrate satisfactory critical skills (15). Brawlow et al (11) studied CPR training without instructor by a video self-instructional system (VIS). Performance of CPR skills immediately following VSI was compared to performance immediately following traditional classroom instruction (TRAD) using an instrumented manikin, a valid and reliable skill checklist, and an overall competency rating. Compared with TRAD subjects, VSI subjects performed more compressions correctly ($p<0.001$), more ventilations correctly ($p<0.001$), and more assessment and sequence skills correctly ($p<0.001$). TRAD subjects delivered twice as many compressions that were too shallow; and under-inflated the lungs twice as often. VSI subjects were rated 'competent' or better 80.0% of the time, compared with TRAD subjects, who achieved this rating only 45.1% of the time ($p<0.001$). TRAD subjects were rated to be 'not competent' in performing CPR nearly 10 times more often than VSI subjects ($p<0.001$). Subjects with 40 years of age or older had a better performance after VSI than after TRAD. Superior skill performance among subjects exposed to VSI persisted 60 days following training. VSI has the potential to reach individuals unlikely to participate in TRAD classes because of its greater convenience, lower cost, and training in about 0.5 h compared with 3–4 h for TRAD classes.

Bachler et al studied CPR performance of subjects over forty years of age following half-hour video self-instruction compared to traditional four-hour classroom training. They exposed 202 subjects (mean age 59.4 years, SD=10.9) to either TRAD or VSI, and tested them individually immediately following training using validated methods including measurement by means of a Laerdal–Skillmeter® manikin. According to American Heart Association (AHA) criteria, VSI subjects performed an average of 20.8% of all compressions and 25.1% of all ventilations correctly, compared with 3.4% of compressions and 1.7% of ventilations by TRAD subjects ($p<0.0001$). VSI subjects performed an average of 10.1 of the total 14 CPR assessment and sequence skills correctly, compared with an average of 4.7 for TRAD ($p<0.0001$). On a measure of overall performance, 62.7% of the VSI subjects were rated 'competent' or better (i.e. capable of performing CPR that 'would probably be effective'), compared to 6.1% of TRAD subjects ($p<0.0001$). Only 17.8% of VSI subjects were rated as 'not competent' (i.e. unable to obtain a combination of any chest rise and any compression of the sternum) compared with 69.1% of TRAD subjects. The researchers concluded that VSI provides an effective, convenient, and inexpensive means of training persons over 40 years of age that achieves skill performance superior to TRAD.

In our study we tried to compare immediate outcomes from traditional (TRAD) versus video-based CPR self-instruction (VSI). There was no significant difference in immediate educational objectives despite the fact that there was no instructor directly available for self-study group. Regarding the fact that self-study has several potential benefits, CPR self-instruction can be used as an alternative method in specific educational settings. Some of the potential benefits are the followings:

1- This is a good choice for those who have time limitations for attendance in standard BLS courses;

2- Trainees can use the best time available for them for learning;

3- There is no added anxiety for performing the skills at the presence of instructor or other attendants;

4- There is enough time for hands-on-practice; and

5- This method can be used when there is shortage of instructors.

More important than the immediate outcomes of BLS courses is the retention of skills in

educators in order to perform it in emergency situations. To find out whether or not video-based instruction is superior to traditional lecture-based teaching methods, requires continuing the study for late educational objectives. We are now at the start of the second phase of our study to respond to this question.

Our study had some week points. One of them was small size of the study groups. Second, the examiners were aware of the educational programs each student participated in. Third, the sequence of skills was not considered in our study and we only focused on isolated skills acquisition.

In conclusion we can say that according to our study, video-based self instruction may be used as an alternative method for specific educational settings. Whether this method is superior to lecture-based programs in regard of retention of critical skills needs more study.

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