Investigating the Effect of Simulation-Based Advanced Trauma Life Support Program on Nurses' Knowledge and Performance

Abolfazl Jokar[1], Mehdi Harorani[2], Arash Yazdanbakhsh[1]*

[1] Department of Emergency Medicine, Arak University of Medical Sciences, Arak, Iran.
[2] School of Nursing and Midwifery, Arak University of Medical Sciences, Arak, Iran.

ABSTRACT

Background and Aim: Initial care of traumatic patients is important in reducing mortality rate and trauma-related complications. The Advanced Trauma Life Support (ATLS) course provides basic care standards for these patients. Methods: In this descriptive-analytic study, 55 nurses working in the emergency department of a teaching hospital in the city of Arak, Iran participated in a 4-day training program in winter 2017. On the first day, knowledge of the emergency nurses on the type of procedures, sequence of procedures and performance of procedures while dealing with a simulated traumatic patient was assessed through an objective structured clinical examination (OSCE) test. The ATLS training workshop was held for the second and third days and the same test as that of the first day was given to the same participants on the fourth day and the scores acquired on these two tests were compared. Results: The scores of the nurses after training in ATLS significantly increased in all three dimensions of the test compared to those before training ($P < 0.05$). Compared to the first day, Knowledge of the participants of diagnostic procedures and their sequence and performance skill when dealing with stimulated traumatic patients significantly increased on the fourth day after training in ATLS ($P < 0.001$). Conclusion: According to the findings of this study, providing all medical staff involved in trauma care with ATLS courses, especially simulated-based ones, can increase their knowledge and skills in dealing with these patients.

Key Words: Trauma, Advanced Trauma Life Support Program, ATLS.

eIJPPR 2020; 10(4):260-263

HOW TO CITE THIS ARTICLE: Abolfazl Jokar, Mehdi Harorani, Arash Yazdanbakhsh (2020). "Investigating the Effect of Simulation-Based Advanced Trauma Life Support Program on Nurses' Knowledge and Performance", International Journal of Pharmaceutical and Phytopharmacological Research, 10(4), pp.260-263.

INTRODUCTION

Trauma is one of the leading cause of mortality with over 5 million deaths and disabilities every year worldwide and is considered as one of the important issues in general health [1]. Almost 90% of the deaths related to trauma occur in countries with low and middle income [2]. Iran has one of the highest rates of trauma incidence in the world. 28000 people die in car accidents each year in Iran. One accident occurs every 3 minutes and one person dies due to these accidents every 19 minutes. In addition, trauma is one of the economic, social and medical problems in Iran [3]. The study of Amaraegbulam et al. (2013) showed that there is a poor knowledge of ATLS among medical team on ATLS. Thus, ATLS training programs should be held by hospitals and passing these courses should be a condition to employ medical team [4]. Advanced Trauma Life Support (ATLS) is a protocol for managing acute trauma victims. This protocol was designed by an American surgeon, James Styner, in 1976 and was officially approved in 1980 by American College of Surgeons Committee on Trauma and is now widely accepted as the standard protocol for initial assessment and treatment of acute trauma victims [5]. ATLS is based on the idea that the greatest threat to life should be treated first, lack of a definite diagnosis should never inhibit treatment of patient and starting medical care should not

Corresponding author: Arash Yazdanbakhsh
Address: Department of Emergency Medicine, Arak University of Medical Sciences, Arak, Iran.
E-mail: Yazdanbakhsh.arash @ gmail.com
Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest .
Received: 20 April 2020; **Revised:** 18 August 2020; **Accepted:** 23 August 2020

delayed because of the lack of a detailed history for assessment and treatment of patient [6].

On the other hand, researchers believe that basic medical training alone cannot adequately prepare medical doctors for emergencies and content of medical and paramedical curricula are inadequate in this regard and need extra trainings on basic and advanced support of traumatic patients [4-7]. Although some studies have not shown clear evidence that training in ATLS can reduce trauma-related complications [8], other studies reveal the positive effects of these programs on trauma outcomes in patients [9]. In addition, adopting these programs can enhance the standards for injured patients care. Therefore, some studies suggest that ATLS should be considered as a necessary skill for all medical staff and as a necessary criterion required for being employed as a healthcare team member dealing with traumatic patients [10].

Today, various approaches are used in medical training, but using simulation in medical training is a new phenomenon [11]. By definition, a simulator is a device or exercise which enables the participant to experience a real-life phenomenon in a controlled condition [12]. This approach not only prepares real-life conditions, but also eliminates the risk of injury caused by training process. Although various studies have shown that staff training can enhance their knowledge, skill and professional performance to provide more efficient care, no study has been so far conducted on Advanced Trauma Life Support program using simulator model. Therefore, to investigate the effect of simulation-based Advanced Trauma Life Support program on emergency department nurses' knowledge and performance in a teaching hospital in the city of Arak.

MATERIALS AND METHODS:

This cohort descriptive-analytic study was conducted in a 4-day period in February 2017. The study population was 55 nurses working in emergency department of Vali-e-Asr Teaching Hospital in the city of Arak. Those nurses who had previously taken ATLS course or did not finished the 4-day period in this study were excluded from the study. To observe the ethical considerations, the aim of the study was explained for the participants, they were ensured of confidentiality of information, there was no need to write first and last name on the test sheets, participation in the study was optional and informed written consents were obtained from all the participants. In the nest stage, the participants' performance in simulated environment for traumatic patients management was estimated in an objective structured clinical examination (OSCE) consisting of three main dimensions as knowledge of diagnostic and therapeutic procedures necessary for traumatic patients management, knowledge of the sequence of these procedures and performance of these procedures. The tests for the first and fourth days were given using OSCE method. To evaluate the knowledge of diagnostic and therapeutic procedures, the score +1 was recorded for sufficient knowledge, -1 for insufficient knowledge and 0 for no knowledge of these procedures. To score emergency nurses' knowledge of sequence of procedures for traumatic patients management, the score +1 was recorded for sufficient knowledge and 0 for not considering the correct sequence. To evaluate the performance in ATLS, the score +3 was considered for complete and appropriate performance, 0 for inappropriate performance and scores +1 and +2 for relatively appropriate performance based on the personal judgment of the examiner. The skill of the participants on the above three dimensions was evaluated based on the approved ATLS checklist verified in various studies in terms of reliability and validity, including the study of Ali et al. (1998) [13]. In the checklist, a specific criterion has been defined for primary and secondary assessment of traumatic patients. Scoring emergency nurses was based on their clinical knowledge of the type of procedures, knowledge of correct sequence of procedures and practical skill performance. The total score for each of the above dimensions was determined based on the nature of the expected knowledge and skill performance.

On the first day, knowledge of the emergency nurses of the type of procedures, sequence of procedures and performing them when dealing with traumatic patients was measured through the checklist using standard OSCE. On the second and third days, a 2-day workshop on standard ATLS was held based on the current standard protocols. On the fourth day, the skill of the participants to deal with traumatic patients was evaluated by the same OSCE as that in the first day and the obtained data from these two evaluations were compared and analyzed in terms of three dimensions of knowledge of type of procedures, knowledge of sequence of procedures and performing procedures.

Data Analysis:

All the results were expressed as mean ± standard deviation (mean ± SD) and the data were analyzed using SPSS 21. In the cases where the data were normally distributed, paired samples t-test was used for comparing the results before and those after the intervention and when the distribution of the data was not normal, Wilcoxon test was used. Also, P value lower than 0.05 was considered as the level of significance.

Ethical Considerations:

This study is compatible with religious beliefs and norms of the society and employs methods were which cause no physical or psychological harm. Also, the participants in

this study were totally free to participate and confidentiality of the information related to individuals and organizations was ensured. Additionally, no invalid source was used in this study and rights of the authors of the original sources were observed.

RESULTS

The average age of the participants was 33.2 ± 8.2 years, their average total work experience was 6.85±5.9 years and their work experience in emergency department was 3.4±3.2 years (Table 1).

Table 1: Frequency distribution of demographic characteristics of the participants

Demographic characteristics		Frequency	%
Sex	Female	47	85
	Male	8	15
Work experience	<5	40	73
	5-10	10	18
	>10	5	9
Education	Undergraduate	52	95
	Graduate	3	5

After training in ATLS, the score of nurses significantly increased in all three dimensions compared to those before training (P<0.05). Compared to the first day, knowledge of the participants of diagnostic procedures, sequence of procedures and performing procedures when dealing with simulated traumatic patients significantly increased after training in ATLS on the fourth day P<0.001) (Table 2).

Table 2: Comparing scores acquired by nurses of emergency department before and after training in ATLS

Training in ATLS	Mean±SD	Min.	Max.	P value
Knowledge of the type of procedures				
Before	-52.2±7.1	-64	-42	<0.001
After	39.2±8.1	29.2	52	
Knowledge of sequence of procedures				
Before	21.1±4.1	15.2	27.2	<0.001
After	62.4±9.2	51.1	76.4	
Knowledge of performing procedures				
Before	23.1±4.6	17.5	28.3	<0.001
After	87±11.5	72.1	92	

DISCUSSION

The results of this study showed that knowledge of nurses of advanced trauma life support in all three dimensions including knowledge of type of procedures, knowledge of sequence of procedures and knowledge of performing procedures increased after the training program compared to their previous knowledge, showing the effectiveness of this training program in increasing the nurses' knowledge. Also, the increase in the score for knowledge of performing procedures after training was higher than those in other two dimensions compared to the scores before the program. The study of Douglas et al. (2012) in India also showed that training in ATLS improved performance of emergency department staff on traumatic patients care. These researchers suggest that ATLS should be an integral part of the medical training [14]. Similarly, study of Ahmadi et al. (2013) showed that holding this course can increase clinical knowledge and performance skills of medical interns [15]. Management of acute traumatic patients is often performed by low-experienced staff who have not passed required training in ATLS principles. Even in centers equipped with skillful staff, counseling may not be possible at any time [16]. There is evidence that ATLS (or similar) programs increase knowledge of performing procedures and enhance performance of medical staff in managing simulated trauma cases [14]. Also, the evidence indicates a significant decrease in mortality of traumatic patients in the first hour after admission and in trauma-related complications [9]. In the same line, Shakiba et al. (2004) reported that participants felt that training in ATLS program improves their clinical skills and professional performance [17]. Therefore, it is recommended that all staff involved in managing traumatic patients be trained in ATLS programs [14]. Although many studies approve the effectiveness of these training programs for improving knowledge and skill of medical staff, some researchers believe that there are not yet strong evidence indicating the effectiveness of training in ATLS in reducing trauma-related mortality and complications [18]. Therefore, further studies are required to accurately evaluate the effectiveness of training in ATLS in the rate of mortality and traumatic disability.

This study had limitations. No control group was considered to be compared with the intervention group trained in ATLS and no alternative training method was used to be compared with the method used in this study, that is, simulation.

CONCLUSION

Given the findings of this study, training all medical staff involved in traumatic patients care in ATLS programs, especially simulation-based ones, can increase their knowledge and skill for dealing with these patients and naturally improves their performance and decrease the trauma-related outcomes.

ISSN (Online) 2249-6084 (Print) 2250-1029

ACKNOWLEDGEMENT

Hereby, the researchers thank the Research Deputy of Arak University of Medical Sciences, administrative and staff of Vali-e-Asr Hospital and all the nurses who participated in this study.

Conflict of interests

There is no conflict of interests.

REFERENCES

[1] Zakeri moghadam M. Sadeghi S. Shahrzad Gh. Kazemnejad A. Effects of comprehensive-care program on patients' satisfaction with trauma in emergency department. Cardiovasc. Nurs. J. 2013, 2(3): 54-62.

[2] Rasouli MR, Saadat S, Haddadi M, Gooya MM, Afsari M, Rahimi-Movaghar V. Epidemiology of injuries and poisonings in emergency departments in Iran. Public Health. 2011;125(10):727-33.

[3] Bijani , M., Nikrooz , L., Naghizadeh, M. & Tavakkol , Z. 2013. The Incidence of Chest Trauma in Patients Refer to Vali - Asr Hospital of Fasa: (Epidemiology of Chest Trauma). Journal of Fasa University of Medical Sciences, 3.

[4] Amaraegbulam PI, Nwankwo OE. The level of knowledge of the advanced trauma life support protocol among nonspecialist doctors involved in trauma care in Enugu metropolis. Niger. J. Clin. Pract. 2013;16(1):67-70.

[5] Carmont MR. The advanced trauma life support course: A history of its development and review of related literature. Postgrad. Med. J. 2005;81:87-91.

[6] American College of Surgeons Committee on Trauma. Advanced Trauma Life Support for Doctors. ATLS Student Course Manual. 8th ed. Chicago IL; 2008.

[7] Khattab OS. Starting basic and advanced cardiac and trauma life support programs will improve the emergency medical service in Iraq. J. Emerg. Med. Trauma. Acute Care. 2007;7:1-5.

[8] Shakiba H, Dinesh S, Anne MK . Advanced trauma life support training for hospital staff. Cochrane Database Syst. Rev. 2004;(3):4173.

[9] Van Olden GD, Meeuwis JD, Bolhuis HW, Boxma H, Goris RJ. Clinical impact of advanced trauma life support. Am. J. Emerg. Med. 2004;22(7):522-5.

[10] Driscoll P, Wadrope J. ATLS: Past, present and future. Emerg. Med. J. 2005;22:2-3.

[11] Satava RM. Historical review of surgical simulation A personal perspective. World J. Surg. 2008;32:141-8.

[12] Katibeh M,Eskandari A, Ziaei H, MD; Javadi MA. The EYESI Simulator for Training Ophthalmology Residents. Bina. J. Ophthalmol. 2011; 17 (2): 155-61.

[13] Ali J, Cohen RJ, Gana TJ, Al-Bedah KF. Effect of the Advanced Trauma Life Support program on medical students' performance in simulated trauma patient management. J Trauma. 1998;44(4):588-91.

[14] Douglas R, Vasanthi B, Giles A, Kumar GA. Improving trauma care in India: a recommendation for the implementation of Atls training for emergency department medical officers. Emerg. Med. Australa. 2012 Feb 1;24:1.

[15] Ahmadi K, Sedaghat M, Safdarian M, Hashemian AM, Nezamdoust Z, Vaseie M, Rahimi-Movaghar V. Effect of Advanced Trauma Life Support program on medical interns' performance in simulated trauma patient management. Chin. J. Traumatol. 2013;16(3):145-8.

[16] Crandon IW, Harding HE, Cawich SO, Williams EW, Williams-Johnson J. Emergency department physician training in Jamaica: a national public hospital survey. BMC Emerg. Med. 2008;8(1):11.

[17] Kennedy DW, Gentleman D. The ATLS course, a survey of 228 ATLS providers. Emerg. Med. J. 2001;18(1):55-8.

[18] Mohammad A, Branicki F, Abu-Zidan FM. Educational and clinical impact of Advanced Trauma Life Support (ATLS) courses: a systematic review. World J. Surg. 2014;38(2):322-9.