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Applying e-Learning in the Laboratory of Nursing Clinical Skills: Resultant of Learning and Student's Satisfaction

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Abstract: Fast development and growth of information and technology has had deep effects on nursing training. This study was conducted with the aim of examining effect of e-Learning on resultant of learning and nursing student's satisfaction in training nursing clinical skills in the laboratory of clinical skills. A two-group post-test experimental study was administered. Sampling was conducted at Isfahan University of Medical Sciences. Nursing students who were learning nursing clinical skills unit selected. Sample size was equal to community size and totally 60 nursing students selected as control group (traditional training) and experimental group (traditional training with e-Learning) for two consecutive terms. Two groups participated in OSCE test and were evaluated in the same way using prepared checklist and satisfaction questionnaire. Statistical analysis was conducted using the SPSS Software Version 16. Finding of the study reflected that mean of midterm score in the combined group was 18±1/08 and mean of midterm score in the traditional training method was 17.48±1/70 (p = 0.04). Final mean score in combined training method was 17.62±1/14) and mean score in traditional training method was 16.96±1/70 (p = 0.01). Total score's mean in combined training method was 18.03±0/83 and total score's mean in traditional training method was 17.57±1/25 (p = 0.02). There was significant difference (p = 0/014) in the mean score of satisfaction between male (100.09±13.76) and female students (90.36±11.51). Based on the findings, e-Learning is recommended because of getting involved the students in the learning process, facilitating the independence and making student's motivation and satisfaction and pleasure increased.

Key words: Nursing students, e-Learning, personal satisfaction, traditional, control group, consecutive terms

INTRODUCTION

Today, technology has affected all aspects of human life including training (Solc *et al*., 2012). Growing development of access to appropriate software and hardware specially those specific to development of worldwide web made new horizons ahead of educational institutes (Ghasemi and Samieirad, 2009). Fast development and growth of information and technology has had deep effects on nursing training (Button *et al*., 2014; Bloomfield *et al*., 2010). Moreover, e-Learning is greatly used because of increasing number of students compared with that of masters and this issue is among the most considerable changes that can be discussed in nursing training (Allan *et al*., 2013). Potential capability of e-Learning using new and flexible approaches has internationally been known in nursing training (Zvanut *et al*., 2011). So that, applying terms of e-Learning as a complementary term results in developed content and increased depth of learning due to flexibility of training system (Ozturk and Dinc, 2014). In this kind of training, educational content is made more faster, more effective and more economic and then is presented to learners (Li *et al*., 2008) and important principles such as student activity individual learning, fast reaction, repeating educational content in proportion to need and request of individual, developing independence skill, flexibility, organizing, setting speed of learning and practicing computer skills would be realized (Vafamehr, 2010). In addition, focus is shifted from teaching to learning and as a result, learning will be deeper and more permanent (Horiuchi *et al*., 2009). Traditional teaching is based on attending class and listening to information presented by lecturer and focuses

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on educational content or materials; and differences among the abilities and learning skills of learners would not be considered (Li *et al*., 2008) and e-Learning must be used simultaneously with lecture and PowerPoint method in classes (Kenny, 2000) e-Learning is used not only for changing learning and training methods but also as one of the complementary methods in traditional training. By applying e-Learning: different methods of training be used, distance learning would be possible, time and cost is saved and sharing information would be possible for students (Baghaie *et al*., 2012) and student's motivation, satisfaction and pleasure is increased (Kaveevivitchai *et al*., 2009).

Applying training methods with advanced technology has increased in nursing training and its advantages have widely been noted in nursing texts (Bloomfield *et al*., 2010). Unit of nursing clinical skills is the main part of nursing curriculum (Bloomfield *et al*., 2010; Allan *et al*., 2013). In nursing curriculums, complete learning of clinical skills is one of the necessary priorities for nursing students because it guarantees the secure care of patient. Therefore, the most efficient methods of training skills must be used in order for students to become professional and maximize learning (Moule, 2011). e-Learning is presented in different formats such as reading, watching and listening to materials or combination of these formats on site. The important matter is that this educational design must be in a way that makes learning simple and efficient. High quality can provide opportunities for professional e-Learning and individuals are presented with new options for access to best curriculums (Sikorski and Peters, 1998). Training skills must be in proportion to learning needs and student's expectations and learning styles (Bloomfield and Jones, 2013). It means that student's speed of learning must be considered and training strategies be used in proportion to their priorities and interests in order to make more efficient learning possible (Johannesson *et al*., 2010). Although, face-to-face educational sessions used traditionally in the laboratory of clinical skills considered an invaluable strategy in nursing training (Bloomfield *et al*., 2013), continual presentation of educational content would not be guaranteed (Herriot *et al*., 2003) in this training method. e-Learning can complement the face-to-face traditional training and therefore, comprehensiveness of learning maximized using different approaches (Button *et al*., 2014). In the combined approach, more comprehensive opportunities are provided for gaining knowledge and understanding educational content compared with each of individual training methods. In addition, it increases validity of evaluation and results in growth and stability of learning due to evident link between theoretical and practical aspects (Bloomfield and Jones, 2013). Therefore, students can control and manage process of their learning and this is a reliable method for training clinical skills and causes boosting confidence, reducing stress increasing self-awareness and self-evaluation of negative and positive behaviors (Fernandez *et al*., 2014). Considering that e-Learning training has a favorable position among international specialists and programmers based on its capabilities, we have designed a e-Learning curriculum for training nursing clinical skills in the laboratory of clinical skills and the content of lessons including files of lesson content, graphs and short video clips, presented in the form of e-Learning with face-to-face traditional training because in Iran gets little survey and attention to the use of e-Learning, especially in the teaching of clinical skills to facilitate learning in undergraduate nursing students therefore present study was conducted with the aim of examining effect of e-Learning on resultant of learning and nursing student's satisfaction in training nursing clinical skills in the laboratory of clinical skills.

MATERIALS AND METHODS

A two-group post-test experimental study was administered. After securing permit from research ethic committee of Isfahan Medical Sciences University, sampling was conducted at Nursing and Midwifery Faculty, Isfahan Medical Sciences University during February 2014 through to February 2015. In this study, all freshmen nursing students who were learning nursing clinical skills unit (without any experience in learning nursing clinical skills) selected. In present study, sample size was equal to community size and totally 60 nursing students selected as control group (traditional training) and an experimental group (traditional training with e-Learning) for two consecutive terms. In control group, students were divided into 10 individual groups and nursing clinical skills were taught in 2 h sessions twice a week in the laboratory of clinical skills. In an experimental group, the traditional method was used with e-Learning, therefore, as students had traditional training of clinical skills in 2 h sessions twice a week in the laboratory of clinical skills, they received address of URL to use designed educational website. In this study, address of URL was nursingskills.ir with Plan A-G-3GB. Because, the control group was evaluated in the previous term the experimental group without the need for a username and password could use the site. This site consisted of text file of step-by-step running nursing procedures with scanned

pictures of the newest references as well as video clips (educational films) of nursing procedures and students easily had access to materials and educational films on computer or mobile device and could download text files with respective pictures and films and use them when they did not have access to network. Therefore, training was continued whenever and wherever students wanted. Role of researchers in e-Learning was to manage site, prepare educational materials, make material available on internet, answer to questions of participants and finally conduct exams.

Two groups participated in OSCE test in 3 station with limitation of time 10 min for any station in unit's midterm and final term and were evaluated in the same way using prepared checklist with 15-20 statement for any procedure and their mean score compared with each other. Checklist in terms of content and face validity was confirmed by faculty members of adults health nursing group. Moreover, student's satisfaction with e-Learning was evaluated by researcher-made questionnaire based on 5-scores Likert scale of 25 expressions. Therefore, options of strongly satisfied, satisfied, approximately satisfied, unsatisfied and strongly unsatisfied received scores of 5, 4, 3, 2 and 1, respectively (minimum and maximum score were 25 and 125) and score of satisfaction was calculated. To make sure of content validity of prepared checklist and satisfaction questionnaire, 10 professors of adult health nursing were offered for poll, corrections were applied. Moreover, equivalence method and Cronbach's alpha were used for examining reliability of prepared checklist and reliability of satisfaction questionnaire, respectively where a reliability coefficient of 0.86 indicates the reliability of research tool.

Statistical analysis was conducted using the SPSS Software Version 16. One-sample Kolmogorov-Smirnov test showed data were normally distributed (p = 0/378 for control group and p = 0/787 for experimental group). Therefore, t-test was used for comparing mean score of training nursing clinical skills of students in two groups, t-test for comparing mean score of male and female satisfaction. This study was approved by the Ethics Committee of Isfahan University of Medical Sciences (No.: 293349).

RESULTS AND DISCUSSION

In traditional training group and an experimental group, total number of 60 individuals (26 male and 34 female) and 59 individuals (29 male and 33 female) took part, respectively. Further participant's demographic characteristics have been presented in Table 1. Comparing mean score of mid-term and final term in two groups were different (Table 2). Mid-term mean score of training nursing clinical skills unit in the traditional training group with e-Learning was 18±1/08 and mean score in the traditional training method was 17.48±1/70 and t-test indicated that two groups were different (p = 0.04). Final-term mean score of training nursing clinical skills unit in combined training method was 17.62±1/14 and mean score in traditional training method was 16.94±1/70 and t-test was significant (p = 0.01). Total score's mean of unit of practical nursing principles and techniques of nursing students in combined training method was 18.03±0/83 and mean score in traditional training method was 17.5±1/25 and t-test was significant (p = 0.02) (Table 3).

Comparing mean score of male and female student's satisfaction with e-Learning reflected that mean score of satisfaction in male students was 100.09±13.76 while mean score of satisfaction in female students was 90.36±11.51 and its maximum was 119 with mean score of 90 scores. t-test reflected that mean score of satisfaction in two groups of male and female students had significant difference with p = 0.014 (Table 4).

Clinical skills, that are base of nursing and training clinical skills are vital part of curriculum of BSc nursing students. The laboratory of clinical skills is a necessary

Table 1: Participants demographic characteristics

Outcome/Age (year)	Genders	Matriculation quota	Addresses
Control groups			
18-20: 50	Male: 26	Region 1: 26	City: 19
21-25: 6	Female:33	Region 2: 26	County: 34
26-30: 4		Other than that: 8	Village: 7
Experimental groups			
18-20: 50	Male: 29	Region 1: 21	City: 18
21-25: 4	Female: 33	Region 2: 28	County: 34
26-30: 5		Other than that: 10	Village: 7

Table 2: Comparing mean score of mid-term and final term in two groups

			Paired t-test	
Outcomes	Mid-term score (mean±SD)	Final term sore (mean±SD)	t-values	p-values
Control	17.48±1.70	16.96±1.70	2.11	0.039
Experimental	18±1/08	17.62±1.14	2.40	0.019

Table 3: Comparing mid-term score, final score and total score in two groups

			T-test	
Outcomes	Control	Experimental	t-values	p-values
Mid-term score (mean±SD)	16.94±1.70	17.48±1.70	1.99	0.04
Final term sore (mean±SD)	17.62±1.14	18±1.08	2.49	0.01
Total score mean±SD)	17.56±1.25	18.03±0.83	2.40	0.01

Table 4: Comparing mean score of male and female's satisfaction in combined group

Outcome	Male	Female	t-values	p-values
Satisfaction (mean±SD)	100.09±13.76	90.36±11.51	2.56	0.014

structure in nursing training that can assure nursing students of sufficient training and makes them ready for real clinical environment that must be prepared using appropriate training strategies. Primary strategies for training nursing clinical skills are consisted of using simulators from low to high precision (Houghton *et al*., 2012). Findings of present study reflected that an experimental group or traditional training that applied e-Learning (combined) had significant difference in terms of mean of midterm, final term and total score compared with that of control group or traditional training. In this direction, Abdelaziz *et al*. (2011)'s study on evaluating e-Learning versus traditional training in nursing student also reflected that post-test score of study group or training through e-Learning was significantly higher compared with that of control group with traditional training method that is consistent with results of present study. In addition, findings of Shen *et al*. (2007)'s study showed that students in traditional group were a little better in term of performance compared with that of on-line group, that is consistent with results of present study. Moreover, Bloomfield and Jones (2013) study on applying e-Learning in learning nursing clinical skills reflected that students considered e-Learning an invaluable experience for developing clinical skills and although, they had positive view about e-Learning, they were reluctant to abandon traditional training and considered face-to-face learning opportunities very invaluable and preferred combined training method with e-Learning. In this direction, video clips were mentioned as the most useful aspect of electronic training of clinical skills (Bloomfield and Jones, 2013) that is consistent with results of present study on applying traditional and e-Learning simultaneously in training nursing clinical skills. Sung *et al*. (2008)'s study indicated that combination of electronic training with face-to-face training can be useful that is consistent with results of present study. Moreover, findings of Bloomfield *et al*. (2010)'s study on washing-hand skills of 242 freshman nursing students in Britain University by two methods of computer-aid training and traditional training (presenting lecture by trainer) reflected that knowledge related to washing hand greatly increased in two groups after training but no significant difference observed in scores of two groups. Although, no significant difference found in scores within two weeks after training but score of skill performance in computer-aid training or study group was higher than traditional group during next 8 weeks follow-up and it means that stability of learning in computer-aid training was more than traditional in spite of efficiency of two methods of learning (Bloomfield *et al*., 2010). Button *et al*. (2014)'s study on analyzing 28 studies on e-Learning in training nursing students showed that a number of 20 studies (71%) noted positive and negative aspects of e-Learning and the desirability of combined learning. A number of seven studies out of twenty studies noted positive results of e-Learning such as fast access to trainer and also receiving fast reply by an e-Mail and group discussion, flexibility, self-regulation ability for learning speed increasing motivation and deeper learning (Button *et al*., 2014). In addition, reviewing findings reflected that although students enjoyed many aspects of e-Learning, they still had more tendencies to interactions of face-to-face training and suggested the combined learning namely traditional training with e-Learning.

Comparing mean score of male and female student's satisfaction with e-Learning reflected that mean score of satisfaction in male students was significantly more than female students. In this direction, Reime *et al*. (2008)'s study reflected that male student's score in e-Learning group was higher while female students achieved higher score in lecture group compared with males but no significant difference observed. Sorensen also noted that there is a symbolic entity between technology and manhood. It seems that male students are interested in technology and can gain considerable competence in it. While, female students pay more attention to care and because of that, they get involved in technology lesser than male students (Reime *et al*., 2008).

On the other hand, results of Stanton *et al*. (2012)'s study reflected that two groups of e-Learning and traditional training had no significant difference in term of score of test (Stanton *et al*., 2012) that is not consistent with results of present study. This inconsistency can relate to under-research community, so that, studies reflected that applying e-Learning made limitations for some students for example for students who had no access to computer and internet in dormitory or at home and had to study curriculum in internet cafe of noisy environment having access to curriculum at each time was impossible and sometimes family did not allow them to study in internet cafe. Moreover, students settled in dormitory could not watch videos several times because of time and cost problems and students with not enough skills for working with computer, experienced anxiety and stress. In addition, findings of meta-analysis and systematic reviewing of Lahti *et al*. (2014) from 11 experimental studies and 2491 nursing students and nurses on effect of e-Learning on knowledge, skill and satisfaction with e-Learning reflected that knowledge development by e-Learning was more than traditional learning based on results of four studies but difference was not statistically significant. In general, no statistical

significant difference observed between two groups of e-Learning and traditional learning in term of knowledge, skill and satisfaction in nursing students and nurses (Lahti *et al*., 2014). Reime *et al*. (2008)'s study on infection control training of nursing students by two methods of e-Learning and traditional learning reflected that two groups had no significant difference in test score in term of age and gender and total test score was higher in lecture group that is not consistent with results of present study. This inconsistency can relate to kind of study method, so that, present study used e-Learning method with lecture and traditional training and had complementary role compared with that of the traditional method solely. In addition, findings of Seabra *et al*. (2004)'s study on training urology unit of nursing students reflected that two groups had not significant difference in their test score where study group and control group used computer-aid multimedia program and traditional program, respectively. In general, students were satisfied with the traditional method with e-Learning. In Reime *et al*. (2008)'s study, students considered the educational content of e-Learning program useful and mentioned that, by this method, knowledge would be presented more precise, more concise and more real than lecture and book, there are more opportunities to test themselves, observing their progression during program makes them motivated, following program is easy and some stated that e-Learning is a more innovative and an attractive method to learn. Generally, applying e-Learning method considered an invaluable experience that can be used as a source like lecture but it matters that students have necessary skills to use this technology (Reime *et al*., 2008).

CONCLUSION

Learning clinical skills is an intricate process and it is necessary to consider learning styles and student's priorities while preparing for training clinical skills. As e-Learning gets learners involved in learning process and facilitate learning and self-guidance, continual presentation of educational materials makes student's motivation, satisfaction and pleasure increased and complements other methods and causes comprehensive learning. Therefore, based on results of above-mentioned studies and results of present study, applying e-Learning with traditional training is recommended for training nursing clinical skills and it is among the responsibilities of nursing trainers not to restrict training to class. The combined approach provides more comprehensive opportunities for gaining knowledge and understanding educational content compared with that of each training method solely and e-Learning is suggested as a complementary method for traditional training.

LIMITATIONS

The limitations of this study include the lack of random assignment of subjects which would add the strength of the study, given that there was a risk of contamination of the samples, the two groups were used in two consecutive semesters. The dominant learning styles of students are an important factor affecting the depth and durability of learning.

RECOMMENDATIONS

Therefore, further studies can be designed to assess student's learning styles and their impact on the design of electronic systems for clinical skills training done. As well as qualitative studies in order to gain deeper information before, during and after intervention is recommended.

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