

Investigating the relationship between demographic characteristics on stress and self-efficacy of surgical technology students

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Article History: Received: 14 July 2020; Accepted: 2 January 2021; Published online: 5 February 2021

Abstract: Background and Aim: Clinical education has a special importance in the operating room education system. Every clinical experience is not merely learning a specific knowledge or practical skill. It also increases the student's confidence in his / her professional abilities. The aim of present study is to investigate the relationship between demographic characteristics and stress and self-efficacy of surgical technology students.

Materials and Methods: In this two-stage randomized controlled clinical trial (before and after), 50 bachelor operating room students studying in the 4th, 6th and 8th semesters were randomly allocated to the experimental and control groups. Craniotomy surgery educational video was displayed for the experimental group before the surgery and the control group received routine education. Data collection instruments were two researcher-made questionnaires, including perceived stress scale (PSS) and evil Sher self-efficacy scale. They were used after confirming their reliability and content validity. Data were analyzed using SPSS 16 software through descriptive and analytical tests at a significant level of 0.05.

Results: No significant relationship was found between students' age, GPA and their mean scores of perceived stress and self-efficacy in the control and intervention groups (P -value > 0.05). No significant relationship was found between students' gender and semester and their mean perceived stress and self-efficacy scores in the control and intervention groups (P -value > 0.05).

Keywords: Self-efficacy, Stress, Operating room, Students

Introduction

Medical science education is a process consisting of a series of continuous and planned actions that its result manifests when there is a change in the knowledge, attitude and skills of the learner. Medical

science education consists of theoretical education along with practical exercises. It is designed in such a way that in addition to the intellectual growth and development of students provides the conditions for gaining practical skills (1). Students' learning in the motor psychology occurs more in the cognition. For this reason, more than 50% of medical science education courses are spent on practical education activities (2). Since clinical education is one of the most important parts of the education of medical students (3) and is a major and vital part of education of competent and professional people, the value of ideal clinical education is such that its role in the personal and professional development as well as the clinical skills of students is deniable (4). Patient bedside education is part of a clinical round in which a student and professor discuss the illness or demonstrate a clinical diagnostic technique in the patient's bedside. This education provides an opportunity for the student to observe how the teacher communicates with the patient and to learn in interaction with the patient, and learn the way of interviewing, physical examination, and counseling skills (1).

Self-efficacy has been defined as an individual's belief in the ability to perform the desired functions. In the academic setting, self-efficacy refers to a student's beliefs about his or her ability to perform assigned tasks. Students with more self-efficacy tend to use more effort in doing their tasks. In a study on the education-related variables, it was found that self-efficacy could help improve students' learning methods and predict the outcome of academic achievement (5). Self-efficacy is related to selection of activities, effort, perseverance in performing tasks and effective performance of learners (6). The structure of self-efficacy has a special importance in educational settings, since according to Bandura; such settings are suitable for growth and development of self-efficacy (7). Students who believe that they can be successful in education show more willingness, effort and perseverance in doing tasks and have more confidence in their ability (8). Also, due to high stressors and the reduced human ability to cope with them and lifestyle changes, stress has become a complex and large phenomenon, since it is affected by many factors and the interaction between them. Stress is a distressing mental state or feeling of helplessness related to a threatening situation or anticipation of an unknown threat to oneself or those around oneself. It is the most common feeling that all human beings experience (9).

In a stressful situation, the person is not calm and balanced and feels pressured. In today's world, everyone experiences some form of stress in their daily lives, and almost no one is free of the stress of environmental and personal stressors. Almost all members of society are involved to varying degrees with stress caused by environment and personal life (10). In a surgery, the surgical team experiences high level of stress due to prolonged surgery and fatigue (11). Surgical team plays a key role in the outcome of surgery. It requires the knowledge of the surgical team. When a student enters surgery with sufficient knowledge and information, his or her stress decreases because he or she knows when to take any action (12). If students receive the necessary education, they can play their role well and reduce their stress in the operating room. Identifying the existing problems in students' clinical education and taking action to eliminate them will lead to better achievement of educational goals, training of people with high self-efficacy, and improving the quality of care services. Studies conducted in the area of clinical education of medical sciences have addressed just environmental and communication issues in clinical settings, including lack of appropriate educational facilities, lack of coordination and respect by hospital staff, inadequate justification of staff about the status of operating room students (13) and sufficient attention has not been paid to learner as an efficient and active element in learning.

In the clinical settings, professors should always be looking for ways to improve and enhance their students' clinical skills and abilities, clinical education and experience so that they can enhance students' self-efficacy and the students can apply the various skills learned with confidence at the end of course (14). In a study conducted by Mirkarimi et al. (2010) entitled "Evaluating the effect of two methods of video displaying and live education in teaching the correct placement of fissure sealants to students of

Zahedan Dental School, thirty 8th semester dental students of Zahedan University of Medical Sciences were randomly divided into two groups of 15. In Group 1, the way of placement of the fissure sealant correctly was trained lively to patient. In Group 2, the students learned how to place the fissure sealant correctly by watching the video.

After teaching each student, a case of fissure sealant was placed on the patient's permanent molar and the correctness of each step was checked and scored by a pediatric dentist. The results showed that both educational methods of video displaying and live education had the same results in teaching how to apply fissure sealant. Therefore, the method of displaying the video can be proposed as an alternative to live education method (15). In a study conducted by Hemmati Maslak Pak et al., the effect of peer mentoring on the clinical stressors of nursing students was studied. In this quasi-experimental study, 44 second-semester nursing students of Urmia School of Nursing and Midwifery were selected by a census method and were randomly divided into two groups of control ($n = 21$) and intervention ($n = 23$). In the intervention group, for 4-5 people, one 7th semester nursing student as a peer mentor took the role of guiding and supporting students. Data collection tool was the Persian form of examining the stressful factors of clinical setting. The results showed that the mean scores of clinical stressors of the students in the intervention group decreased from 50.45 to 41.9 after the implementation of the peer group program. In the control group, the mean scores of students' clinical stressors before and after the intervention did not show a statistically significant difference (16).

Desirable educational programs are dynamic in nature and are regularly revised following environmental feedback. Planned teaching is one of the accepted principles of modern education. Also, the best use of modern methods at different levels of education, especially higher education, is one of the most important concerns of those involved in educational affairs. It is always tried to make the best use of the available facilities in these methods and to enable students to participate more actively in education (17). Thus, operating room students, due to crucial nature of their tasks, need basic learning and education to be able to play a role in major surgeries such as craniotomy. As a result, students should receive basic education before scrubbing in this surgery. Given what was stated above, we examine the demographic characteristics of operating room students and their relationship with the students' self-efficacy and stress.

Materials and Methods

The present study is a randomized controlled clinical trial consisting of two groups and two stages (before and after). The first stage was before scrubbing in craniotomy surgery and the second stage was after watching the video, and scrubbing and completing the surgery in intervention group. The data were collected in two groups of intervention and control before and after the intervention. In the intervention group, the subjects watched the craniotomy surgery video. The research environment in this study was the elective operating room 1 of Al-Zahra Hospital and the orthopedic and neurological operating room of Kashani Hospital affiliated to Isfahan University of Medical Sciences. The study population was all bachelor operating room technology students studying in the 4th semester and higher semesters. The sample consisted of 50 bachelor operating room technology students, who met the inclusion criteria such as lack of previous experience in craniotomy and scrub surgeries at least 5 times in different surgeries.

In the present study, researcher-made questionnaires of perceived stress scale and self-efficacy scale were used. They were used after being adapted with standard questionnaires of Sher self-efficacy scale and perceived stress scale (PSS). To evaluate their validity, they were submitted to ten faculty members (3 in the psychiatric nursing department, 2 from the management department and 5 people from the operating room department) of Isfahan School of Nursing and Midwifery.

The reliability of the self-efficacy scale and perceived stress scale was obtained at 0.86 in a pilot study. The research data are quantitative (continuous, discrete) and qualitative (nominal). They were analyzed in SPSS-20 software using descriptive statistics and analysis of covariance (ANCOVA) and paired t-test, and independent t-test, Chi-square test, and Mann-Whitney test.

Results

In this randomized controlled clinical trial conducted in two stages (before and after), 50 bachelor students of operating room studying in 4th semester and higher semesters were selected and randomly assigned to two groups intervention and control (25 subjects in each group) to evaluate the effect of video displaying before craniotomy on the self-efficacy and stress of operating room technology students in selected teaching hospitals in Isfahan in 2017. Tables 1 and 2 show the results of examining and comparing the frequency distribution of qualitative and quantitative demographic characteristics of the two groups. It was observed that the frequency distribution of gender and semester were not significantly different between the two groups (P -value > 0.05). The mean age of students in the intervention group was significantly lower than that of students in the control group ($* P$ -value < 0.05), while the mean GPA of students in the two groups was not significantly different (P -value > 0.05).

Table 1- examining the frequency distribution of qualitative demographic characteristics in the two groups

		Gender			total	Chi-square	P-value
		Female	Male				
Group	Intervention	12	13		25	0.321	0.571
		48.0%	52.0%		100.0%		
	Control	14	11		25		
		56.0%	44.0%		100.0%		
Total		26	24		50		
		52.0%	48.0%		100.0%		
		Semester			total	Chi-square	P-value
		Semester 4	Semester 6	Semester 8			
Group	Intervention	8	9	8	25	0	1.00
		32.0%	36.0%	32.0%	100.0%		
	Control	8	9	8	25		
		32.0%	36.0%	32.0%	100.0%		
Total		16	18	16	50		

	32.0%	36.0%	32.0%	100.0%		
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Table 2: examining the frequency distribution of quantitative demographic characteristics in two study groups

	Group	Mean	SD	Mean SD	t	P-value
Age (year)	intervention	21.04	1.27	.25	-2.17	0.035 *
	control	22.16	2.25	.45		
GPA	intervention	16.91	1.25	.25	-0.119	0.905
	control	16.95	1.14	.23		

The relationship between the mean scores of stress and self-efficacy of room technology students and the demographic variables was examined and they were compared in students of intervention and control groups using independent group t-test and Kruskal-Wallis tests.

Table 3: examining and comparing the mean scores of stress and self-efficacy based on gender in two groups

Control	Gender	N	mean	SD	Standard mean error	Z	P-value
Stress	female	14	45.86	14.68	3.92	-0.495	0.647
	male	11	43.36	4.34	1.31		
Self-efficacy	female	14	23.57	16.80	4.49	-0.549	0.609
	male	11	17.73	10.07	3.04		
Intervention	gender	n	Mean	SD	Standard mean error	Z	P-value
stress	female	12	13.83	3.07	.89	-1.1	0.295
	male	13	13.15	2.73	.76		
Self-efficacy	female	12	53.17	3.19	.92	-0.739	0.470
	male	13	57.62	11.72	3.25		

Table 4: examining and comparing the mean scores of stress and self-efficacy based on semester in two groups

control semester		N	Mean	SD	Standard mean error	statistic	P-value
stress		8	43.50	5.61	1.98		
		9	42.56	5.75	1.92	4.81	0.090
		8	37.63	5.29	1.87		
		25	41.28	5.92	1.18		
Self-efficiency		8	20.25	2.76	.98		
		9	19.56	7.49	2.50	1.08	0.584
		8	19.63	3.38	1.19		
		25	19.80	4.93	.99		
intervention semester		N	Mean	SD	Standard mean error	Statistic	P-value
stress		8	46.00	9.83	3.47		
		9	42.22	1.72	.57	5.29	0.071
		8	45.13	2.70	.95		
		25	44.36	5.84	1.17		
Self-efficiency		8	17.63	1.92	.68		
		9	17.11	1.62	.54	1.48	0.478
		8	19.38	4.10	1.45		
		25	18.00	2.80	.56		

There was no significant relationship between gender and students' semester and mean perceived stress and mean self-efficacy scores in the control and intervention groups ($P\text{-value} > 0.05$) (Tables 3 and 4). There was no significant relationship between students' age and GPA and the mean perceived stress and self-efficacy scores in the control and intervention groups ($P\text{-value} > 0.05$) (Table 5). The results are presented based on correlation analysis.

Table 5: examining and comparing the mean stress and self-efficacy scores based on age and gpa of students in the two groups

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Intervention			stress	Self-efficiency
Spearman	Age (year)	Correlation coefficient	-.152	.277
		Significant level (two-way)	.469	.180
		Sample size	25	25
	GPA	Correlation coefficient	-.166	-.041
		Significant level (two-way)	.427	.847
		Sample size	25	25
Control			stress	Self-efficacy
Spearman	Age (year)	Correlation coefficient	.254	.080
		Significant level (two-way)	.221	.704
		Sample size	25	25
	GPA	Correlation coefficient	-.115	.316
		Significant level (two-way)	.585	.124
		Sample size	25	25

Discussion and Conclusion

Given the fact that operating room students should be trained in a clinical setting due to the clinical nature of the field, educational centers aim to strengthen the clinical skills of these students as much as possible to perform better in their future jobs in the clinic. In fact, students in this field are trained in clinical departments (operating rooms) and not in the classroom because of their special professional work. According to Masaruh, the clinical learning setting is the clinical classroom (18). Regarding the research question of "What are the demographic characteristics of operating room technology students in two experimental and control groups", no significant difference was found between two groups in terms of frequency distribution of gender (48% female and 52% male in the intervention group and 56% female and 44% male in the control group) and the semester (P -value > 0.05). The mean age of students in the intervention group (21.04) was significantly lower than that of students in the control group (22.16) (* P -value < 0.05), while the GPA of students in the two groups (intervention group = 16.91 and control group = 16.95) was no significantly different (P -value > 0.05).

Lack of paying attention to students' preparedness leads to reduced learning, reduced quality of education, and anxiety and stress in them (19). The results of a study conducted by Sharif and Armitgh (2004) to examine the effect of psychology and education on nursing students' stress showed that nursing students experience levels of anxiety in the clinic, and management of anxiety and increasing self-confidence were described as effective interventions (20). A study conducted by Carvalho et al. in 2004 to examine the anxiety of 30 nursing students showed that 80% of nursing students in the clinical setting and in interaction with the teacher suffer overt anxiety at a moderate level (21).

Safarzadeh and Davoodi Azad (2010) conducted a study to investigate the effect of information and communication technology (ICT) on self-efficacy, academic performance, and entrepreneurship of students of Alborz Islamic Azad University. It was a comparative study conducted on all bachelor students of Islamic Azad University of Alborz Province in the academic year of 2009-2010. They were selected by stratified sampling method (543 female and 365 male). The results of analysis of variance showed the effect of ICT in general (simultaneously) on self-efficacy, academic performance and entrepreneurship separately in males and at the significant level of 0.01. Based on the results obtained from data analysis, the effect of ICT on self-efficacy, academic performance and entrepreneurship in students was confirmed (22).

Hassani et al. (2008) also examined the effect of self-efficacy and self-regulatory learning in clinical practice. They showed that self-efficacy and self-regulatory learning had a role in independent care of patient and improved the professional skill and capability of nursing students (23). Based on the results obtained, it can be stated that in the medical professions, the ability to perform the assigned tasks is not enough, but the ability to combine appropriate knowledge, attitudes, values and skills to provide professional services is also essential. Many factors affect the learning process of students, including operating room students and one of these factors is self-efficacy (24). One of the requirements for student learning in the clinical setting is to gain clinical experience and practice the required skills that can be achieved through direct observation and practice.

Recommendations

Clinical educators have a significant effect on student learning in the operating room. Thus, their cooperation in implementing new educational programs can largely prevent student stress and increase student self-efficacy.

Acknowledgment

The authors' thanks are also extended to Isfahan University of Medical Sciences for its support and help in completing the paper.

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