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Original Article

Evaluation of the development of emergency response skills of intern doctors after emergency medicine internship: A prospective cross-sectional study

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Abstract

Introduction: Although there are many forms of education, learning by doing is one of the most efficient ways of learning in the field of medicine. In Turkey, intern doctors can perform and observe many emergency interventions in the presence of supervisors during their emergency service internship. This study aimed to examine whether intern doctors have developed the necessary emergency response skills concerning some vital situations after emergency medicine internship involving their applied training and observation.

Methods: This prospective cross-sectional study was conducted between June 2, 2022, and September 1, 2022, in the emergency department of a tertiary hospital. In the study, the emergency response skills of intern doctors were measured with a questionnaire prepared using scenarios in which emergency situations were described.

Results: The participants' emergency response skills were improved in the most of emergencies described in the questionnaire. However, there was no significant improvement in emergency intervention skills related to the approach to ventricular tachycardia and multi-trauma patients ($P=0.771$ and $P=0.45$, respectively).

Conclusion: Doctors doing internship in the emergency medicine clinic receive both theoretical and applied training, which increase their ability to respond to emergency situations. However, there is a need to identify emergency situations in which internship training does not sufficiently improve intervention skills and try new methods to improve the related skills.

Introduction

For all patients presenting to the emergency department, it is important to make a diagnosis and initiate treatment as soon as possible. However, since patients with special conditions, such as anaphylaxis, major trauma, dysrhythmias, ST-elevation acute myocardial infarction, and cardiopulmonary arrest have high mortality rates, they should be evaluated very fast and immediately provided with an appropriate treatment. In Turkey, the "national core education program" (NCEP) has been defined to ensure the standardization of medical education and train well-equipped physicians. In this program, anaphylaxis, major trauma, dysrhythmia, and ST-elevation acute myocardial infarction are conditions that student doctors should be able to "diagnose, have knowledge of their treatment, recognize them as emergency situations, and apply immediate treatment" before their graduation.[1]

Medical school education in Turkey is generally designed in such a way that students can practice in addition to theoretical education. In the last years of their education accompanied by competent supervisors (internship period), they usually have the opportunity to observe medical practices closely rather than only receiving theoretical training.[2] Considering the constant circulation of patients, especially in emergency services, the active participation of intern doctors in the care of critically ill patients with their supervisors has reduced the anxiety rate and increased the awareness of doctors in the last stage of training.[3]

This study aimed to examine the intern doctors' ability to recognize clinical situations that require emergency interventions and accurately perform the first intervention before and after receiving emergency medicine internship.

Methods

This prospective cross-sectional study was conducted between June 2, 2022, and September 1, 2022, in the emergency department of a tertiary hospital. Ethical approval was obtained from the local clinical research ethics committee. The study was performed in accordance with the tenets of the Declaration of Helsinki. Each subject in the project signed a detailed informed consent form.

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The protocol reversion by the appropriate institutional review body was obtained.

The sample included intern doctors that had received emergency medicine internship during the study period. Intern doctors who took an advanced cardiac life support course during the study, those had previously received their emergency medicine internship in another center and repeated it in our center, and those that did not agree to participate in the study were excluded.

All intern doctors doing their internship in our clinic during the study period were contacted. The questionnaire was administered through face-to-face interviews to 145 of the intern doctors who had completed their emergency medicine internship in our clinic. A questionnaire consisting of seven questions (Supplementary File 1) was administered to the intern doctors at two different times: on the day they first started and on the day they completed their emergency medicine internship. These questions described clinical situations commonly encountered in the emergency department, which can result in death in cases where appropriate treatment is not applied. At the beginning of the form, the age and gender of the participants were also recorded. This instrument consisted of multiple-choice questions, each containing a scenario and using a related visual, to determine the first responses of the participants in the cases of anaphylaxis (one question), approach to a multi-trauma patient (one question), basic life support principles (one question), dysrhythmia (one question on atrioventricular block, two questions on ventricular fibrillation, and one question on ventricular tachycardia), and acute ST-elevation myocardial infarction (one question). The participants were given a total of 21 minutes (3 minutes for each question) to complete the questionnaire. The questionnaire was administered by the study team. In the scenarios included in each question, patients' medical stories, clinical information, and vital signs (for the evaluation of stable or unstable state) were presented in detail. For the scenarios related to dysrhythmia and acute myocardial infarction, we used the electrocardiogram (ECG) images of patients who were previously followed up in our clinic. Correct answers were determined by considering the guidelines in the international literature.[4-6] The responses of the participants before and after emergency medicine internship were compared.

The analysis of the obtained data was performed using IBM SPSS v. 20 statistical analysis software. Data were presented as mean, standard deviation, median, minimum, maximum, percentage, and number. The consistency between two categories of nominal variables before and after internship was examined using the McNemar test. The statistical significance level was taken as $P<0.05$.

Results

Of the intern doctors participating in the study, 72 were female and 73 were male. The mean age of the participants was 24.7 years (Table 1).

Among the participants, the rate of those accurately answering the question on anaphylaxis was 39.3% (n=57) before emergency medicine internship and 95.2% (n=138) after internship, indicating a statistically significant increase ($P<0.001$). Concerning the question related to the approach to trauma patients, it was observed that the rate of correct answers was 40.7% (n=59) before internship and 35.9% (n=52) after internship, and the decrease in the number of correct answers was not statistically significant ($P=0.45$). While 22.8% (n=33) of the participants correctly answered the question related to ventricular tachycardia emergency intervention before emergency medicine internship, the rate of correct answers was 25% (n=36) after internship, and there was no statistically significant increase ($P=0.771$). The distribution of the participants' correct and incorrect answers to the questions in the questionnaire before and after emergency medicine internship is summarized in Table 2 and Figure 1.

Table 1. Sociodemographic characteristics of the participants

Age	Mean	Median	Minimum	Maximum
Female (n=72)	24.26±1.4	24	22	32
Male (n=73)	24.97±2.9	25	23	47
Total (n=145)	24.62±2.3	24	22	47

Table 2. Changes in the participants' answers to the questionnaire questions after emergency medicine internship compared to the pre-internship period

	After internship	Before internship			
		True	False	Total	*P*
Question 1	True	55	83	138 (95.2%)	
	False	2	5	7 (4.8%)	<0.001
	Total	57 (39.3%)	88 (60.7%)	145	
Question 2	True	76	54	130 (89.6%)	
	False	11	4	15 (10.4%)	<0.001
	Total	87 (60%)	58 (40%)	145	
Question 3	True	103	38	141 (97.2%)	
	False	2	2	4 (2.8%)	<0.001
	Total	105 (72.4%)	40 (27.6%)	145	
Question 4	True	11	25	36 (25%)	
	False	22	87	109 (75%)	0.771
	Total	33 (22.8%)	112 (77.2%)	145	
Question 5	True	15	58	73 (50.3%)	
	False	8	64	72 (49.7%)	<0.001
	Total	23 (15.9%)	122 (84.1%)	145	
Question 6	True	24	28	52 (35.9%)	
	False	35	58	93 (64.1%)	0.45
	Total	59 (40.7%)	86 (59.3%)	145	
Question 7	True	115	23	138 (95.2%)	
	False	3	4	7 (4.8%)	<0.001
	Total	118 (81.4%)	27 (18.6%)	145	

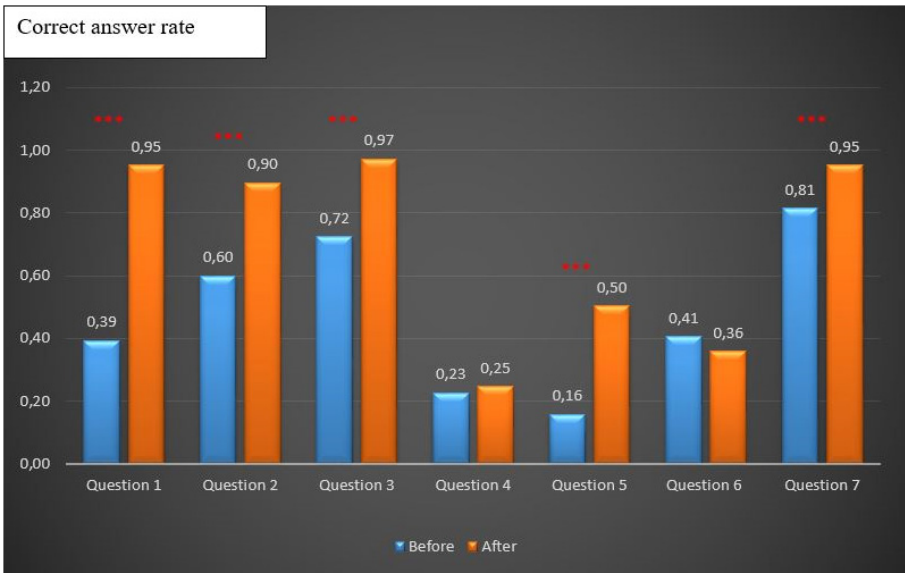

Figure 1. Correct answer rates of the participants before and after emergency medicine internship.

Discussion

On completion of this study, it was determined that the participants had improved their first and emergency response skills in cases of anaphylaxis, basic life support, ventricular fibrillation, atrioventricular complete block, and ST-elevation acute myocardial infarction after emergency medicine internship compared to the pre-internship period but there was not significant improvement in skills related to the management of unstable trauma and ventricular tachycardia.

Since anaphylaxis is a clinical condition that can be fatal, its first and immediate treatment is very important. Therefore, anaphylaxis has been classified by NCEP among the conditions whose diagnosis and emergency treatment must be known before graduation from medical school.[1] In a study conducted on anaphylaxis, the rate of doctors that recognized anaphylaxis and performed appropriate emergency interventions was reported to be 96.44%.[7] In the current study, it was observed that the participants greatly improved their emergency response skills in the case of anaphylaxis after receiving their emergency medicine internship. Since the emergency department, where this study was conducted, is located in a tertiary university hospital, it receives a large number of referrals from external centers. In addition, anaphylaxis cases are frequently observed in the secondary level intensive care unit in the emergency department where the study was undertaken. The follow-up of these patients is carried out by emergency physicians and emergency medicine interns under supervision. All these factors increase the number of patients with anaphylaxis encountered by intern doctors doing their internship in our emergency department. Thus, the participants were able to acquire much experience in relation to the appropriate approach to anaphylaxis cases during their internship.

Basic life support intervention is the most basic skill that should be possessed by professional healthcare professionals. In a study, the basic life support knowledge level of doctors was higher than that of other healthcare professionals.[8] In another study, the basic life support intervention skills of senior residents were observed to be higher than those of interns. This difference was attributed to the practical experience gained over the years.[9] In the current study, we observed that the basic life support skills of the participants had been increased at the end of their emergency medicine internship. This result may be due to the repetitive application of basic life support interventions during emergency medicine internship education.

In this study, the participants' ability to recognize fatal dysrhythmias and perform necessary emergency interventions generally had been improved after completing their emergency medicine internship. However, while the recognition of ventricular fibrillation, complete atrioventricular block, and ST-elevation acute myocardial infarction and related emergency response skills significantly had been improved after emergency medicine internship, there was no improvement in their ability to recognize and respond to atrioventricular tachycardia. In a previous study in which physicians were asked to evaluate ECGs, they were determined to accurately identify ventricular tachycardia at a lower rate than ventricular fibrillation and acute myocardial infarction.[10] This was considered to be related to the difficulty in distinguishing ventricular fibrillation from supraventricular tachycardia.[10] In another study, it was mentioned that the ECG recognition skills of emergency department physicians were improved as their professional experience was increased.[11] Intern doctors may not be able to evaluate ECGs accurately because they do not yet have sufficient professional experience. In addition, the lack of a specific curriculum in ECG education may be a factor making it difficult to read ECGs.[12] In intern doctor education, learning objectives and curriculum can be standardized by revising theoretical courses on ECG.

There are studies showing that dysrhythmia training with simulations is very beneficial.[13,14] We also consider that the experience of intern doctors can be increased by providing them with training on how to recognize dysrhythmias and offer ECG training with simulators.

The initial evaluation of trauma patients is usually undertaken by emergency physicians. Therefore, it is important for emergency physicians to know how to perform trauma care and manage traumatic shock. For this purpose, a certain protocol is generally followed to provide standardization in the care of trauma patients. In the emergency department where the study was conducted, the recommendations of the adult trauma life support (ATLS) guideline are applied[6]. Intern doctors doing their internship in the emergency department receive theoretical trauma courses according to the ATLS guideline. In addition, during their internship, they actively participate in the follow-up and treatment of trauma patients. Despite this, we observed that the emergency response skills of the intern doctors concerning the management of trauma patients did not improve after emergency medicine internship according to the post-test results. This may have been resulted from the management of unstable trauma patients in a special room reserved for critical care in the emergency department where the study was conducted. Intern doctors may not have observed a sufficient number of trauma cases because they do not take an active role in critical care room. There are studies recommending simulation training in trauma care.[15-18] This suggestion of simulation-assisted education shows the importance of learning by doing in the medical world.

Conclusion

The main goal of emergency medicine internship is to increase the ability of intern doctors to appropriately respond to emergency situations through both theoretical and applied training. For this purpose, they participate in the management of many emergencies and take an active role in interventions under the supervision of competent physicians. Thus, as seen in this study, they have the opportunity to improve their response skills in many emergencies.

Limitations

In this study, all the emergency interventions observed in the emergency department were not questioned. Therefore, the results of this study only offer an idea about the emergency response skills of intern doctors concerning certain emergency situations. The study can be repeated with questionnaires containing more emergency scenarios. In addition, since our goal was to examine whether intern doctors have developed their ability to respond to emergencies after internship, we did not perform any analysis on incorrect answers. Furthermore, the study was conducted with three separate groups of intern doctors in terms of internship period.

Study Highlights

What is current knowledge?

- After an internship in the emergency department, it can be assumed that all interns will have a similar level of experience in all emergency situations.

What is new here?

- Intern doctors often increase their emergency response skills during their emergency medicine internship. However, in some cases (such as frequently encountering the same type of emergency situations, being adequately supported by theoretical courses), the level of emergency response skills may increase more significantly after the emergency medicine internship.

The number of patients presenting to the emergency department during which each intern group was receiving their emergency medicine internship and their diagnoses may have shown seasonal differences (e.g., the number of patients presenting to the emergency department with trauma complaints is higher in summer). This may have led to differences in the number of interventions applied by each group.

Authors' Contribution

Conceptualization: Fatma Tortum.
Data curation: Hatice Kubra Tasci, Kamber Kasali.
Formal analysis: Fatma Tortum, Atıf Bayramoglu, Kamber Kasali.
Investigation: Fatma Tortum, Hatice Kubra Tasci.
Methodology: Fatma Tortum.
Project administration: Fatma Tortum, Atıf Bayramoglu.
Resources: Fatma Tortum, Atıf Bayramoglu, Kamber Kasali.
Validation: Hatice Kubra Tasci, Kamber Kasali.
Visualization: Atıf Bayramoglu, Kamber Kasali.
Writing–original draft: Fatma Tortum, Atıf Bayramoglu, Hatice Kubra Tasci, Kamber Kasali.
Writing–review & editing: Fatma Tortum, Atıf Bayramoglu, Hatice Kubra Tasci, Kamber Kasali.

Competing Interests

The authors declare that they have no conflict of interest to disclose regarding this manuscript.

Ethical Approval

Ethical approval was obtained from the local clinical research ethics committee (number: 5/07, date: 02/06/2022).

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Supplementary File

Supplementary file contains A questionnaire consisting of seven questions

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