Original article:

Comparison of Lecturing and Multimedia-Based Learning on the Knowledge and Remembrance of Breast Cancer Topics in Midwifery Students of Shiraz University of Medical Sciences in 2016

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Abstract:

Background and Purpose: One of the most important principles of training is the appropriate teaching method. The method used plays a key role in the process of teaching and learning and affects the students' learning while knowledge of these methods and choosing the best of them lead to improvement in education. The aim of this study was to compare the effect of two lecture-based and multimedia-based training methods on learning, knowledge and remembrance of breast cancer topics in students of Shiraz University of Medical Sciences in 2016. ***Methods:*** In a quasi-experimental study, 42 midwifery students were assigned to two groups for training (25 students in multimedia-based method and 18 in lecture-based method). The students' knowledge was measured using 20 multiple-choice questions designed by the researcher in three stages: pre-test, post-test and test-retest (2 months after the intervention). Then, the data were analyzed using SPSS, 19, at a significance level of 95%. ***Findings:*** There was no significant difference between the students' mean age and their mean score in the course of women's diseases in the two groups. No difference was observed in the mean scores in the two groups (p>0.05) before the intervention, but after the intervention the level of students' knowledge in both groups increased (p=0.000). In the post-test stage, there was a significant difference between the scores in the multimedia-based and lecture-based groups (p=0.000). ***Results:*** The results indicated the effectiveness of multimedia knowledge and breast training method so that this method showed a more lasting knowledge after two months of training.

Keywords: Multimedia-based method; Lecture-based method; Stability; Cancer and screening; Midwifery students

Introduction:

Choosing a teaching model depends on teachers' knowledge of philosophy and approaches of education while this selection and implementation of effective training method in the development of learning are considered as important objectives and main elements in the educational program.[1] Choosing of training methods can be considered as activities adopted by teachers according to the conditions and facilities to achieve educational goals. [2] In the selection of training and teaching methods, some points are considered including knowledge, skills considered by the teacher for the learners, how teacher communicates with the learner, how to use the facilities in the training process and participation of students in the learning.[3, 4] having knowledge of these methods and choosing the best of them leads to maximum use of opportunities, improvement of education and remembering training process.[5] Today, training methods refer to two general teaching models. One is teacher-centered model where the goal is to form a behavior on the basis of a pre-determined

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pattern. Teacher is a learning point and among the most common used model of teacher-centered methods we can refer to lecture-based method as the most common type of training. Another model that pays special attention to the learner, his needs and abilities is called learner-centered model where active participation of the learner in obtaining knowledge by using new training methods is important.[6-8] A new kind of training method is multimedia-based method which has been developed to enter the medical education system since the early 1960s.[9,10] Multimedia is considered as an Individualized Education Program in which students learn how to learn by a variety of electronic trainings.[11] Studies conducted on multimedia-based and lecture-based methods indicated different opinions regarding these two methods. As an example, one study was conducted by Perfeito et al. entitled "Pleural Drainage Clinical Training for Medical Students with two multimedia-based and lecture-based methods." Findings showed that there was no significant difference between the two groups[10]. Another study also showed that training by the use of multimedia software was more successful than lecture-based method. However, in the bleeding control station, results of the lecture group were better than those of multimedia software group. [12]

Breast cancer is the most common cancer and the second leading cause of cancer death among women. Detection of breast cancer in the early stages leads to almost complete treatment. Breast cancer screening includes breast self-examination, clinical breast examination and mammography.[13] Breast cancer constitute one-third of cancers in women.[14] In most societies and cultures, protection of the breast appearance is very important.[15,16] The purpose of screening is to detect cancer at early stage when the tumor is smaller than 1 cm with highest potential for surgical treatment. A person who wants to do breast examination should be trained. High-risk women with more than 20% lifetime risk should add M.R.I to their diagnostic methods.[17]

Midwives, in addition to the general duties, are responsible for assigning tasks of self-care training and follow-up of patients with breast cancer. The findings of this study will help the midwives in training, research and management sections to implement the best training methods for the learners. Therefore, awareness of the advantages of lecture-based and multimedia-based methods causes the country's researchers to focus on the most effective method to develop knowledge about the related method. Moreover, in the training and management sectors, teachers and administrators in the women sectors will use the best training methods in the training centers with the aim of reducing the costs and increasing the maximum learning. The aim of this study was to compare the effects of two lecture-based and multimedia-based methods on the stability of knowledge and learning of breast cancer and its screening in students of Shiraz University of Medical Sciences in 2016.

Methods:

This cross-sectional and quasi-experimental study was conducted from 2015 to 2016 in Shiraz Nursing and Midwifery School in which the researcher compared two lecture-based and multimedia-based training methods in breast cancer detection and its screening. The study was conducted in Shiraz Nursing and Midwifery School affiliated to Shiraz University of Medical Sciences. The study population included all midwifery students of the third semester of the academic year 2015-2016 for whom courses on gynecologic diseases was presented in the academic year 2015-2016. In this study, the sample size was equal to that of census and all midwifery students of women's diseases would pass the course of breast cancer topics and screening methods in the academic year 2015-2016. Inclusion criterion for the study sample was passing the course of women diseases during studying at Shiraz University of Medical Sciences. Exclusion criteria were the presence of student as guest student or transferred student at Shiraz University of Medical Sciences, respectively. The researchers first obtained permission from the Ethics Committee of the University and also a referral from university and then presented it to the school of nursing and midwifery to have permission for carrying out the present research. The students were provided with complete explanation of the purpose of the study and their written consent was obtained. This study began with the permission of the dean of the faculty at the School of Nursing and Midwifery and coordination with the head of the department and teacher of women diseases course regarding the goals and implementation of the study. Initially, the students were trained randomly into two groups: one group with lecture-based method and another one with multimedia-based method. In order to have

similar trainings in the two groups, a fixed teacher trained with necessary trainings in this area was selected. Each group had four teaching sessions. In the lecture-based group, a 45-minute presentation was considered. To assess the knowledge stability in each group, all students in the control and experimental groups were tested two months after the end of each class. Training content in the four sessions included recognition of breast cancer in women, knowledge of prevention methods and screening of breast cancer and breast self-assessment techniques, familiarity with benign breast disease and breast cancer. The training content at the beginning of the session was presented with the lesson plan. Persistence test was conducted two months after the end of this period. Due to the time of final exams and lack of training opportunity and the need for more time, the maximum persistence time period was considered two months. All questions included 20 multiple choice questions with a score range from 0 to 20. To investigate the stability of knowledge in each group, all students of lecture-based group and multimedia-based group were tested two months after the end of training. All the students were assured that the pre-test, post-test and sustainability scores had no effect on their evaluation. In order to prevent the abuse of study tools and its impact on the training process, persistence tests of the two groups was conducted without any information given to the students. In this study, data collection instrument included two parts. One part was a questionnaire including personal information (gender, total average, score of cancer lesson, interest and easy access to a computer) and tests (pre-test and persistence test) which contained 20 multiple choice tests with a score ranging from 0 to 20. Questions did not have a negative score. For the scientific validity of the data collection tool in this study, questionnaire and tests (pre-test, post-test and sustainability of knowledge) were designed by the researcher based on the training goals and then objectives of the training plan with questions given to 10 teachers of nursing and midwifery in order to use their comments. In the design of all three test questions, the cognitive learning areas were considered in 5 domains of the classification of sciences including understanding, intended use, analysis, synthesis and evaluation. For scientific reliability and validity of the data collection tool in this study, the test was approved by test-re-test reliability method. Also,

Cronbach's alpha coefficient was obtained 0.92 using SPSS 19. The ethical considerations in this study included explaining the purpose of the study to the participants, confidentiality, observing ethics in the use of other resources and studies, giving a summary of the results of the study to the participants in this study, and informing and receiving a written consent from participants in the study. For data analysis, descriptive statistics, independent t-test, dependent t-test and Pearson tests were used in SPSS, version 16. All statistical analyses were performed at a significance level of 95%.

Ethical considerations:

The researchers first obtained permission from the Ethics Committee of the University and also a referral from university and then presented it to the school of nursing and midwifery to have permission for carrying out the present research. The students were provided with complete explanation of the purpose of the study and their written consent was obtained. This study began with the permission of the dean of the faculty at the School of Nursing and Midwifery and coordination with the head of the department and teacher of women diseases course regarding the goals and implementation of the study.

Results:

In this study, finally 18 students in the lecture-based group and 25 students in the multimedia-based group were enrolled. There was no significant difference between the mean age, mean score, students' grade in the women diseases course in the two groups ($p < 0.05$, Table 1).

Table 1: Comparison of Demographic Characteristic of Participants in Two Lecture- and Multimedia-based groups

Training Group / Variables	Lecture-based Group		Multimedia-based Group		T-Statistics	Probability Value
	Average	Standard Deviation	Average	Standard Deviation		
Age	23.33	1.56	22.20	1.00	1.85	0.17
Total Average	17.02	1.26	16.63	16/11.16	2.852	0.07
Women patients score	15.80	1.00	15.87	1.15	-0.210	0.835

The frequency of marital status, interest in the field and amount of access to computer showed no significant difference in the two groups (P< 0.05, Table 2).

Table 2. Comparison of Distribution of Demographic Characteristics of the Participants in the Two Lecture and Multimedia-based Groups

		Group presentations		Group Multimedia		Probability Value
		Abundance	Frequency	Abundance	Frequency	
Marital Status	Married	5	27.8	7	28.0	P=0.987
	Single	13	72.2	18	72.0	
Interest Status to the Field	No Interest	1	6.5	2	8.0	
	Average Interest	10	55.6	19	76.0	P=0.237
	Having Interest	7	38.9	4	16.0	
Amount of Access to the Computer	Little	2	11.1	1	4.0	
	Average	7	40.0	10	38.9	P=0.660
	Much	9	50.0	14	-56.0	
Amount of Interest to Computer	Little	1	5.6	6	24.0	
	Average	17	94.4	18	72.0	P=0.169
	Much	0	0	1	4.0	

Pre-test scores were not significantly different between the two lecture-based and multimedia-based groups (P=0.942). Post-test scores were significantly different between the two lecture-based and multimedia-based groups (P=0.000). There was a significant differences in test-retest test between the two lecture-based and multimedia-based groups (P=0.00, Table 3).

Table 3: Comparison of Pre-test Scores in the Two Lecture-based and Multimedia-based Training Groups

Probability Value	T-Statistics	Standard Deviation	Average	Training group	Variable
0.946	-0.068	1.16	3.05	Lecture	Pre-test score
		1.15	3.08	Multi Media	
0.000	-5.335	2.67	11.72	Lecture	Post-test score
		2.13	15.64	Multi Media	
0.000	-5.241	2.99	11.44	Lecture	Knowledge Stability score
		1.95	15.40	Multi Media	

There was a significant difference between the mean scores in pre-test and post-test scores in the lecture-based and multimedia-based groups (P=0.000). Average pre- and post-test scores were significant in multimedia (0.000 p =, Table 4).

Table 4: Comparison of Pre- and Post-test Scores in the Lecture-based Training Group

Probability Value	T-Statistics	Standard Deviation	Average	Time of Testing	Variable
0.000	15.011	1.16	05/3	Pre-test	Score
		2.67	72/11	Post-test	
0.000	24.941	1.15	08/3	Pre-test	Score
		2.13	64/15	Post-test	

In this study, the effects of two multimedia-based and lecture-based training methods on the learning and stability of knowledge in women diseases sector (breast cancer and its screening) in students of Shiraz University of Medical Sciences were compared in 2016. First, individual characteristics, including age, interest in the field and working with computer, computer access, total average and score of women diseases that seemed to affect the results of the study were examined. The two groups were compared in terms of demographic and interest rates, computer access and an interest in computers. The two groups were homogeneous in terms of these characteristics.

In this study, according to the obtained results, comparison of pre-test mean score was 3.05± 1.16 in the lecture-based group and 3.08± 1.15 in the multimedia-based group. Pre-test scores were not significantly different between the two multimedia-based and lecture-based *groups* (P=0.942). There was no significant difference in the two multimedia-based and lecture-based methods before the intervention. The results of the present study suggest that midwifery students had no information and knowledge on the subject discussed. Lack of difference between the two groups in terms of information and awareness of the related topic indicates similarity between the two groups in the present study and above-mentioned studies.

Discussion

In this study, according to the results, comparison of the post-test mean score in the lecture-based and multimedia-based groups was 2.67 ± 11.72 and 2.13 ± 15.64, respectively. Mean scores of post-test in the lecture-based and multimedia-based groups had a significant difference (P=0.000). It should be noted that there was a significant difference in the present study between lecture-based and multimedia-based groups before the intervention. Pape-Köhler (2013) conducted a study with the aim of helping the students to succeed in learning multimedia-based and lecture-based surgery training at a university in Germany. Post-test scores in multimedia-based training group were higher than those of lecture-based group.[18] Keulerc et al. (2007) carried out a comparative study of training patients through computer software, compact discs and face-to-face methods. The average value of learning was observed in the face-to-face and computer software (CD-ROM) groups. But compared to the average level of satisfaction, these two groups were homogenous and no statistically significant differences were observed.[19] As mentioned in these two studies, the obtained results were in line with

those of the present study in which using software improved midwifery students' learning. But in one study conducted by BloomField et al. (2010) as a randomized controlled study entitled "The Impact of Multimedia-based versus Traditional Teaching Methods for Hand Washing in Nursing Students at the Faculty of London Nursing and Midwifery College", it was concluded that the scores of multimedia-based and lecture-based training groups were similar before and after the intervention and the use of multimedia-based training method was ineffective.[11] Moreover, in a study done by Vahabi et.al (2011) the effects of triage training were compared using lecture-based and multimedia-based methods on the learning of nurses in one of the hospitals in Isfahan. Learning of triage in nurses was not observed in both methods. But scores of the test-retest in the training multimedia-based software group was more than that of lecture-based group. [20]

In this study, according to the results, comparison of test-retest score in the lecture-based group was as 11.44±2.99 and in the multimedia-based group was as 15.40±1.95. There was a significant difference (P=0.000) in the mean scores of test-retest between the two groups. Significant differences between the two methods were observed immediately after the intervention. The results showed a significant difference between the scores in the lecture-based group after the intervention compared to pre-intervention. In other words, it indicates the effect of increasing the knowledge of students in lecture-based group after the implementation of the lecture-based method. Also, the results showed a significant difference between the two groups of students in lecture-based and multimedia-based methods in the students of multimedia group. However, a comparison of scores between the two groups after the intervention indicated a significant difference in lecture-based and multimedia-based training methods in the students of multimedia group. But comparison of scores in both groups after the lecture-based and multimedia-based indicated a significant difference after the intervention in the two training methods. In other words, intervention of using multimedia-based training could increase the knowledge of the students about the subject of breast cancer and its screening after teaching more than that of lecture-based method so that this increase showed a significant difference. Studies on methods of multimedia-based and lecture-based training suggest two different views on these methods. Perfeito et al. studied the pleural drainage clinical training for medical students with two multimedia-based and lecture-based methods." The findings showed that there was no significant difference between the two groups.[10] Another study also showed that training by the use of multimedia software was more successful than lecture-based method. However, in the bleeding control station, the results of the lecture group were better than those of multimedia software group.[12] Dordi Ghochi et al. reported that using this method with traditional lecture-based methods and practical classes are more effective. Using these methods together can raise the quality of training both quantitatively and qualitatively.[19]

In this study, although there were differences in the scores of the two lecture-based groups compared to previous studies, using multimedia-based method, after two months led to even more learning than lecture-based method, showing a significant difference with lecture-based method. Although the amount of knowledge of the students trained by multimedia-based method indicated lower scores obtained two months after the intervention compared to the data obtained immediately after the intervention. Statistically, this difference was significant, too. However, comparison of these scores two months after the intervention with those of pre-intervention indicated a significant difference in the impact of multimedia method on the sustainable knowledge. For lecture-based method, the results of two months after the intervention compared with those obtained immediately after the intervention revealed a reduction. This reduction of differences was significant and reflected the ineffectiveness of lecture-based method on sustainable knowledge. However, compared to the pre-intervention, the knowledge was at a much better level and it showed a significant difference. In addition, comparison of the students' score of knowledge two months later in using multimedia–based and lecture-based methods showed a significant difference and confirmed the effectiveness of multimedia on the sustainability of the students' knowledge. Vahabi et al. (2011) conducted a study entitled" Comparison of the Effects of Lecture and Multimedia Triage Training Methods on Learning of Nurses". No significant difference was observed in both methods. However, the scores of the test-retest in the training multimedia-based software group were more than those of lecture-based group.[20] Moreover, in the study conducted by Khorami Rad et al. (2011), entitled "Comparison of Two Self Study Methods (CD and Manual) for Training of General Practitioners about Reporting

of Diseases", the two groups showed a significant difference. There was no significant difference between the two groups in terms of training methods; more satisfaction was observed in compact discs.[21] Thus, according to the results, it can be stated that although the content of the training had influenced the result of using multimedia training methods, multimedia method compared to lecture method certainly led to equivalent or better improvement in sustainable knowledge of students. This can be due to taking advantage of the benefits of multimedia method such as audio and video features available in every time and place, more attractiveness, and better understanding of the content. This would be achieved through enabling and engaging the students in their learning, making more realistic training environment and reusing the training program. This method, considering its repeatability, could provide deeper understanding of scientific subjects and knowledge improvement in the sustainable learning of students more efficiently.

Conclusion

Results of the present study indicated that although training by both multimedia-based and lecture-based methods increased the level of the students' knowledge about the topic of breast cancer and its screening, multimedia-based method, compared to lecture-based method, had a greater impact on the students' knowledge sustainability after 2 months of training. According to the results, it seems that the use of multimedia training according to its effectiveness in learning can be considered in the educational system as a solution to meet the growing demand for higher education provided that the required infrastructure and conditions and correct design of education system are provided. Culturalization is also necessary to make use of multimedia software because training through multimedia allows people to set the training programs based on their other programs. Flexibility, attractiveness and strategic learning in training through multimedia provide the opportunity for learners to decide when and where they intend to receive the required training content so that the training process does not disturb other responsibilities of the learners. Moreover, the time spent on learning and repeatability is available to learners in this method.

Authors's contribution:
LB was the idea owner of this study, designed and supervised the study, wrote the first draft, and approved the final draft.

MGh performed the study, gathered the data and assisted in its analysis.

MK presented the course and assisted in data gathering and analysis.

NSH contributed to the design of the study, commented on and revised the first draft, did the final editing and approved it, and submitted the manuscript.

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