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## The Comparison of the effectiveness of Two Education Methods video and lecture on Knowledge, Belief and Practice of Hand Hygiene in Nursing Students: Clinical Trial

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### ABSTRACT

Using educational methods among nursing students is very important, as they increase knowledge and affect their attitude and ultimately their performance. The use of an effective training method leads to reform and change in bad habits and replacement of correct hygiene habits. This issue is also very important element for providing, maintaining and improving the health of patients. The general purpose of this study was to compare the effect of two educational methods of film displaying and lecture on knowledge, attitude and performance of hand hygiene in nursing-midwifery students of Tabriz University of Medical Sciences. In this study, the research population included 5th and 6th semester nursing students of Tabriz University of Medical Sciences, School of Nursing and Midwifery, which are randomly selected based on inclusion criteria. This research is a clinical trial study. The data collection tool consists of 4 parts. In both group, demographic questionnaire, and questionnaire of knowledge, attitude and performance of hand hygiene before and after intervention were conducted. Collected data were analyzed using SPSS 17 software and they were analyzed using descriptive indices of mean, standard deviation and inferential statistics (paired t-test) and (independent t). The results of this study showed that there is difference between knowledge and belief of nursing students before and after training using film displaying method ( $p < 0.05$ ), while that is no significant difference between the performance of nursing students before and after training by displaying method. In addition, there is no significant difference between knowledge, belief, and the performance of nursing students before and after the training by lecture method.

**Keywords:** Training method- film displaying –lecture- hand hygiene – nursing student

## INTRODUCTION

Hand Hygiene is a recognized method of reducing infections resulting from care. Hospital infections are infections created as result of hospitalization occurring within 48 hours after hospitalization [1-2]. The prevalence of these infections is different in different countries around the world. Its rate is 7.1 per cent in European countries, 15.5 percent in developing countries, and 5.7-45.8 percent in African countries. Based on the results of research conducted in Iran, the prevalence of hospital infections is 1.9 percent at minimum and over 25 percent at maximum [3-4]. Care infections is a global priority created concerns about patient safety. In United States of America, nearly two million patients are infected annually and 100000 patients lose their lives due to these infections [5-6]. Throughout of world, 1.4 million people suffer from hospital infections [7]. The prevalence of these infections have been reported in Europe annually about 5 million that they have been cause of death of 135000-50000 patients increasing treatment costs by 24-13 milliard US \$ [8]. This figure represents that these infections are serious risk for patient [9].

Nurses and nursing students play an important role in the control of infection. Therefore, training the appropriate clinical performance and educational institutions should be provided before starting to work. However, research literature shows that much research has not been conducted on prevention and control of infection [10-11]. Education and training of health care students during their studies are an important factor in hand hygiene and its investigation is necessary among nursing students, since they are the future workforce and training before hiring is an opportunity to show the factors affecting in not observing the hand hygiene [12-13]

One of the elements of effective health education is educational planning. Properly planning in education needs to select the appropriate method. To implement health education, various methods such as lectures, group discussion, role-playing, film displaying, printed materials, etc., are used [14].

Lecture is a traditional method in health education. This method was the first educational method used since ancient times. Today, many different methods have been developed to education that the effectiveness or efficiency of many of them is approved. One of the new methods in this regard is using educational documentary films that it is believed education can be presented at various levels from preliminary educational to complete learning using them [15]. The major role of lecture method is transfer of knowledge used for great groups. Lecture causes materials to be provided for learners with lower cost and at the shortest time. Film displaying is one of the educational methods. The most advantage of this method is that it allows learners to observe objects and phenomena. It is economical in terms of time and requires lower cost. On the other hand, it reduces tools limitations [16].

### **Importance of study**

Hand hygiene care is a recognized method for reducing infections. Hospital infections are a major problem for health care and the most common cause of death in hospitalized patients. Hospital infections are infections created as result of hospitalization occurring within 48 hours after hospitalization so that researchers have reported its rate 7.1 per cent in European countries, 15.5 percent in developing countries, and 5.7-45.8 percent in African countries. Based on the results of research conducted in Iran, the prevalence of hospital infections is 1.9 percent at minimum and over 25 percent at maximum [3-4].

The prevalence of these infections is different in different countries. These infections prolong hospitalization, increase healthcare costs, increase morbidity and mortality of patients. Patients should receive high quality cares and without complications during their hospitalization. Control of hospital infections is a global problem and global health organization pays special attention to the protection of patients different methods have been proposed for achieving this important goal. The need for hand hygiene is one of the measures proposed by this organization. Lack of observing the hand hygiene by health care workers is the most important ways of transmission of infection to patients. Hand hygiene is very simple, cheap and effective method playing an important role in the prevention and reduction of hospital infections and patient safety.

Despite all the efforts made in the field of hand hygiene and the use of various methods to improve it, results of other studies suggest low levels of hand hygiene among nurses and nursing students. Knowledge of students about the necessity of hand hygiene and infection control is limited and adequate training is necessary in this regard. Therefore, as knowledge and knowledge in this regard is one of the basic and important needs in nursing, limited studies have been conducted in Iran. On the other hand, conducted interventions are not enough and complete to

increase knowledge and control the performance of nursing students. Therefore, finding effective, easy and low cost training methods for larger population of nurses and students will be necessary. This study was conducted to compare the effect of two educational methods of lecture and film on knowledge, beliefs and performance of nursing students will be done. It is hoped that the results of this study to achieve appropriate solutions in order to control hospital infections.

### **Applied goals of the project**

#### **A) General goal of project**

Comparing the impact of two educational methods of film displaying and lecture on knowledge, belief, and hand hygiene performance in nursing students of nursing-midwifery department of Tabriz University of Medical Sciences

#### **B) The special goal of project**

1. Determining and comparing knowledge, belief, and performance of nursing students before and after training using displaying method
2. Determining and comparing knowledge, belief, and performance of nursing students before and after training using lecture with PowerPoint
3. Comparing changes in knowledge, belief and performance of nursing students in two studied groups before and after training

## **MATERIALS AND METHODS**

**Study type:** This study is a single blind clinical trial. A clinical trial is one of the studies investigating the classic capability effects of various treatments in which effects of treatment on treatment group and non-treatment group are examined [22].

In the current study, the effect of two educational methods, film displaying and lectures on knowledge, belief and performance of hand hygiene in nursing students were compared. Collected data were analyzed using SPSS 17 software and they were analyzed using descriptive indices of mean, standard deviation and inferential statistics (paired t-test) and (independent t).

**The study population, sample size and sampling:** In this study, the research population included 5th and 6th semester nursing students of Tabriz University of Medical Sciences, School of Nursing and Midwifery, which are randomly selected based on inclusion criteria. They included following characteristics: in the first group of students (training by film displaying method) before and after intervention, the questionnaire of knowledge, belief, and performance of nursing students will be completed. Then, results will be calculated and compared before and after the intervention. In the second group of students (training by lecture method with PowerPoint) before and after the intervention, knowledge assessment questionnaire, belief and performance of nursing will be completed. Then, results were calculated and compared before and after the intervention. In this study, due to lack of access to proper study to be able to extract its mean and standard deviation, we conducted a pilot study on 24 subjects (12 people in each group) and the main sample needed was calculated 42 people in each group using mean and standard deviation of each variables in the studied groups, 10% probability loss,  $\alpha=0.05$ , study power of 80% in G power software.

**Tools and methods for data collection:** in both groups, demographic questionnaire and knowledge, belief and performance questionnaire of hand hygiene were used to study hand hygiene before and after the intervention. Tools to collect data in this study included a questionnaire consisted of four parts. This tool was developed in 2009 by Van de Mortel and its validity and reliability have been confirmed. The first part of the questionnaire contains questions about personal information such as age, gender, educational status and the second part contains 12 multiple-choice questions to assess the knowledge of nursing students, that one option is correct and other options are wrong. The scoring of Knowledge Questionnaire was so that score 1 was given for each correct answer and zero score was given for each wrong answer. The reliability of this questionnaire was obtained 0.73. The third part contains 19 items related to students' beliefs about hand hygiene developed based on a 5-part Likert scale. The reliability of the questionnaire was 0.75 and the scoring of this tool using Likert method was with the range of completely disagree [1] to agree completely [5]. High score represents high belief among students. The fourth part of the questionnaire consists of 14 items related to determining the performance of students about hand hygiene. The reliability of the questionnaire is 0.82 developed based on 5-part Likert scale. Scoring this tool is based on range of never [1] to always [5] in which higher scores indicate better performance [17].

**Data analysis:**

**Table 4-1: Distribution of personal and social characteristics frequency of students in the study groups (qualitative variables)**

Training group	Gender		
	Male	Female	Total
Film (intervention)	11	31	42
	% 26/2	%73/8	%100
Lecture (control)	14	28	42
	%33/3	%66/7	%100
Training group	Married status		
	Single	Married	Total
Film (intervention)	40	2	42
	%95/2	%4/8	%100
Lecture (control)	38	4	42
	%90/5	%9/5	%100

As **Table (4-1)** shows, 26.2 percent of studied samples in the film-training group are male and 73.8 percent of them are female. In addition, 33.3 percent of the samples received lecture training was male, and 66.7 percent of them were female. In terms of marital status, results indicated that 92.4 percent of studied samples in the film-training group are single, while 4.8 of them were married. Additionally, 90.5 percent of samples in the lecture group were single, while 9.5 of them were married.

**Table 4.2 Distribution of personal and social characteristics of students in the groups studied (quantitative variables)**

Variable	Film	Lecture
	Mean and SD	Mean and SD
Age	21/80 ± 0/96	21/90 ± 0/90
Average	16/57 ± 1/12	16/86 ± 1/15

As **Table (4-3)** shows, the mean age of film group is 21.80, while mean age of lecture group was 21.90. Mean of Film group average was 16.57, while mean of lecture group average was 16.86.

First hypothesis: There is significant difference between knowledge, belief and performance of nursing students before and after training by film displaying method.

**Table 4.3 Comparison of knowledge, belief and performance score of nursing students in the intervention group before and after training**

Variable	Before training by film	After training by film	P Value	df	t
	Mean and SD	Mean and SD			
Knowledge	3/35 ± 1/30	5/95 ± 2/10	0/000	41	6/50
Belief	75/33 ± 6/61	79/83 ± 11/38	0/024	41	2/34
Performance	60/95 ± 7/09	61/40 ± 8/42	0/775	41	0/28

According to Paired t-test results and with regard to significant level of error for 0.95 confidence level, it can be stated that there is significant difference between knowledge, belief and performance score of nursing students in the intervention group before and after training (P<0.05). Knowledge and belief of these students increased by using film displaying training than before training. However, significant difference was not observed among them before and after training when film displaying method was used (p>0.05).

Second hypothesis: There is significant difference between knowledge, belief and performance of nursing students before and after training by lecture with power point method.

**Table 4.4 Comparison of knowledge, belief and performance score of nursing students in the control group before and after training**

Variable	Before training by lecture	After training by lecture	P Value	df	t
	Mean and SD	Mean and SD			
Knowledge	5/23 ± 1/77	5/66 ± 2/17	0/362	41	0/92
Belief	75/66 ± 10/00	79/52 ± 10/95	0/094	41	1/71
Performance	59/71 ± 7/89	59/76 ± 8/65	0/974	41	0/03

According to Paired t-test results and with regard to significant level of error for 0.95 confidence level, it can be stated that there is no significant difference between knowledge, belief and performance score of nursing students before and after training using lecture with power point method ( $P > 0.05$ ).

Third hypothesis: There is significant difference between knowledge, belief and performance of nursing students before and after training by lecture with PowerPoint method and film displaying method.

**Table 4.5 Comparison of knowledge, belief and performance score of nursing students in two studied groups before intervention**

Variable	Film before intervention	Lecture before intervention	P Value	Df	t
	Mean and SD	Mean and SD			
Knowledge	5/95 ± 1/30	5/66 ± 1/77	0/40	82	0/84
Belief	79/83 ± 6/61	79/52 ± 10/00	0/86	82	0/16
Performance	60/95 ± 7/09	59/76 ± 7/89	0/46	82	0/72

According to Paired t-test results and with regard to significant level of error for 0.95 confidence level, it can be stated that there is no significant difference between knowledge, belief and performance score of nursing students before training using lecture with power point method and film displaying method ( $P > 0.05$ ).

Fourth hypothesis: There is significant difference between knowledge, belief and performance of nursing students after training by lecture with PowerPoint method and film displaying method.

**Table 4.6 Comparison of knowledge, belief and performance score of nursing students in two studied groups after intervention**

Variable	Film after intervention	Lecture after intervention	P Value	Df	t
	Mean and SD	Mean and SD			
Knowledge	3/35 ± 2/10	5/23 ± 2/17	0/000	82	4/02
Belief	75/33 ± 11/38	75/66 ± 10/95	0/89	82	0/13
Performance	61/40 ± 8/42	59/71 ± 8/65	0/36	82	0/90

According to Paired t-test results and with regard to significant level of error for 0.95 confidence level, it can be stated that there is no significant difference between knowledge, belief and performance score of nursing students after training by using lecture with power point method and film displaying method ( $P < 0.05$ ). The knowledge of nursing students after the training by lecture with power point method was more than film method, while there is no significant difference between belief and performance of nursing students after training by film method and lecture with power point method ( $p > 0.05$ ).

## DISCUSSION

The aim of this study was to compare the impact of two training methods of film displaying and lecture on knowledge, belief, and performance of hand hygiene in nursing students of Tabriz University of medical sciences, Faculty of Nursing and Midwifery. This section is presented to interpret the results. In this section individual - social features of respondents are firstly discussed and summary of results of the study are compared with results of some other studies. Then, by investigating discussed results, it was concluded and accordingly, results application and recommendations are provided. In addition, recommendation for future studies is presented.

The special objectives of the present study was to determine and compare the knowledge, belief, and performance of nursing students before and after training by using film displaying and lecture methods. In addition, knowledge, belief, and performance of nursing students before and after training in two groups were compared.

According to results obtained, 26.2 percent of studied samples in the film-training group are male and 73.8 percent of them are female. In addition, 33.3 percent of the samples received lecture training was male, and 66.7 percent of them are female.

In terms of marital status, results indicated that 92.4 percent of studied samples in the film-training group are single, while 4.8 of them were married. Additionally, 90.5 percent of samples in the lecture group were single, while 9.5 of them were married.

The mean age of film group is 21.80 with standard deviation of 0.96, while mean age of lecture group was 21.90 with standard deviation of 0.90. The mean of Film group average was 16.57 with standard deviation of 1.12, while mean of lecture group average was 16.86 with standard deviation of 1.15.

First hypothesis of study states that there is significant difference between knowledge, belief and performance of nursing students before and after training by film displaying method.

According to Paired t-test results and with regard to significant level of error for 0.95 confidence level, it can be stated that there is significant difference between knowledge, belief and performance score of nursing students in the intervention group before and after training ( $P < 0.05$ ). Knowledge and belief of these students were increased by using film displaying than before training. However, significant difference was not observed among them before and after training when film displaying method was used ( $p > 0.05$ ).

These results are in line with results of the study conducted by Saffari et al (2010) titled as the comparison of dietary training impact by two methods of lecture and film displaying on knowledge, belief of volunteer health workers. They concluded that knowledge of volunteer health workers increased from 57% before training to 96% after training. The results of the Mac Neymar also suggest the effectiveness of film displaying method in increasing the knowledge of studied subjects.

The most important issue is efficiency of these methods in the teaching of nursing skills. Since most of the studies done in this area are limited to evaluation of the effectiveness of individual techniques. For example in comparing hand washing skills using surgery method and simple dressing, it was shown that video method has had greater impact on Psycho-motor domain than lecture method, since student in this method learns tangibly. As a result, it will have greater impact on his performance.

Second hypothesis has stated that there is significant difference between knowledge, belief and performance of nursing students before and after training by lecture with PowerPoint method.

According to Paired t-test results and with regard to significant level of error for 0.95 confidence level, it can be stated that there is no significant difference between knowledge, belief and performance score of nursing students before and after training using lecture with power point method ( $P > 0.05$ ).

The research findings are inconsistent with the results of Picheansathian et al (2005-2004). They conducted a study in 2005-2004 to determine the impact of a promotional training program on hand health and the results of this study showed that hand hygiene among employees had no correlation with the intensity of patients care and after the intervention and training, no reduction was found in hospital infections. Its possible reason can be due multiple reasons involved in the hospital infections. The participants in this study agree with the implementation of the program and believed that this approach could be a factor in creating motivation and improving the hand hygiene among employees. This study shows that the continuous encouragement of staff and the use of multiple methods can be an effective factor in increasing and improving hand hygiene in nursing staff [18].

These results are not in line with results of the study conducted by Saffari et al (2010) since they concluded that knowledge of volunteer health workers increased from 63% before training to 98.75% after training using lecture method. The result of the Mac Neymar also suggests the significance impact knowledge after training by using lecture method.

As most of training method used for students is lecture by power point, this method is somewhat repetitive and boring for students and they show not enough willingness for this method. Additionally, uniformity of this method and lack of its diversity are another reasons that students show no willingness to use this method. This caused that this method of training to have no significant impact in increasing the knowledge and performance of nursing students.

Third hypothesis of study states that there is significant difference between knowledge, belief and performance of nursing students before and after training by lecture with PowerPoint method and film displaying method.

According to Paired t-test results and with regard to significant level of error for 0.95 confidence level, it can be stated that there is no significant difference between knowledge, belief and performance score of nursing students before training using lecture with power point method and film displaying method ( $P>0.05$ ), indication that allocation of samples in two studied groups has been performed properly.

Using two methods of data collection, Koll in 2009 determined the amount of hand hygiene implementation in nursing students: with an anonymous questionnaire ( $n = 147$ ) and an interview ( $n = 14$ ). He stated that students overestimate their hand hygiene and give higher scores to their performance. According to his conclusion, defective self-assessment is one of the obstacles causing that students cannot understand the necessity to improve their level of understanding. He concluded that higher emphasis on performance and self-assessment in the education of undergraduate students is an essential.

The results of the research also are consistent with the results of research conducted by Golbahar Nmadari titled as the impact of different training methods on implementation of hand hygiene in Imam Ali Hospital of North Khorasan University of medical sciences. In the mentioned study, the performance of employees in implementing the hand washing stages were correct by 0.78%, while it was increased by 91% after training. In addition, the amount of consumption of soap and disinfectants for hands also increased from 45 liters to 165 liters indicating the positive impact of training through videos.

Fourth hypothesis of study states that there is significant difference between knowledge, belief and performance of nursing students after training by lecture with PowerPoint method and film displaying method. According to Paired t-test results and with regard to significant level of error for 0.95 confidence level, it can be stated that there is no significant difference between knowledge, belief and performance score of nursing students after training by using lecture with power point method and film displaying method ( $P<0.05$ ). The knowledge of nursing students after the training by lecture with power point method was more than film method, while there is no significant difference between belief and performance of nursing students after training by film method and lecture with power point method ( $p>0.05$ ).

Rim et al (2008) investigated infection control training by two electronic and lecture methods and the results of the study indicated that electronic training can be an effective educational method that can be used as lecture and students should learn skills related to computer since they might encounter with various electronic training system in their careers. Additionally, it is required that various educational methods to be used in their academic years. Each of these methods can be used for different goals and provide various levels of education and learning. Additionally, Zolfaghari et al conducted a study in 2007 with the aim of comparing the impact of two methods of electronic and lecture on learning mother and child health course in nursing and midwifery students in Tehran University of medical sciences. The results showed that they learning rate in two methods was same. The views of students with regard to learning in two educational methods showed that in electronic training, the ability to use educational method and independence in this method and the impact of training on learning and motivation in lecture were preferable. This study showed that electronic training might be used for teaching some nursing courses.

Derenhait et al conducted a study in 2012 in which they investigated the impact of video training compared to written training on understanding and satisfaction of patients in a group of elder people referred to pain clinic. Results indicated that understanding score ( $p<0.001$ ) and satisfaction score ( $p=0.01$ ) after the training in video group patients were significantly higher compared to written group patients. According to results, as understanding and satisfaction of patients in the video training group were higher than written group, they concluded that video training is effective method for low educated elder people and those who have visual problems. They also stated that video training provides better understanding compared to traditional methods in various areas of health. This study is among the studies showed the superiority of training through film, while one disadvantage of this study was that pre-test has not been conducted [21].

## CONCLUSION

The results of this study showed that there is significant difference between knowledge, belief and performance score of nursing students before and after training ( $P<0.05$ ). Knowledge and belief of these students were increased by using video displaying method than before training. However, significant difference was not observed among them before and after training when video displaying method was used. In addition, it was found that there is no

significant difference between knowledge and belief and performance of these students before and after training using lecture by power point method.

Results of the study also indicted that there is no significant difference between knowledge, belief and performance score of nursing students after training by using lecture with power point method and film displaying method ( $P < 0.05$ ). The knowledge of nursing students after the training by lecture with power point method was more than film method, while there is no significant difference between belief and performance of nursing students after training by film method and lecture with power point method ( $p > 0.05$ ).

Therefore, using educational methods among nursing students is very important since it increases their knowledge and belief and ultimately affects their performance. Using an effective educational method improves and modifies incorrect habits and replaces correct health habits. This issue is very important for maintaining and improving the health of patients. Following health guidelines in the hand hygiene of nurses reduces symptoms and consequences in patients and improves the health of patients. As a result, it improves life quality of patients and increases their hope for life.

Therefore, according to results, it is recommended that findings of the current study to be used in designing education by various ways especially film displaying since it improves knowledge and performance of health among nursing students. It can be one of the most important factors controlling the infection in hospitals and other medical centers.

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