

## Research Paper:

## The Effect of Workshop and Multimedia Training Methods on Nurses' Knowledge and Performance on Blood Transfusion



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## ABSTRACT

**Background:** Blood transfusion faults and its consequences are major concerns of health care systems. This study aimed to determine the effects of workshop and multimedia training methods on nurses' knowledge and performance about blood transfusion.

**Methods:** It was a controlled quasi-experimental study. Sampling was conducted. Data were collected from 37 participants in three hospitals during 2016 by a three-part questionnaire consisting of nurses' demographic information, routine blood transfusion knowledge (RBTQ) questionnaire, and Purfarzad-performance-evaluation questionnaire. Statistical analyses were conducted using SPSS V. 20.

**Results:** Nurses' knowledge and performance levels in workshop and multimedia groups increased from the average to the good level. No significant differences was found between workshop and multimedia groups regarding knowledge ( $P = 0.474$ ) and performance scores ( $P = 0.984$ ). Results of paired T-Test showed no significant differences before and after knowledge evaluation in control group ( $P = 0.262$ ), while it revealed significant differences in workshop and multimedia group so that, the knowledge scores level increased from average to good ( $P = 0.474$ ). Mean (SD) performance scores in multimedia group were 70.36 (7.06) and 79.78 (0.91) before and after intervention, respectively. Therefore, before training the performance of groups was in average levels but they improved to the good levels after training ( $P = 0.984$ ). Paired T-Test for workshop and multimedia groups before and after intervention revealed significant differences ( $P < 0.001$ ).

**Conclusion:** This study showed that workshop and multimedia training methods are effective in promoting the nurses' knowledge and performance. None of these two methods outweighed the other. One reason in this regard might be due to mutual connection between teacher and students, the possibility to ask and answer the questions, discussing in workshop method, and the possibility to repeat the concepts and regulate the pace of training based on individuals learning abilities in multimedia method.

### Keywords:

Workshop, Multimedia, Knowledge, Performance, Nurse, Blood transfusion

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## 1. Background

Nowadays, organizations allocate lots of their resources to educate their personnel (Alavi et al. 2009). In nursing education, the relationship between education and nursing services are growing, as well. Because of the need for creating dynamicity in this field and importance of nursing education through the life time (Heravi et al. 2004), the necessity of a cost-effective, practical and most effective training program is disclosed. With a continuous training, nurses can properly react to the rapid alterations in health system and upgrade their job skills. The science has a half-life of 2.5 years, and afterward would be considered as outdated and old. In addition, with the rapid advances in health related knowledge and technologies, basic training of nursing is practical only in a 10-year period (Jalali et al. 2004).

Thus, updating knowledge, which is mentioned in clinical governance and effective on knowledge and performance of medical staff as well as nurses is very important. Learning domains is divided into three major parts, namely, knowledge, attitude, and performance and training the nurses in all parts is necessary (Seif 2011). There is a relationship between knowledge and performance, for instance, one with a limited knowledge might be unable to perform or behave professionally in his or her job (Izad Panah 1994; Aghajan et al. 2013).

One of the big challenges in nursing education is providing an effective training method. There are variety of training methods, including workshop method. Workshop method consists of educational sessions held in order to teach a specific updated knowledge or skill for limited numbers of participants. In workshop classes, every educator can share and discuss his or her experiences about the topics and exchange his or her ideas and points of view with other participants (Haghani et al. 2012).

Educational technology has hastily advanced through its path. Early in this century, the importance of the audiovisual instruments in education was revealed and thereafter, a great evolution has happened in this area. The prophecy of educational technology is to provide such conditions that make learning processes more efficient and easier, improve creative capabilities of educators so that, they are responsible for their own learning, and encourage participants to interact with a larger community (Sabeghi, Heydari & Borhani 2012).

One of the educational methods is multimedia method. Multimedia means communicating and transferring top-

ics and concepts with the use of different media such as speech, music, images, text, animation, and interactive and user-friendly interfaces environments. With the arrival of Windows 95 operating system and improvements of computers' sound and image, multimedia was introduced. This tool is effective on better learning because it is interesting, cost-effective, low size, and engages various senses (van den Brink, Jager & Tost 2013). However, despite new learning methods, which are based on problem solving and using the internet and computers, the workshop method still remains one of the popular methods (Marambe, Edussuriya & Dayaratne 2012; Lai, Ngim & Fullerton 2012).

Blood transfusion is one of the interventions that nursing knowledge has a great impact on decreasing its complications and dangers; it is reported that, lots of mortalities caused by blood transfusion is due to the lack of knowledge (Hijji, Arwa & Dabbour 2012). There is no systemic report on the blood transfusion errors and mistakes in Iran. In the UK, from 2005 to 2010, a number of 7048 blood transfusion complications was reported. In addition, from 3054 reports given in 2011, half of the mistakes were related to the basic information about blood transfusion, like patient identification (Hijji et al., 2010).

Various studies have investigated the causes of this reported errors and mistakes which has been led to wrong administration of blood products. Some of the reasons were insufficient or inappropriate training of doctors and nurses in blood transfusion concepts and also lack of personnel (Purfarzad et al. 2012; Stainsby et al., 2005). According to above-mentioned, addressing the nurses training and retraining issues in order to update their knowledge and improve their performance is necessary. Thus, this study aimed to investigate and compare the effects of workshop and multimedia training methods on knowledge and performance of the nurses in the field of blood transfusion in hospitalized patents.

## 2. Materials & Methods

### Study design and participants

This is a controlled quasi-experimental study. This research conducted with the approval of the University Research Ethics Committee with code No. IR.IUMS.REC.1395.9211196222 and approval of Iran Research Council and MS Society. Before starting the study, written and oral consent were taken from patients. Study population were nurses working in oncology, surgery, and emergency departments of three hospitals affiliated to Iran University of Medical Sciences (Firooz Abadi,

Firoozgar, and Rasool Akram hospitals). All participants had BS and were included into the study based on convenience sampling. Inclusion criteria were as follows: being engaged for at least six months in current work place, not being NGO workers, and providing direct care to the patients. Exclusion criteria were non-cooperation during the study and any department displacement. Participants were divided into three groups (workshop, multimedia, and control), consisting 37 participants in each group.

### Data collection

Data were collected through a three-part questionnaire. In section one, there were 7 demographic questions (age, sex, blood transfusion performance history, education, and emergency, surgery, and/or oncology work experiences).

The second section was routine blood transfusion knowledge questionnaire with 32 questions that evaluates nurses' knowledge about blood transfusion in a self-reporting format. The least and the highest scores were 0 and 32, respectively. Scores less than or equal to 50% of total score (0-16) assumed as poor knowledge, scores between 51% to 75% (17-24) of total scores assumed as average knowledge, and finally scores more than 75% (25-32) of total score assumed as good knowledge. The questionnaire should be answered in 30 minutes (Purfarzad et al. 2012). The validity of this questionnaire has been confirmed and its Cronbach  $\alpha$  test was estimated as 0.8 to confirm its reliability (Hijji, Arwa & Dabbour 2012). Ten members of science committee of Iran University of Medical Sciences confirmed the questionnaire's validity. In terms of reliability, internal correlation was used and Cronbach  $\alpha$  was 0.789 for this questionnaire.

The third part evaluated the nurses performance toward blood transfusion. In this regard, the self-reporting performance-evaluator questionnaire was used (Purfarzad et al. 2012). The mentioned questionnaire comprised 20 questions about nurses' performance in terms of blood

transfusion with the 5-point Likert-type scale. The scores were between 0 and 80. Scores less than or equal to 75% (0-60) rated as poor score, scores between 76% to 90% (61-72) rated as average score, and scores more than 90% (73-80) rated as good score. The questionnaire should be answered in 10 minutes. The questions were about necessary actions before, during, and after blood transfusion and incidence of possible adverse reactions. The validity of this questionnaire was confirmed and the Cronbach  $\alpha$  test has estimated as 0.7 in terms of its reliability (Purfarzad et al. 2012). In the current study, to determine the scientific validity of data collector's tools, content validity method was used; the questionnaire was evaluated by the use of related articles and textbooks and also advice of 10 professors. Internal correlation was used and the Cronbach  $\alpha$  was 0.759 for this questionnaire. It is worth mentioning that in order to prevent data contamination, performance questionnaire was distributed after collecting the knowledge questionnaire.

### Intervention

Before intervention, a pretest was obtained from all participants. The workshop group received four sessions containing presentation, slideshows, group discussion, question and answer, and practice; each session took approximately 4 hours. The multimedia group received a multimedia file (visual and audio). The storyline software was used in multimedia group. Educational contents were identical in both groups and the only difference was educational methods. The presented topics were derived from scientific websites, resources and articles. The content of topics was about process, history and applications of blood transfusion, necessary actions before, during, and after blood transfusion and having best performance encountering blood transfusion complications. Two weeks after intervention a posttest was obtained from 3 groups.

**Table 1.** Demographic characteristics of participants (n = 111)

Groups	Age, y Mean $\pm$ SD	Work Experience, y Mean $\pm$ SD	Gender %		Job Status %		
			Men	Women	Permanent Employee	Contractual Employee	Trial Employee
Control	32.05 $\pm$ 6.24	4.40 $\pm$ 4.77	13.5	86.5	40.5	37.9	21.6
Workshop	33.83 $\pm$ 7.62	7.15 $\pm$ 6.74	10.8	89.2	54.1	35.1	10.8
Multimedia	30.32 $\pm$ 5.37	3.54 $\pm$ 3.37	10.8	89.2	16.2	56.8	27.0
P	0.07	0.068	0.917		0.015		

**Table 2.** Distribution and homogeneity of blood transfusion times between groups (n = 111)

Group	Blood Transfusion Times %				
	0	1 - 4	5 - 8	9 - 12	12 <
Control	21.6	40.5	16.2	5.4	16.2
Multimedia	10.8	21.6	24.3	8.1	35.1
Workshop	29.7	27.0	5.4	18.9	18.9
P		0.031			

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### Data analysis

Data were assessed by descriptive (frequency, mean and standard deviation) and inferential statistics, Chi Square, Kruskal-Wallis, ANOVA, and Scheffé post hoc tests using SPSS V. 20. P values less than 0.05 were considered as statistically significant.

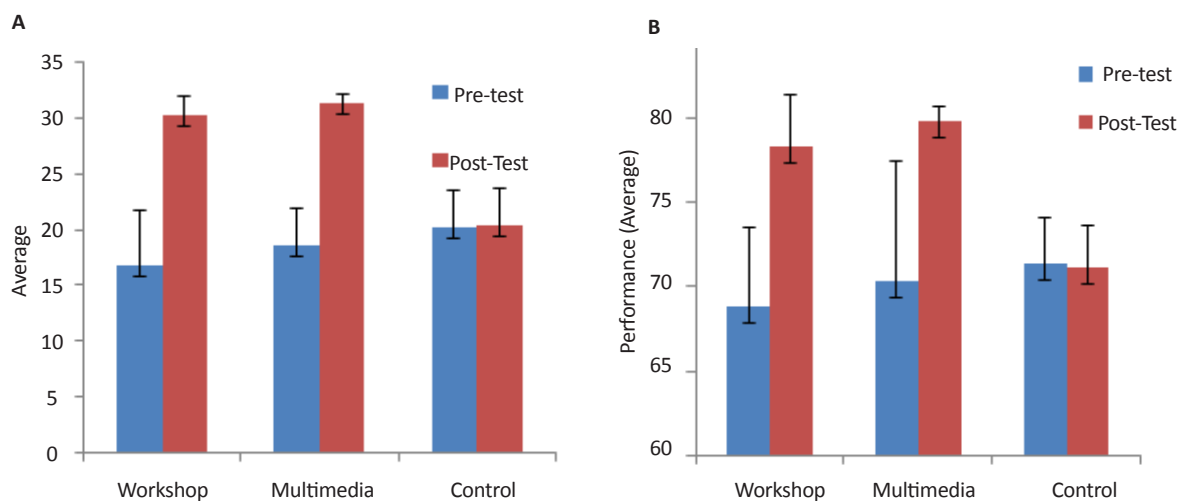
### 3. Results

Demographic characteristics of participants (Table 1) disclosed that based on ANOVA analyses, 3 groups did not have any significant mean age differences. In addition, based on Chi-square and Kruskal-Wallis analyses, three groups were homogenous in terms of sex and work experience, respectively. However, Chi-square analyses revealed a significant differences in job status between groups ( $P < 0.05$ ). Overall, homogeneity analyses of this study exhibited that three groups were homogenous in terms of age, sex, and work experience but were different in terms of job status.

Table 2 results based on Fischer test, show that the blood transfusion times had significant differences in three groups ( $P = 0.031$ ). It is worth mentioning that, the majority (40.5%) of participants in the control group had already performed blood transfusion (1-4) times, whereas, in the workshop group the majority (29.7%) had never experienced blood transfusion. In addition, 35.1% of multimedia group performed more than 12 times of blood transfusion.

Results of participants' knowledge evaluation showed that in workshop group, mean (SD) scores of knowledge before and after training were 16.68(4.93) and 30.37(1.60), in multimedia group 18.62(3.36) and 31.40(0.86), and in control group 20.18(3.36) and 20.35(3.41), respectively (Figure 1).

Results of paired T-Test in each group revealed that mean score of knowledge in control group did not show any significant differences before and after study ( $P = 0.262$ ). Whereas, mean score of knowledge had significant differences between workshop and multimedia groups before and after study ( $P < 0.001$ ). In addition,

**Figure 1.** Mean knowledge (A) and performance (B) scores of nurses before and after the study

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**Table 3.** Mean  $\pm$  SD knowledge and performance scores comparison in three groups before intervention (n = 111)

Group	Knowledge Mean $\pm$ SD	Performance Mean $\pm$ SD
Workshop	16.86 $\pm$ 4.93	46.87 $\pm$ 4.61
Multimedia	18.62 $\pm$ 3.36	70.36 $\pm$ 7.06
Control	20.18 $\pm$ 3.36	71.35 $\pm$ 2.74
Analyses of variance	F = 6.529 P = 0.002	P = 0.117

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**Table 4.** Knowledge and performance changes of intervention groups (n = 111)

Group	Independent T-Test	Multimedia Group Mean $\pm$ SD	Workshop Group Mean $\pm$ SD
Knowledge changes	t = 0.720 df = 72 P = 0.474	3.44 $\pm$ 12.78	13.51 $\pm$ 5.11
Performance changes	t = 0.021 df = 72 P = 0.984	9.41 $\pm$ 7.17	9.38 $\pm$ 9.38

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scores increased from average to good in both groups. Mean (SD) score of performance in workshop group before and after training was 68.87(4.61) and 78.26(3.06), respectively and the scores rose from average to good.

Mean (SD) score of performance in multimedia group before and after training was 70.36(7.06) and 79.78(0.91), respectively. Thus, although, majority of the study subjects were at average level before the intervention, they upgraded to the good level after the intervention. Furthermore, performance scores of control group before and after study were 71.35(2.74) and 71.10(2.52), which indicates no significant changes ( $P < 0.001$ ).

Results of ANOVA illustrated that knowledge scores before intervention at least in one group was significantly different from others. Scheffé test indicates that mean knowledge score in control group was significantly different from workshop group and was higher in control group ( $P = 0.002$ ) (Table 3). Due to the results of ANOVA, performance scores did not have any significant differences between groups before intervention ( $P = 0.117$ ) (Table 3). Scheffé test revealed that mean performance scores in three groups were different from each other and was lower in the control group and higher in multimedia group.

Based on Table 4 results, independent T-Test revealed that there was no significant difference between work-

shop and multimedia groups in terms of knowledge and performance scores after intervention ( $P = 0.474$ ). Thus, although both methods are effective in upgrading the knowledge and performance scores, none of the mentioned methods outweighed the other one.

#### 4. Discussion

This study showed conspicuous changes in knowledge and performance scores in both experimental groups after the intervention. Knowledge and performance levels increased from average to the good levels, which indicates the effectiveness of both training methods. A study evaluated the knowledge of Brazilian nurses on blood transfusion; the results were similar to our study. This study revealed that lack of knowledge in some aspects is critical and may endanger the patients' health. Furthermore, it can decrease the effectiveness of blood transfusion and put the patients at the risk of receiving contaminated blood (Hijji, Arwa & Dabbour 2012). Since the control group did not receive any intervention, obviously there was no significant changes in this group before and after the study. Purfarzad et al. (2012) reported that there was a need for increasing the knowledge about blood transfusion complications and improving the related performances, and emphasized on the importance of training programs and the vital role of managers in controlling and supervising this issue.

According to the results, knowledge changes before and after intervention had statistically significant differences in three groups ( $P < 0.001$ ). Results of the after intervention analyses disclosed that changes in the control group was very small and it was significantly different from the other groups. Knowledge score changes was not significantly different between workshop and multimedia groups, thus they were identically effective. Based on our knowledge, there was not any similar study which compare workshop and multimedia training methods. So comparison of our results with the results of other studies was not possible.

Aghajani et al. (2013) in their study evaluated the impact of multimedia training on knowledge and performance of surgical technology students and observed significant differences between knowledge ( $P = 0.01$ ) and performance ( $P = 0.03$ ) of participants before and after the intervention. Tukey test in the mentioned study revealed that the highest differences and impacts was observed on participants' knowledge. Thus, the mentioned study implies the effectiveness of multimedia method on upgrading knowledge and performance of participants, as well. In the quasi-experimental study of Perfeito et al. pleural drainage technique was taught to 35 medical students with the multimedia and workshop methods. There was no significant differences between two groups in the mentioned study (Perfeito et al. 2008).

Changes of performance scores in workshop and multimedia groups were not statistically different. So that, no method overweighed the other. The study of Alijanpour et al. (2014) which investigated the effects of multimedia and practical training on cardiac and pulmonary resuscitation in medical students, reported that practical method is more effective than multimedia method regarding students' better performance and skill earning. The results of mentioned study is not similar to our results.

In this study, the two intervention methods were equally effective. In workshop training method, individuals can learn better through discussing the issues, exchanging their experiences, and actively participating in the educational process. They can memorize the subjects more precisely and remember them easily (Berahmandpour & Ardestani 2012). On the other hand, in multimedia training method, individuals can learn better through simultaneous using of the senses, ability to repeat the concepts, giving exam at the same time with learning, and the ability to adjust the speed of training with learning capabilities (Wang 2008). Thus, both mentioned methods are effective on learning.

Because of the continuous expansion of Nursing and Medical Sciences, the research on methods which promote knowledge and performance in nursing seems necessary. Therefore, it is important to know and identify the effective and new methods and technologies in nursing education. In order to improve nursing education, it is vital to include some theoretical courses to train and re-train nurses during education and after graduation. Thus, they can provide better, faster and more comprehensive service to the patients. According to the findings of this study to improve nurses' knowledge and performance, both methods are useful, but this study suggests that integration of both methods (workshop and multimedia) could be more effective on improving nurses' knowledge and performance.

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### Conflict of Interest

The authors declared no conflict of interests.

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