Research Paper

Comparing the Training of the Mass Casualty Incident Triage by the Virtual Workshop and Non-virtual Workshop (Face-to-face) on the Nursing Students' Learning and Satisfaction

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Citation Karampourian A, Imani B, Khatiban M. Comparing the Training of the Mass Casualty Incident Triage by the Virtual Workshop and Non-virtual Workshop (Face-to-face) on the Nursing Students' Learning and Satisfaction. Health in Emergencies and Disasters Quarterly. 2023; 8(4):269-276. http://dx.doi.org/10.32598/hdq.8.4.494.2

http://dx.doi.org/10.32598/hdq.8.4.494.2

Article info:
Received: 11 Nov 2022
Accepted: 05 Apr 2023
Available Online: 01 Jul 2023

Keywords:
Lecture, Teacher training, Computer user training, Distance learning, Work performance, Personal satisfaction

ABSTRACT

Background: Workshop training is one of the most effective learning methods. This study aims to compare the effect of virtual and face-to-face workshop training on students' learning and satisfaction.

Materials and Methods: A three-group intervention study with before and after measurements was conducted with the participation of 106 nursing students. A convenient method of assigning replacement blocks was used. The groups included three groups, a virtual workshop, a face-to-face workshop, and a control. The data collection tool included a demographic form, and researcher-made awareness, performance, and satisfaction questionnaire. The content validity of the tool was confirmed by experts in the fields of nursing, health in disasters and emergencies, and medical education. The reliability of the tool using test re-test and Cronbach's α was 0.858. Awareness and performance were evaluated before and after the study. Satisfaction was checked at the end of the study. Data were analyzed using analysis of variance with SPSS software, version 23.

Results: Most of the students were female (55.66%), with a Mean±SD of age 22.75±2.05 for all groups, single (93.4%), seventh semester (62.30%), without experience of participating in the training workshop (67.9%), and reading the book related to triage with mass casualty incident (MCI) (81.13%). Before the intervention, the groups had no significant difference in terms of awareness (P=0.169) and performance (P=0.296), while after the intervention, the difference was significant (P<0.001). After the intervention, the most awareness and performance were related to the face-to-face workshop. A significant difference was observed between the groups in terms of satisfaction (P<0.001). In the face-to-face workshop, 43.42% were very satisfied and 36.36% were satisfied, while very satisfied students did not exist in the virtual workshop and only 22.44% of students were satisfied. Satisfaction in the control group was moderate and poor.

Conclusion: Since the face-to-face workshop increased students' awareness, performance, and satisfaction, it is suggested to use face-to-face educational workshops to improve the scientific level of nursing students before graduation.

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1. Introduction

When medical demands significantly exceed available resources, a decision on how to distribute resources becomes necessary. Decision-making for rationing, allocating, and distributing resources at all levels, from national to local, is referred to as triage [1]. The word triage, from the French word trier, means to categorize and arrange patients for the priority of receiving care and transfer. It was first used in war to classify the wounded and better distribute medical resources [2]. The topic of triage is quite challenging all over the world [3]. Triage is one of the crucial clinical functions of nurses in the emergency department, mastering it leads to stabilizing the position of the emergency department [4]. Also, proper triage can increase the quality of patient care, satisfaction, and efficiency of emergency departments and reduce the waiting time and stay of patients, mortality, and related costs [5, 6]. Although the history of setting up hospital triage in Iran dates back to the last few years, today all hospital emergency rooms have this unit in their structure under the responsibility of nurses.

Triage is performed in both normal and unexpected situations with different goals. In crisis events, the health of many people is at risk in a short period and there is a possibility of injury. In this situation, society's expectations from the treatment team are the quick, timely, and favorable treatment of patients [7]. Mass casualty incident (MCI) is among the critical conditions. According to the definition of the Joint Commission On Accreditation of Healthcare Organizations (JCAHO), MCI is an event whose health and treatment needs are more than the resources available in normal processes [8]. Factors, such as car accidents, chemical spills, building collapses, fires, terrorist incidents, and mass gatherings can cause many injured [9]. According to the Centre for Research on the Epidemiology of Disasters, the frequency of MCI is increasing. During the years 2005-2015, a total of 42 disasters occurred in Iran, which resulted in 1356 deaths, 7797 injuries, 1066504 affected people, 20750 homeless people, and finally 1988262 thousand dollars in economic damage [10].

Triage in MCI can save the lives of more people. The studies conducted in the world and Iran show the lack of preparation of nurses in triage and consequently the ineffectiveness of triage in accidents and emergencies [11-14]. Nurses in our country do not receive comprehensive training for the triage system during their university education, the contribution of triage in the heading of nursing courses in the course of emergency nursing in crises and unexpected events is a two-hour session, which only deals with the general cases of triage and the conditions and special situations are ignored. The lack of education in the field of triage has been emphasized by the Ministry of Health and Medical Education [6, 15]. Fry's study in Australia showed that 42% of nurses were not trained for triage, and 14% stated that although they had attended triage training classes, they still did not feel sufficiently prepared to do this [16]. These inadequacies can cause the appropriate background for the knowledge-based behavior of nurses. In other words, triage is implemented in Iranian hospitals while not enough knowledge and training are conducted during the student period [17].

The management of MCI requires the establishment and preparation of the medical team based on planned and structured training courses. Education is one of the most effective factors in creating familiarity and preparation to increase work competence [9, 18]. Since learning and education is a complex process, it cannot be limited to the classroom. Various methods, including electronic and virtual training, as well as workshops and face-to-face training, have transformed the teaching-learning process and transformed learning patterns [19]. Therefore, the future solution can be workshop training of students in this field [17]. Since few studies have been conducted in the field of triage in special conditions and situations, the researchers decided to conduct a study to compare the effect of training of MCI triage using two methods of face-to-face and virtual workshops on the learning and satisfaction of nursing students of Hamadan University of Medical Sciences.

2. Materials and Methods

This three-group intervention study with before and after measurements was conducted with the participation of 106 senior nursing students at Hamadan University of Medical Sciences in 2022. The samples were selected by the convenience sampling method, and if they met the inclusion criteria, they were randomly assigned to three groups, virtual workshop, face-to-face workshop, and control using the ABC-ACB-BCA-BAC-CAB-CBA permuted block method. A sequence of the above blocks was randomly generated using R software and a list was created. It should be noted that the control group was evaluated first to prevent the exchange of information. The inclusion criteria included seventh and eighth-semester nursing students willing to participate in the study on the condition of passing the emergency nursing course in crises and unexpected events worth 1.5 theoretical and practical units, lack of a medical degree, non-participation in related classes, and workshops at the same time as the research. The exclusion criteria included absence or lateness in the face-to-face workshop and failure to study the educational content in the virtual workshop. To collect data, the following tools were used: A demographic form including age, sex, marital status, semester (7 and 8), overall grade point average, history of participation in a training workshop

related to the MCI triage, and a recent reading of a book or article related to MCI triaging, awareness, performance, and satisfaction questionnaire. According to Karampourian's study, the awareness questionnaire has 20 items, with a score of 0-20 [20], the performance checklist includes three different scenarios MCI, the score is 0-3 [20], and the satisfaction questionnaire has 13 items with a Likert rating of 13-0 [20]. Validation of the content of the questionnaires was done with the approval of 10 expert professors in the fields of emergency medicine, nursing, and health in disasters and emergencies. The reliability of the tool was obtained using test re-test and Cronbach's α 0.85.

The method was as follows, first, The plan to receive the approval of the code of ethics in Hamadan University of Medical Sciences. After obtaining the consent form from the students and ensuring the confidentiality of the information, the demographic characteristics form was completed by self-report by all three groups. In the control group, no intervention was done by the researcher, but at the end of the study, educational content was provided to them. In two virtual and face-to-face intervention groups, lesson plans were compiled and content approved. The content was the same for the virtual and face-to-face groups, and the only difference was in the way of presenting the content. After allocating the students to three groups under study, the names of the groups, the time, and place of the meetings were informed to the participants through the student representative. Then, the students of each group were familiarized with the educational objectives and the research method, and while assuring the students about the confidentiality of the information, written consent was obtained from them. To prevent the transfer of information between the studied groups, first, the information was collected from the control group. In the virtual group, educational content was presented in the form of a CD, and the face-to-face group, based on the predetermined program, it was presented face-to-face. The awareness and performance questionnaire was measured before the study and 3 weeks after the end of the study. Also, at the end of the workshop, the satisfaction of the students was evaluated. Data were analyzed using SPSS software, version 21 and analysis of variance (ANOVA) test.

3. Results

The results of the study showed that most of the students were women (55.66%), the Mean±SD of age was 22.75±2.05, single (93.4%), seventh semester (62.30%), without a history of participating in educational workshops (67.9%) and without reading books related to MCI triage (81.13%) (Table 1).

Table 1. Demographic characteristics of the studied students in three groups

Variables	Groups	Mean±SD/No. (%)				P
		Control (n=37)	Virtual Workshop (n=36)	Face-to-face Workshop (n=33)	Total	
Age (y)		22.2±81.25	23.1±36.05	23.2±09.58	22.2±75.05	0.330[a]
GPA		14±60.32	15±75.3	14±83.29	15±6.18	0.302[a]
Sex	Male	17(45.94)	15(41.67)	15(45.45)	47(44.34)	0.433[a]
	Female	20(54.06)	21(58.33)	18(54.55)	59(55.66)	
Marital status	Married	3(8.11)	1(2.78)	3(9.09)	7(6.6)	0.106[a]
	Single	34(91.89)	35(97.22)	30(90.91)	99(93.4)	
Educational semester	Semester 7	20(54.05)	25(69.44)	18(54.55)	66(62.3)	0.58[b]
	Semester 8	17(45.95)	11(30.56)	15(45.45)	40(37.7)	
Participation in the workshop	Yes	14(37.84)	9(25.00)	11(33.33)	34(32.1)	0.083[b]
	No	23(62.16)	27(75.00)	22(66.67)	72(67.9)	
Book reading	Yes	7(18.92)	8(22.22)	5(15.15)	20(18.87)	0.11[b]
	No	30(81.08)	28(77.78)	28(84.85)	86(81.13)	

[a]ANOVA test, [b]chi-square test (Xi^2).

Table 2. Comparing the mean score of awareness and performance of students in three groups before and after the intervention

Variables / Groups	No.	Awareness			Performance		
		Mean±SD		Pair t-test	Mean±SD		Pair t-test
		Before Intervention	After Intervention		Before Intervention	After Intervention	
Non-virtual workshop	33	7.68±4.34	13.87±5.85	P<0.001	1±0.83	2.87±0.05	P<0.001
Virtual workshop	36	9.32±5.03	10.25±5.97	P=0.476	2.03±0.94	2.55±0.49	P=0.656
Control	37	4.13±4.23	7.39±4.34	P=0.952	0.97±1.19	0.99±0.21	P=0.872
ANOVA statistics		P=0.169	P<0.001		P=0.298	P=0.002	

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The results showed no significant difference between the groups in terms of awareness before the intervention (P=0.169), while after the intervention, the difference was significant (P<0.001). The highest awareness after the intervention was related to the face-to-face workshop workshop (P<0.001). Also, before the intervention, no significant difference was observed between the groups in terms of performance (P=0.298), while the difference was significant after the intervention (P=0.002). Face-to-face training has improved performance (Table 2).

The results showed a significant difference between the groups in terms of satisfaction (P<0.001). In the face-to-face workshop, 43.42% of students were very satisfied with the workshop and 36.36% of them were satisfied, while in the virtual workshop, there were not very satisfied students and only 22.44% of students were satisfied. In the control group, satisfaction was moderate and weak (Table 3).

4. Discussion

The results of this study showed that face-to-face and virtual training improved the level of awareness. To compare the effect of lecture and network-based teaching, Zeraati et al. showed no significant difference in the average grades of students in face-to-face workshop and virtual training, and these two methods had the same effect on students' learning [21]. Despite the present study, other studies concluded that virtual and face-to-face teaching methods have relatively equal success in learning materials [22-26] and are effective in improving learners' awareness [27-30]. In Docherty's study, the usefulness of the virtual training method has been recommended only for supplementary education [31]. The difference between the existing studies and the present study may be the simultaneous education of students during the COVID-19 pandemic. Since during 2021-2019, students were virtually taught and the lessons that had practical parts in addition to theoretical topics were practically ignored due to the conditions during the COVID-19 epidemic, and the students attended the face-to-face workshop for the first time on the topic of MCI triage and the subject was completely new to them, therefore, they learned better.

The results of the study showed that the performance of students increased after the face-to-face workshop. Esfijani found that education in a combined method did not have a significant effect on students' academic performance in the final semester [32]. In this study, the combined training method was used, while in our study,

Table 3. Comparison of the frequency of the researched units for the satisfaction of holding the triage workshop of MCI

Groups	No.	Very Satisfied	Satisfied	Medium	Dissatisfied	Very Dissatisfied
Non-virtual workshop	33	14(42.43)	12(36.36)	3(9.09)	4(12.12)	0(0.00)
Virtual workshop	36	0(0.00)	8(22.44)	20(55.56)	7(19.20)	1(2.80)
Control	37	0(0.00)	0(0.00)	12(32.43)	15(40.54)	10(27.03)
ANOVA				P<0.001		

ANOVA: Analysis of variance.

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the groups were independent, and only one method was used for each group. Sadeghzadeh also concluded that nursing students had a very good academic performance in virtual training [33]. Oducado's study on the virtual training of nursing students during the COVID-19 pandemic showed that the academic performance of 37% of students was poor and 50% was average [34]. The sample size in this study was 108 students, which is somewhat consistent with our study. In this study, virtual training has little effect on students' performance. On the other hand, the students of Uducado's study were in the second year, while the present study was conducted on the fourth year students who had practically acquired the necessary skills to some extent. Zeraati's study showed no significant difference in the academic performance of students in face-to-face and virtual training [21]. As can be seen, the studies in this field are contradictory and the researchers found a different effect of virtual and face-to-face training on performance.

The results indicated that students were more satisfied with the face-to-face workshop than the virtual workshop. Esfijani's study showed that combined training had a positive and significant effect on student satisfaction [32]. In this study, unlike our study, a combined method was used. Sadeghzadeh's study showed that nursing students were moderately satisfied with virtual training [33]. In a study conducted by Elewa et al. during the COVID-19 pandemic, the students' satisfaction level with virtual training was reported moderate [35]. In the studies conducted by Farsi et al. [36] and Ruiz-Grao et al. [37], the satisfaction level with virtual training was also moderate. The studies conducted, unlike the present study, were in the field of theoretical topics. In the present study, the satisfaction with education through face-to-face workshops was higher, which may be due to the preference for face-to-face training over virtual training, the problems in the virtual training system, and the need for face-to-face training in the practical aspects of nursing units. Ruiz et al. emphasize that electronic training should not replace face-to-face training and should only be used as a supplement along with other usual educational methods [38]. Thurmond believes that virtual training alone without support methods, such as face-to-face workshops can reduce students' motivation and satisfaction [39].

One of the limitations of the present study was a small sample of nursing students; therefore, to create more reliable results about awareness, performance, and satisfaction, studies on a larger scale are needed. In addition, the mental state of the participants may affect their response to the study instrument.

5. Conclusion

Since in the current study, the face-to-face workshop increased the awareness, performance, and satisfaction of the students, therefore, it is suggested to use face-to-face training workshops in various other fields, such as advanced cardiopulmonary resuscitation and practical skills to communicate with patients and colleagues to improve the scientific level of nursing students before graduation.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by Hamadan University of Medical Sciences (Code: IR.UMSHA.REC.1398.282). Written consent was obtained from the study participants.

Funding

This article is the result of a research project financially supported by Hamadan University of Medical Sciences (Grant No.: 9804182908).

Authors' contributions

Data collecting: Arezou Karampourian; Data analyzing: Behzad Imani; Designing and writing–original draft: Arezou Karampourian and Mahnaz Khatiban.

Conflict of interest

The authors declared no conflict of interest.

Acknowledgments

The researchers thank the Research Vice-Chancellor of Hamadan University of Medical Sciences for their financial support and all the nursing students participating in the study.

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