Study of the effect of self-aid and buddy-aid education using lecture and multimedia software package on the performance level of military personnel

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Abstract

Aims: Warriors' education and complete domination over self-aid and buddy-aid is one the most effective approaches for enhancing their safety in military operations. The present study has been performed to "investigate the effect of self-aid and buddy-aid education using lecture and multimedia software package on performance level of military personnel".

Methods: In this semi-experimental study in 2010, sixty subjects from the selected military battalion of Tehran and Mashhad were investigated. Participants were randomly allocated into two groups of thirty each and were educated using lecture and multimedia software package. In the end, they were evaluated in terms of performance level through objective structured clinical examination. Data were analyzed by SPSS statistical software and nonparametric statistical tests.

Results: At "vital signs monitoring," "carrying method of injured," "head bandage," "self-care and decontamination of biological attacks," stations, no significant difference was observed between the two groups (p>0.05); while, in "cardiac and pulmonary rehabilitation," "first-aid measures for eye burns," and "splinting" stations, the results indicated a statistical difference by Man-Whitney (p<0.001). In "bleeding monitoring" station, lecture-trained group showed more acceptable results compared to software-educated group (p<0.05).

Conclusion: Regarding more effectiveness of multimedia software in some stations, especially CPR, and considering lecture-related limitations, expanding multimedia software application is recommended in self-aid and buddy-aid education.

Key words: Self-aid; Buddy-aid; Education; Lecture; Multimedia software package

Introduction

War is accompanied by many lesions, especially regarding the manpower, and is a matter of special significance from the military aspects in different dimensions in terms of human resources and relative protection in war zones and particularly in combat operations, so as no force maintenance may even lead to major changes in the war result. The aid (self-aid and buddy-aid) and transportation mechanism is a way to achieve the maintenance in operational areas; this can reduce the mortality rate and manpower injuries on one hand and heighten the confidence and spirit among operational forces on the other [1].

Knowledge and skill over the first aid is highly required for soldiers to survive self and other combatants. In spite of being acquainted to organizational duties and the burden of human responsibilities they feel, they can be a life savior with timely and appropriate medical measures or prevent permanent disability or reduce the length of hospital stay to self and the rest of their fellow fighter [2].

Given the need for the preservation of military forces against enemy and reduction in human casualties resulting from war injuries, some of which are considered as a life-threatening medical emergency, the necessity of developing self-aid associated ground and possibilities is strongly felt, in addition to expanding buddy-aid measures, to give opportunity to military forces for addressing the self-aid during injuries, while possessing the care knowledge and equipment, and prevent exacerbation of lesions and take action toward protecting their lives and health until the arrival of rescuers and medical teams.

Basic life-giving measures of self-aid and buddy-aid are among the best approaches to preserve the life of injured and reduce the injuries severity. During this procedure, the fighter deals with simple but life-giving treatment of self or other fellow fighters on the battlefield by the equipments available through obtaining some basic medical information and the skills related to use of this information [3, 4, 5]. Another important point on the issue of self-aid and buddy-aid, after the theoretical and practical training, is the appropriate assistance tools proportional to the forces' mission and complete familiarization with their application. The special operation forces dispatched to the enemy's territory with no clear sequence behoove to have higher education and mobilization level compared to those operating in classic organization with supporting facilities. Educational axis of military forces is so comprehensive on self-aid and buddy-aid, among which familiarization with the initial steps of resuscitation, breathing examination, bleeding evaluation, types of shocks and their controlling manner, wound dressing types, dealing with different fractures, temporary splint application, and protective measures against NBC hazards, etc. can be enumerated. Each action keeping the soldier and his unit in ideal conditions is considered as the fundamental principles of combat organization;

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therefore, learning the first aid principles and resuscitation basic measures is a matter of high necessity for all militaries [6].

Education is an important part of preparation process [3, 7]. The presence of an active educational and healthcare system has been cited as a defensive key for confronting the threats, as the attacks can be easily identified and effectively equipped against [8, 9]. In a classification, the training approach has been divided into two methods including lecture and multimedia software package. Lecture-based education is teacher-centered, and contents are presented as class (face to face) lectures or training workshops; simultaneous attendance of both instructor and student is mandatory in the class. While in multimedia software technique, student-centeredness and separation of learner and the trainer are from the characteristics of this kind of education. Media is the agent providing a non-contiguous relationship between these two important educational components [10 and 11]. As for the advantages of lecture-based education, mutual and two-way communication, learner's active participation and discussion opportunities, acquisition of behavior-and skill-leading habits along with gaining knowledge, development of acceptable interpersonal relations and communication skills, the chance for intimate discussion and conversation, the possibility of immediate question and answers and a prompt feedback, and encouragement and motivation for behavioral interpretation are worth mentioning [11].

Researchers have previously investigated the effect of training using educational software package, among whom some have confirmed usefulness of this method in teaching and learning, and others have indicated significant differences in favor of traditional teaching methods compared to multimedia software-based education. There are some interesting points in training using the multimedia software pack as follows: 1. Learner is facing a wide maneuvering power in use of educational software which increases the power of choice and consequently learning levels.

2. In multimedia software packs designed based on educational principals, an attention has been paid to individual differences; as a result, each person deals with learning according to his/her own position and existing situation.

3. The power of choice in educational software brings more growth and development of abilities and competencies among learners [12].

Several studies have been conducted to compare the effectiveness of education between lecture and multimedia software packages, and contradictory results have been brought about.

In a randomized study by Koivunen et al. on continuous education of graduated physicians, lecture-based training has been compared with web-based education and the results demonstrated more effectiveness of distance teaching method compared to the other after elimination of a group of participants with lower computer skills and higher mean age [13].

In an investigation by Karimzadeh et al., the effect of face to face and distance teaching method has been mutually compared on health teachers’ re-training among the schools of Shiraz, and the results revealed superiority of distance education to conventional training methods in health education [14].

In this line, the efficacy of lecture and multimedia software packages on nurses’ learning level has been compared in Moradi study in terms of medical nuclear care nursing training in three stages before, immediately after, and four weeks following the education. Nurses mean scores was significantly higher in multimedia software-based education in three levels of knowledge, perception and application and in three steps than the lecture group [15].

In a smoking cessation training program by Chaikoolvatana and his colleague, lecture-based education has been compared with interactive multimedia training and no significant difference has been observed between the two methods; however, the attitude alteration was higher in a group receiving the multimedia program compared to the other [16].

In an experimental study by Aslani Malayeri, face-to-face training has been regarded more appropriate than distance teaching for students in physiopathology and clinical courses [17].

In order to compare the effect of web-based and lecture-based education, 21 medical students were evaluated, from those who had not passed the Vascular Ultrasound course, in a study by Chenkin et al.; the lecture group scores were found to be higher than those of web; nonetheless, the web-based group showed more satisfaction compared to the pamphlet group [18].

The most well-known method for the evaluation of clinical skills is the Objective Structured Clinical Examination (OSCE) which has been studied more than any other approaches. Objective structured clinical examination is a valid method for the assessment of clinical competency. This technique is easily capable to evaluate basic and principal skills in specialized classes as well as cognitive, emotional and psychomotor fields. Objective structured clinical examination is a series of stations through which the candidate passes and performs a predetermined duty in each station; this method has been used in the present study for the evaluation of functional competencies [19].

By the time the present study was initiated, there had not been any study comparing the effect of self-aid and buddy-aid education using lecture and multimedia software package; hence, the researchers aimed to investigate the effect of self-aid and buddy-aid education through lecture and multimedia software package on performance level of the military personnel.

 Methods

The present quasi-experimental study with single posttest-only design was conducted after sampling from two selected battalions, consisting of 300 subjects.
each. The sample size required was calculated to be 30
participants in each group using Altman's nomogram
and assuming α=0.05, β=20% and 80% power, and the
standard deviation of 2.4. Based on inclusion criteria,
one out of six soldiers was systematic randomly
selected from those with pre-test scores less than 60%
(200 out of 300 subjects in Mashhad, and 180 out of
300 in Tehran) and received self-aid and buddy-aid
education using lecture and multimedia methods.
Inclusion criteria included soldiers in their first or
second decades of service with diploma and associate's
degree receiving no self and buddy-aid training
previously.
In multimedia software package group, least
familiarization with Windows, using multimedia CDs,
and having a personal computer were among the
criteria for entering the study, and lack of samples' participation in post-education test was considered as
exclusion criteria.
Data-collecting instrument included researcher-made
demographic questionnaire, scenarios and checklists.
Objective structured clinical examination was used to
determine participants' performance in each group.
Valid checklist assistants were applied, the validity of
which was performed by faculty members and approved after necessary revisions by relative professors, and the reliability was calculated through
test-retest and Pearson's test (r=93%). For the
multimedia software, content validity was determined
using the opinions of expert faculty members.
Then, first group was trained by lectures, questions and answers and educational pamphlets for eight hours, and
statistical tests to compare participants' mean scores in
functional test stations by OSCE using Man-Whitney,
and Fisher's qualitative test for the relationship
between education and gender variables.

Results
Most participants had diploma in lecture (66.7%) and
associate's degree in multimedia (53.3%) groups; however, Fisher's exact test showed no significant
difference between the two groups (p>0.05).
Most participants were married in both groups but not statistically significant according to Fisher's exact test
(p=0.005).
On the contrary, age and work experience have been shown to be statistically different between the two
groups by t-test (p<0.001).
In station one "vital signs monitoring," five "carrying
method of injured," seven "head bandage," and eight "
self-care and decontamination of biological attacks,”
no significant difference has been observed between
the two groups (p>0.05); while, in station three "pulmonary and cardiac resuscitation," four "first-aid
measures for eye burns," and six "splinting"
meaningful difference has been found by Mann-
Whitney between the study groups (p<0.001).
Multimedia software-based teaching method has been
more successful on participants' performance level in
these stations compared to lecture-based education.
Nevertheless, in station two "bleeding monitoring", the
results were more acceptable in lecture than the media
group (Table 1).

| Table1. Comparison of the mean OSCE station scores in both lecture and multimedia software groups |
|-----------------|-----------------|-----------------|-----------------|
| Groups          | Stations Lecture | Multimedia software | Mann-Whitney Significant level |
| One             | 90 ± (14.3)      | 89.2 ± (11.1)    | > 0.05           |
| Two             | 88.5 ± (13.8)    | 71.4 ± (10.7)    | < 0.001          |
| Three           | 51.7 ± (11.7)    | 66.2 ± (6.9)     | < 0.001          |
| Four            | 58.3 ± (16.5)    | 80.8 ± (9.7)     | < 0.001          |
| Five            | 71.2 ± (20.8)    | 72.9 ± (13.9)    | > 0.05           |
| Six             | 51.9 ± (15.6)    | 80 ± (10.3)      | < 0.001          |
| Seven           | 89.5 ± (10.9)    | 82.5 ± (14.8)    | > 0.05           |
| Eight           | 65.1 ± (7.9)     | 60 ± (10.8)      | > 0.05           |

Discussion
In line with specific aim of the research, determination of performance level one week after the education in
lecture and multimedia software groups, no statistical difference has been detected between the two groups in
some stations (vital signs monitoring, carrying method of injured, head bandage, self-care and
decontamination of biological attacks), which is in
consistence with Chaikoolvatana study, indicating no
significant difference between lecture and multimedia
software methods [16]. The reason behind such a
similarity between the two educational methods in
these stations may be probably due to participants' previous information on the above issues or the
background on the concepts mentioned. However, no remarkable difference has been observed in other stations (pulmonary and cardiac resuscitation, first-aid measures for eye burns, and splinting), representing more efficacy of multimedia software training in subjects’ performance level in these stations compared to other approach. Findings of the present investigation is in accordance with Stinson and Steinberg studies that declare non-attendance presentation of some practical courses entails better results in distance education system in comparison with lecture-based teaching method [10]. It is also in line with other surveys in which the superiority of multimedia software has been elucidated to lecture training method [13, 14 and 15]. More effectiveness of multimedia software in comparison with lecture in PCR station along with increased performance level of soldiers is worth considering.

On the other hand, lecture-based training has been more successful than multimedia software on participants’ performance level in "bleeding control" station, which could be owing to better presentation of this topic in lecture education, as also reported in Chenkin and Aslani Malayeri studies [17 and 18].

Conclusion
The results of the present study demonstrated that in optimal condition, in terms of time and place, and presence of multimedia assistant tools, application of multimedia software packages can be more effective in increasing the performance level of some skills among soldiers.

Regarding the more efficacy of multimedia software in some stations, especially cardiac and pulmonary resuscitation, and considering limitations of lecture-based method, development of multimedia software application is recommended for self-aid and buddy-aid education.

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References
17. Aslani Malayeri M, Hossein M. Comparing The Efficacy of Non Face To Face And A Familiar Presence on Medical Students (Undergraduate Physiopathology) Medical Reference Research In Medical Sciences Isfahan University of Medical Science. 1998;3(1):8-11. [Persian]