

Comparing two methods of electronic and teacher-based education on nursing students' level of knowledge in taking care of trauma patients

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Abstract

Objective: Trauma is a major health problem worldwide regardless of regional socioeconomic and healthcare status. As a leading cause of death, trauma results in severe socioeconomic damages, which could be highly prevented by optimal care. As nurses are the major professional groups involved in patient care, improvement of their knowledge and practical skill leads to more qualified healthcare staff. Nowadays, traditional methods of education cannot meet students' needs and modern methods of training are recommended to be applied. This study, therefore, aimed to compare the effects of two methods of teaching (electronic education and teacher-based education) on students' learning and the efficacy rate of each method on the knowledge of fourth year students of nursing and midwifery faculty in Tabriz University of Medical Sciences.

Methods: In this study, the participants were randomly assigned into 2 educational groups of electronic (experimental group) and teacher-based (control group) method. All participants took a pre-test. Then each group attended the same course in a different method. Finally, post-test was taken by the participants and data were analyzed.

Results: A comparison of the mean knowledge score of both groups showed that electronic education was more effective than teacher-based education.

Conclusion: The electronic training will result in more effective learning in comparison to teacher-based method and can be applied as an appropriate and efficient method of education.

Keywords: Electronic education, Teacher-based education, Level of knowledge, Nursing students, Trauma patients

Introduction

Traumatic injury and mortality is a public health problem globally (1), with a disproportionate number occurring in developing countries (2), particularly in Iran (3). As most of the trauma outcome are preventable by principled, emergent and appropriate care, these preventive conductions are highly recommended to be applied (4).

Nurses are the major group involved in health care and have a key role in trauma patients care (5,6). One of the requirements of social health is training qualified health worker with both scientific and practical competencies. Obviously, academic education is the main part of their training, therefore, promoting educational standards of this group leads to better trauma patients care (7).

Currently, the use of modern educational methods is increasing all around the world (5,8). Since traditional methods of education cannot meet students' needs, applying student-based methods can result in more effective learning and reasoning abilities (9,10).

One of these educational methods which is now applied in nursing education system of many countries is electronic education, while it has not been in nursing field in Iran (7,11,12).

Electronic education is a self-directed learning method which seems to cause deeper learning in comparison with traditional method (13,14). Considering the limited research on the efficacy of electronic learning in nursing education, particularly in Iran, and also regarding contro-



versial results in this matter, the researcher was encouraged to examine the efficiency of this method in improving students' knowledge on trauma, as one of the major global health problems.

Thus, this study aimed to introduce electronic education as an effective and affordable method for improving nursing education and trauma patients care.

Methods

In this study, knowledge acquisition between 2 groups of students was compared. The research was conducted after permission of the ethics committee of Tabriz University of Medical Science and was registered in IRCT.

It is a single-blinded randomized controlled clinical trial. To eliminate subjective, unrecognized biases, data collecting was not performed by the researcher.

All the last year nursing students of Nursing & Midwifery faculty were studied (in 2013-2014). This group was selected because they had completed the theoretical courses and entered clinics. Guest students were not participated. Students who had attended trauma patient care and similar courses were also excluded. Ultimately, 78 students were participated.

Random Allocation Software (RAS) was used to randomly assign the participants to either the experimental (electronic) or control (teacher-based) group. Each group consisted of 39 participants. Some interventions were used to increase the likelihood that students will participate. These interventions included explaining the necessity and benefits of participating as, they had not attended this course, prior to this study. Besides, all participants get an educational CD and a certificate after the experiment. Some gifts were also for appreciation.

Experiment was conducted in second semester of 2013-2014, after briefing the research goals, a written participating consent was taken from the students.

Before the course started, all the students took a pre-test. The planned course was on the topic of "Basic Trauma Life Support". Educational contents were the same for both groups and both courses concluded three 2-hour sessions. The teacher-based course was taught by the researcher and supervision of emergency medicine professor.

In electronic education method a computer was allocated to every student by the permission of education deputy and head of computer site. Students were given a password to login to the software and were instructed how to work with it. Their access to the educational CD was limited to coursework sessions.

The courses finished in 4 weeks and then a post-test was used to compare knowledge acquisition between two groups of students. Pre-test and post-test were designed by a co-researcher who was not aware of the experiment's aims.

It prevented the experimenter's conscious or unconscious biases let the experiment remain blind.

The questionnaire consisted of 25 multiple choice ques-

tions including demographic characteristics & knowledge questions. It was designed based on NAEMT's (National Association of Emergency Medical Technicians) PHTLS (PreHospital Trauma Life Support) guideline, version 1.3, seventh edition which is free accessed on the web. These questions were designed for evaluating the primary knowledge of all health worker participated in the field if trauma patient care. For each correct answer, we assigned a point value of 1 and 0 for false answers. The range of scores was between 0 to 25. Obviously, higher scores represent better learning achievements.

After clarifying the scores, the students were classified in 6 groups due to their score: 91%-100% in group A, 83%-90% in group B, 75%-82% in group C, 67%-74% in group D and below 67% in group E. Students needed to achieve a score above the chosen threshold (above 75%) to successfully finish the course.

The reliability of the test was assessed by test-retest method. Students in experimental group received a compact disc relative to trauma patients care. It was designed by the researcher and emergency medicine professor.

The CD data was obtained from the book "Basic Trauma Life Support for Paramedics & Advanced EMS Providers" by John Emorry Campbell, fifth edition, 2004. Educational subjects were introduced in 3 steps: 1: scene survey, 2: primary survey, and 3: secondary survey.

Statistical analysis was performed by SPSS version 15. Knowledge acquisition was examined according to descriptive index, standard deviation and frequency of student's scores in the designed test. Paired *t* test was used to compare the knowledge of each group before and after the courses. Independent *t* test was conducted to compare the mean scores of two groups. The result is considered statistically significant as the P-value was less than 0.05.

Results

This study enrolled 78 senior nursing students with the mean age of 23.76 (46.2% male and 53.8% female). 48.7% were in seventh and 51.3% in eighth semester. Fifty percent of the participants had no working experience, while others had a mean experience of 1.07 year.

Comparing basic demographic variables (age, semester) by the chi-square test showed no significant difference between 2 groups. Also, the mean age and experience did not significantly differ due to independent *t* test.

The results of paired *t* test showed a significant outcome of the course on knowledge acquisition of both groups, but there was a favorable magnitude of difference in favor of electronic education due to independent *t* test results using the analysis of covariance (ANCOVA) model to investigate the results by modifying on basic numbers of 2 groups, a significant difference was observed (Table 1 and 2).

Discussion

Based on the results of this study, the electronic education

Table 1. Frequency distribution of under-research units according to level of knowledge in relation to taking care of trauma patient in two educational groups in Nursing and Midwifery Faculty of Tabriz University of Medical Sciences

Educational group, frequency		Teacher-based		Electronic	
		Before test	After test	Before test	After test
Performance	Very good	-	-	-	1
	Good	-	-	-	5
	Average	-	4	-	13
	Weak	-	1	-	6
	Very weak	39	34	39	14
	Total	39	39	39	39

Table 2. The difference of knowledge scores in two different groups

Group		Number	Mean	Standard deviation	P-value
Level of knowledge	Electronic	39	18	2.00	0.000
	Teacher-based	39	14	2.00	0.000

was significantly more effective on the students' knowledge acquisition. This result is similar to the results of the researches in which electronic method is reported to be more effective than traditional method.

Button in his article reported that Studies carried out by Abdelaziz et al and Jeffries and Smolle in this field (Nursing Education) are all in concordance with the results of our study. However, studies conducted by Desai et al, Seabra and Stanton et al showed no significant difference in efficacy of the two methods (10). The results of a similar research showed a better outcome of electronic-based method in a blood pressure course in comparison to the lecture-based method (15). Ream et al study affirms the students' more satisfaction with the electronic-based section in universities (16). In another related study, 94% of the students were taught by electronic method believed to gain equal or better training in comparison to the traditional method (9).

In a review, the efficacy of electronic and traditional method were stated to be equal (17). A similar study conducted by Zolfaghari et al, on "mother and baby's health" training showed no significant difference in the efficacy of 2 methods. However, statistical analysis better efficiency of electronic method, yet, students have a higher perception of lecture-based method which led to higher training motivation. Therefore, this study suggests the integration of electronic education with desirable environment to encourage the students (13).

Another research carried out to compare the effects of lecture-based, problem-solving and electronic self-study methods. It claims that all 3 methods lead to promote their skills, however, the electronic self-study method was less efficient and further studies are recommended (18).

The study's main limitation was the small number of participants. Inducting this study with a large sample size is recommended to achieve more valid results. Also, computer access among students may be limited in some cases

which can restrict the expansion of this method.

Conclusion

Based on the findings of this study, electronic education was more effective than lecture-based education. Students' liberty to choose the time and place of training leads to their more satisfaction and propensity to use this method.

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Ethical issues

The study was approved by the local ethic committee.

Authors' contributions

All authors contribute to drafting/revise the manuscript, study concept or design, analysis or interpretation of data.

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