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DOI: 10.4103/jehp.jehp_106_19

Effect of simulation-based training method on the psychological health promotion in operating room students during the educational internship

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Abstract:

BACKGROUND: Simulation is one of the strategies which are suggested and used to reduce stress and anxiety in clinical student education. This study aimed to determine the effect of simulation-based training method on psychological health promotion in operating room students in their educational internships.

MATERIALS AND METHODS: This study was a clinical trial. Research population was operating room students at Semnan University of Medical Sciences. A demographic questionnaire and the Spielberger's Situational Anxiety Inventory were used as data collection tools. Students were divided into two intervention and control groups randomly. Situational anxiety was measured before the intervention and on the 1st and the last days of the internship. The data from the two groups were compared by using the Mann-Whitney and Friedman statistics at the significant level of 0.05.

RESULTS: There was a significant difference between students' situational anxiety scores in the experimental and control groups on the 1st day of internship after education by simulation ($P = 0.481$). There was a significant difference between the students' anxiety scores in the two groups on the last day of the internship ($P = 0.008$).

CONCLUSION: Simulation of the operating room environment before the internship cannot reduce the operating room students' situational anxiety on the 1st day of internship, but it can reduce their situational anxiety during the internship and significantly reduce it at the end of internship compared to those who are not in the simulated environment.

Keywords:

Anxiety, education, premedical, simulation training, students

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Received: 11-03-2019

Accepted: 11-04-2019

Introduction

Training methods are among the skill and knowledge transfer determinants which change by training content, training instructions, and supports from peer, supervisors, and organizational culture.^[1] The educational designer's main role is to determine instructional goals and revise instructional methods.^[2] Nowadays, the education designers are trying to involve learners in concept acquisition by different ways.^[3] Various educational methods have

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been utilized and proposed in nursing student education in order to achieve this objective. Preceptorship, ward sister, clinical teammate, mentor, mentorship and partnership are among these methods. All of these educational methods use trained nurse(s) with higher degree of education level. In most of these methods, educators are usually responsible for simultaneous education of the clinical students and staff nurses.^[4-7] The major problem of these student clinical education methods is that students have to directly work on patients in clinical procedures, and this issue imports

How to cite this article: Mohammadi G, Tourdeh M, Ebrahimian A. Effect of simulation-based training method on the psychological health promotion in operating room students during the educational internship. *J Edu Health Promot* 2019;8:172.

tension and anxiety in some of them. Tension and anxiety affect students' proper clinical training efficiency, academic performance, critical thinking, learning outcomes, and cognitive appraisal.^[8-10] Therefore, it is essential to find a solution to the reduction of anxiety in this group of students.

Simulation is one of the strategies which are suggested and used to reduce stress and anxiety in clinical student education. Simulation is a method in which the existing realities are imitated in clinical environments. This method uses techniques such as role playing and working with devices such as videos or models or mannequins.^[11] Simulation is usually used due to the reception of sufficient feedback from students, lack of mobility in mannequins for examination, lack of enough patients for education, varied patient characteristics in real clinical environments, lack of available clinical conditions, and a large number of students in clinical environments in medical education.^[12] Results of some studies also indicate that application of simulation has been beneficial in students' clinical training in some medical groups such as junior doctors, nursing, and midwifery.^[13-15]

Both worldwide and in our country, the anxiety of students and other people increases day by day.^[16,17] Early recognition and prevention of the anxiety of operation room students by scientific method can be effect on operation room students' academic performance and psychosocial and physical health well-being. Researchers have not found any study on the effects of simulated environments on anxiety of this group of students despite the fact that operating room students are constantly forced to perform different, sophisticated, and aggressive procedures in the operating room and always experience great stress during their internships due to the nature of disciplines in which they are studying. This study aimed at finding the effects of simulation-based training method on psychological health promotion in operating room students in their educational internships.

Materials and Methods

Study design and participants

This study was a clinical trial. The research population consisted of operating room students at Semnan University of Medical Sciences, Iran. The research environment contained the Clinical Skills Center of Semnan University of Medical Sciences and the operating room of Kowsar Hospital of Semnan, Iran. The research sample consisted of those operating room students who completed the informed consent form and satisfied the research inclusion criteria. The inclusion criteria comprised the willingness to participate in

the study; completion of the informed consent form; selection of internship course; not suffered from severe anxiety disorders based on the students' statements; nonparticipation in internship or not working in the operating room or other hospital sectors. Exclusion criteria comprised anxiety disorder diagnosis in the first survey of anxiety and reluctance to continue participation in the study. The research was conducted at Semnan Nursing and Paramedical School, the center of clinical skills at this school, and operating rooms of Kowsar Hospital of Semnan. Sample size was determined based on the objective, and all the 17 operating room students of a class were included in the research.

Measures

Data collection tool consisted of a two-section questionnaire. The first section contained questions about demographic and educational characteristics, and the second section included Spielberger's Situational Anxiety Inventory. Spielberger's Situational Anxiety Inventory has 20 items and is scored based on a 4-point Likert scale. During the response to situational anxiety questions of this questionnaire, participants express their momentary feelings. Each of the test questions has points from 1 to 4. Points of this questionnaire range from 20 to 80. The total scores of six groups are 20–31 for mild anxiety, 32–42 for moderate-to-low anxiety, 43–53 for moderate-to-high anxiety, 54–64 for relatively severe anxiety, 35–75 for severe anxiety, and 76 and above for very severe anxiety.^[18] Spielberger's Anxiety Inventory is among the widely used questionnaires to determine the level of anxiety in medical students and other people, and its validity is confirmed in several studies.^[19-21] The reliability coefficient of this test varies between 0.94 and 0.96, and Cronbach's alpha value of the Spielberger's Anxiety Inventory was found to be 0.791 in Gönenc and Yılmaz's study.^[19]

Procedures

At the beginning and during the semester, students' anxiety was measured using Spielberger's Situational Anxiety Inventory. Students were then divided randomly into two intervention (simulation method, eight people) and control (traditional method, nine people) groups. In the control group, students attended the internship site with their preassigned professor and learned the clinical skills based on their selected course. In the intervention group, students were trained in a simulated environment for 2 days prior to the beginning of internship course at the Clinical Skills Center of Nursing and Paramedical School. Educational intervention program provisions included handwashing techniques, sterilization, filling and drop methods, and familiarity with general surgical set. On the 1st day of internship, anxiety level was re-measured before initiation of surgery in the intervention and control groups. Furthermore, students'

anxiety was measured on the 5th day (middle internship) and at the last day of internship.

Data analysis

The students' anxiety levels were analyzed using descriptive (frequency and mean and standard deviation) and analytical (Mann–Whitney U and Friedman) statistics at the significant level of 0.05. Data were analyzed using SPSS software version 16, IBM Corporation, New York, USA.

Ethical considerations

This study was approved by the Ethics Committee of Semnan University of Medical Sciences (no: IR.SEMUMS.REC.1394.155). Data collection started after obtaining permission from the Ethics Committee of Semnan University of Medical Sciences and the authorities at Semnan Nursing and Paramedical School.

Results

A total of 21 operation room students, 20 persons met the inclusion criteria. Three students were excluded from the study during the sampling process, and finally, the data of 17 students were analyzed [Figure 1].

The students' mean age was 19.75 ± 0.70 years in the simulation group and 19.78 ± 0.97 years in the control group. In both the studied groups, two students were male and the rest of them were female. All participants in both simulation and control groups were single. The students' average score was 16.01 ± 1.12 in the

simulation group and 16.54 ± 2.17 in the control group during the sampling period. Six students in the control group and four students in the simulation group were living in dormitories and others were living with their families. The mean \pm standard deviation of operating room students' situational anxiety scores was 38.87 ± 5.24 in the simulation group and 42.00 ± 5.26 in the control group before the intervention. Mann–Whitney U-test also indicated that there was no significant difference between students' situational anxiety scores before interventional training in the group of education by simulation and traditional education group ($P = 0.114$), and both groups were homogeneous in terms of degree of situational anxiety before intervention [Table 1].

The obtained results indicated that the students' mean scores of situational anxiety were 46.00 ± 3.07 in the simulation group and 44.88 ± 7.44 in the control group after simulation in the intervention group in the first morning of internship and after the students' first presence in the operating room. According to statistical Mann–Whitney U test, there was no significant difference between students' situational anxiety scores in the experimental and control groups on the 1st day of internship after education by simulation ($P = 0.481$). Results indicated that the students' mean scores of situational anxiety were 38.00 ± 1.60 in the simulation group and 43.22 ± 5.73 in the control group on the last day of internship. Mann–Whitney U-test also indicated a significant difference between students' situational anxiety scores in the experimental and control groups on the last day of internship ($P = 0.008$). The obtained

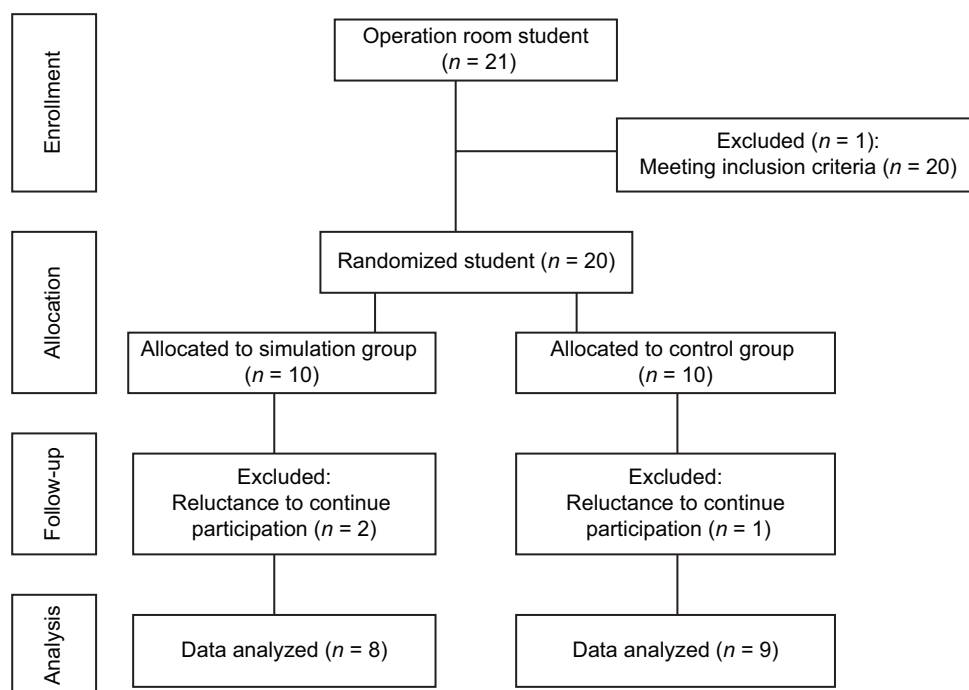


Figure 1: Flow of students through the trial

Table 1: Situational anxiety of the operating room students in the simulation and control groups at the time before intervention and the first and last days of internship

Times	Anxiety levels	Groups				P
		Simulation group		Control group		
		n (%)	Mean±SD	n (%)	Mean±SD	
Before intervention	Low	0	38.87±5.24	0	42.00±5.26	0.114
	Moderate	7 (87.5)		6 (66.7)		
	Higher than moderate	1 (12.5)		3 (33.3)		
	Relatively severe	0		0		
	Severe	0		0		
	Very severe	0		0		
The 1 st postintervention internship day	Low	0	46.00±3.07	0	44.88±7.44	0.481
	Moderate	1 (12.5)		4 (44.4)		
	Higher than moderate	7 (87.5)		4 (44.4)		
	Relatively severe	0		1 (11.1)		
	Severe	0		0		
	Very severe	0		0		
Last internship day after intervention	Low	0	38.00±1.60	0	43.22±5.73	0.008
	Moderate	8 (100)		4 (44.4)		
	Higher than moderate	0		4 (44.4)		
	Relatively severe	0		1 (11.1)		
	Severe	0		0		
	Very severe	0		0		
P		0.002		0.282		

SD=Standard deviation

results also indicated that none of the students had mild, severe, and very severe anxiety in both experimental and control groups before and after intervention [Table 1].

Discussion

Nowadays, significant advances have been made in the medical and paramedical fields. Along with these advances, medical and paramedical education has also undergone some changes, and the traditional educational methods will be gradually replaced with advanced methods. Meanwhile, it is indispensable to perform clinical practices in a safe environment. Simulation is a unique teaching method for learning in safe conditions, and it provides an opportunity for medical students' safe and low-stress learning according to the available limitations in clinical education facilities and spaces and also patients' short time of stay at the hospitals. Creation of a simulated clinical environment can help to prevent clinical mistakes and control any damage to patients and also help medical students to learn clinical skills.^[22] It seems that the students' peace of mind about safety of clinical practices in a simulated environment can enhance their skills in performing treatment procedures, and it can thus reduce their anxiety in real clinical environments.

In the present study, students experienced moderate preintervention anxiety in both simulation and traditional groups. Researchers have not found any study on degrees of anxiety and its causes in the operating

room students before the beginning of internship. However, some studies have investigated degrees of anxiety and its causes in students of other disciplines before the internship. For instance, Kocak *et al.* found that there were high levels of anxiety in students before the internship in the emergency department.^[23] Chen *et al.* also found that the students' personality traits and internship can cause anxiety in them.^[24] It seems that this degree of anxiety in operating room students before the internship in the present study was related to their age conditions, living environment, feeling of internship, and personality traits.

Operating room students experienced anxiety higher than the moderate level in both simulation and control groups on the 1st day of internship after intervention. There was also a significant difference between the levels of anxiety in students on the 1st day of internship after intervention in both simulation and control groups. In other words, the simulation of operating room environment does not affect the level of anxiety in students on the 1st day of internship. This finding indicates that the anxiety of the 1st day of internship depends on other factors rather than the students' lack of familiarity with surgical procedures. In this regard, Shahrokhi and Tayebi-Miyaneh found that nursing students experienced moderate stress on the 1st day of internship,^[25] but Kocak *et al.* reported high levels of anxiety equal to 9.02 ± 7.25 in students on the 1st day of arrival to emergency departments based on the Beck Anxiety Inventory.^[23] Erler and Rudman also found that there was no implemented simulation study

on nursing students before entering the intensive care units compared to control group who directly entered the real clinical environment. Erler and Rudman stated that high levels of anxiety occurred in students during the internship due to the assigned tasks to them.^[26] According to the results of the present study and its comparison with some similar studies, the anxiety of the 1st day of internship is a serious issue. Therefore, it is suggested conducting a research on the determinants of anxiety in operating room students on the 1st day of internship.

The obtained results indicated that the operating room students' mean anxiety was significantly lower in the simulation group than that of the control group on the last day of internship. It seems that the simulation of operating room environment before the internship increases the students' ability and dominance of surgical procedures, and this increase in students' abilities reduces their anxiety in doing their tasks. Kocak *et al.* showed that students' anxiety was significantly lower on the last day of internship than the 1st day and reached from 9.02 ± 7.25 to 4.69 ± 4.58 .^[23] Furthermore, Wang *et al.* showed that the level of anxiety in medical school students during the internship is high, and the anxiety level slightly decreased after internship.^[27] This comparison indicates that conducting an internship in a simulated or a real clinical environment can reduce anxiety in students in the long term. Therefore, it is suggested putting the operating room students in a simulated environment in order to reduce their anxiety and create a safe environment for improving their clinical abilities before their presence in the operating room environment.

During the study, a number of students may have experienced stressful events, or stress may be reduced in some of them for some other reasons. To control these problems, at the beginning of the study, students were told to tell the research team about such issues. However, they may not have done this for some reason. Therefore, this study is limited in this regard.

Conclusion

Simulation of the operating room environment before the internship cannot reduce the operating room students' anxiety on the 1st day of internship, but it can reduce their situational anxiety during the internship and significantly reduce it at the end of internship compared to those who are not in the simulated environment. Because the reduction of situational anxiety in the operating room students during the internship can increase their efficiency, interest, and learning, it is suggested putting the operating room students in the simulated operating room environment before the internship.

Acknowledgments

We would like to thank the Nursing Care Research Center and Clinical Research Development Unit of Kowsar Educational, Research and Therapeutic Center of Semnan University of Medical Sciences for providing facilities for this work and all operation room students that participated in this study for their sincere cooperation.

Financial support and sponsorship

This study was a part of a study supported financially by Semnan University of Medical Sciences (Grant no: 939).

Conflicts of interest

There are no conflicts of interest.

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