TAKIM ÇALIŞMASI YAKLAŞIMI İLE GELİŞTİRİLEN TRAVMA İLERİ YAŞAM DESTEĞİ KURSUNUN DEĞERLENDİRİLMESİ

EVALUATION OF THE ADVANCED TRAUMA LIFE SUPPORT COURSE DESIGNED BASED ON TEAMWORK APPROACH

Emine Vatansever, Nilüfer Demiral Yılmaz, Zeynep Sofuoğlu, Ahmet Özçevikel, Ebru Araz, Haluk Agah, İrem Akbulut, Okan Ok, Şirin Çınar, Volkan Ergun, Zühtü Benli, Halil İbrahim Durak

Anahtar Sözcükler: travma kursu, ekip eğitimi, takım çalışması, deneysel desen, ADDIE

Keywords: *trauma course, team training, teamwork, experimental research, ADDIE*

ÖZET

Giriş ve Amaç: Travmaya bağlı ölümlerin azaltılmasında, hastane öncesi tıbbi bakım veren ve acil servis birimlerinde görev yapan sağlık ekibinin eğitimi önemli rol oynamaktadır. Bu çalışmanın amacı; "European Trauma Course The Team Approach (ETC)" kursu model alınarak geliştirilen Travma İleri Yaşam Desteği (TİYD) eğitiminin tasarımını, içeriğini ve değerlendirme sonuçlarını paylaşmaktır.

Yöntem: Çalışmada araştırma deseni olarak tek gruplu son test modelini içeren vaka çalışması kullanılmıştır. Travma İleri Yaşam Desteği kursunun öğretim tasarımında "ADDIE (Analysis, design, development, implementation, evaluation)" modeli kullanılmıştır. Kurs, anket yoluyla toplanan katılımcı görüşleri, ön-son test puanları ve başarı testi (uygulama sınavı) ile değerlendirilmiştir. Katılımcıların ön-son test puan ortalamaları eşleştirilmiş örneklem t-testi ile karşılaştırılmıştır.

Bulgular: Katılımcıların travma yönetimi ile ilgili yeterlik algıları değerlendirildiğinde, % 39,2'sinin (n = 40) kendine tamamen güvenen, % 57,8 'inin (n = 59) kendine güvenen ve % 2,9 'unun (n = 3) kendine orta derecede güvenen olduğu belirlenmiştir. Kurs değerlendirme anketinde, katılımcıların memnuniyetinin yüksek olduğu başlıklar: senaryonun içeriği, öğretim yöntemleri, eğitim ortamı, eğiticiler, ekip çalışması, liderlik, durumsal farkındalık, iletişim ve eğitimin mesleğe katkısıdır. Katılımcıların ön-son test puan ortalamaları arasında istatistiksel olarak anlamlı fark saptanmıştır ($t= 26.5$; $p<0.00$). Katılımcıların uygulama sınavı puan ortalaması oldukça yüksek bulunmuştur (ortalama puan = 94.5; SD = 5.1).

Sonuç: Kurs katılımcıların bilgi, teknik, teknik olmayan becerilerini ve senaryo yönetimi bilgilerini geliştirmiştir. Ekip çalışması yaklaşımına dayalı, ADDIE modeli ile tasarlanan Travma İleri Yaşam Desteği kursu etkili bir eğitim yöntemi olarak kullanılabilir.

ABSTRACT

Background: *Training of health care teams who work in prehospital medical care and in emergency units plays an important role to reduction of trauma-related deaths. The purpose of this study is to share the design method, the content and the evaluation results of an Advanced Trauma Life Support (ATLS) course which was developed based on the "European Trauma Course the Team Approach" course.*
Methods: This study has a one-shot case study design. In the instructional design of the course, the ADDIE model was used. The course was evaluated with the participants' feedback obtained through the survey and the test scores they obtained from the pre-test, post-test and practice exam. Participants' mean pre- and post-test scores were compared with the paired-sample t test.

Results: *The evaluation of the participants' perceptions of competence related to trauma management revealed that 39.2 % of them (n = 40) considered themselves as completely confident, 57.8 % (n = 59) as confident and 2.9 % (n = 3) as moderately confident. In the course evaluation survey, it was determined that the participants were very satisfied with the items under the following headings: the contents of the scenarios, teaching methods, educational environment, trainers, team work, leadership, situational awareness, communication, and contribution of education to the profession. The difference between the mean scores the participants obtained from the pre- and post-tests was statistically significant high (t = 26.5, p <0.00). The mean scores the participants obtained from the practice exam were also high (mean scores = 94.5; SD = 5.1).*

Conclusions: *The course improved the participants' knowledge, technical, non-technical skills and scenario management knowledge. The team approach with the prescriptive ADDIE model for The ATLS course can be used as an effective training method.*

Giriş: Travmaya bağlı ölümlerin azaltılmasında hem hastane öncesi hem de hastane acillerinde görev alacak sağlık ekibinin eğitilmesi önem taşımaktadır. Bu çalışmanın amacı; "European Trauma Course The Team Approach (ETC)" kursu model alınarak geliştirilen Travma İleri Yaşam Desteği (ATLS) kursunun tasarımını, içeriğini ve değerlendirme sonuçlarını paylaşmaktır.

Yöntem: Araştırma, tek gruplu son test modelini içeren vaka çalışması desenindedir. ATLS kursunun öğretim tasarımında "ADDIE (Analysis, design, development, implementation, evaluation)" modeli kullanılmıştır. Kurs, katılımcı görüşleri (anket) ve başarı puanları (ön-son test, uygulama sınavı) ile değerlendirilmiştir. Katılımcıların ön-son test puanları paired-sample t test ile karşılaştırılmıştır.

Bulgular: Katılımcıların travma yönetimine ilişkin yeterlik algıları değerlendirildiğinde; 39.2 % sinin (n= 40) kendini tamamen güvenli, 57.8 % i (n= 59) güvenli ve 2.9 % u (n= 3) orta düzeyde güvenli olarak tanımladığı belirlenmiştir. Kurs değerlendirme anketinde, katılımcıların senaryoların içeriği, eğitim yöntemi, eğitim ortamı, eğiticiler, ekip çalışması, liderlik, durumsal farkındalık, iletişim ve eğitimin mesleğe katkısı başlıklarında bulunan maddelere ilişkin memnuniyetlerinin oldukça yüksek olduğu belirlenmiştir.
Katılımcıların ön ve son puan ortalamaları arasında istatistiksel olarak anlamlı fark saptanmıştır (t=26.5; p<0.00). Katılımcıların beceri uygulama sınavından puan ortalamalarının (puan ortalaması= 94.5; sd= 5.1) yüksek olduğu görülmüştür.

Sonuç: Kurs katılımcıların bilgi, teknik, teknik olmayan beceri ve senaryo yönetimi bilgisini geliştirmiştir. Ekip çalışması yaklaşımına dayalı olarak ADDIE modeli ile tasarlanan Travma İleri Yaşam Desteği kursu etkili bir eğitim yöntemi olarak kullanılabilir.

INTRODUCTION

Trauma is a major health problem both nationally and internationally. Every year over 5 million people die because of trauma in the world (1). In Turkey, although data on the causes and consequences of trauma are not enough, the data released by the Turkish Statistical Institute in 2014 demonstrated that of the 375 291 cases whose causes of death are known, 10.7 % (40 516 people) died due to trauma (2).

Reduction of trauma-related deaths plays an important role in the training of health care teams to work in prehospital medical care and emergency units. The purpose of trauma education to be given to medical teams working in the field of pre-hospital healthcare is to develop their knowledge, skills and attitudes related to trauma management so that they can provide the best possible medical care for a trauma patient and prevent trauma-related preventable injuries and deaths likely to occur within the first few hours of trauma.

The first trauma training in the world was given in emergency rooms in the state of Nebraska US in 1978. This training namely the Advanced Trauma Life Support (ATLS) Course has been implemented in all the states of the United States since 1980. The ATLS training given to healthcare personnel working in the field of pre-hospital medical care is called Pre-Hospital Trauma Life Support (PHTLS) (3). In the European countries, a similar training called the European Resuscitation (ETC) was started in 2006 (4). This training was given theoretically and practically at the beginning. In medical errors, although the focus was the concept of human factor (5,6) in developed training programs non-technical skills based on teamwork were also dealt with (7-9). In Turkey, the first trauma training was given in 1998 by the "National Association of Trauma and Emergency Surgery" and called the Trauma Resuscitation Course (TRC). The Trauma Resuscitation Course which was initially given primarily to physicians was then given to ambulance and emergency care technicians and to emergency medical technicians and called the Advanced Trauma Life Support (ATLS) Training. The training was regulated by the Emergency Medicine Certification Program Application Guidelines published in the government's Official Gazette of January 23, 2004, number: 717 and the official report regarding the Working Procedures and Principles of the Ambulance and Emergency Care Techniques and Emergency Medical Technicians published in the government's Official Gazette of March 26, 2009, number: 27181 (10). In Turkey, although the content and length of the ATLS training programs have been defined by regulations, there is no regulating legislation on approaches, methods and techniques used in the training.

We have borrowed ADDIE (Analysis, Design, Development, Implementation, Evaluation) model to design our ATLS course. The course program of the ATLS training provided by the Izmir Ambulance Service was developed based on "European Trauma Course The Team Approach (ETC) course" (4,11-13). The characteristic of the ETC course is that the training program is based on teamwork (11,12). In this model, the emphasis in trauma management is the human factor, and the aim is to improve the participants' not only technical skills but also non-technical skills such as teamwork, leadership, situational awareness, mutual support, communication. This teamwork-based training program is given to participants in small groups under the supervision of educational counsellors. Eight issues of trauma are implemented with

realistic scenarios on simple simulation models. Depending on the nature of the trauma scenario, the participants gain targeted knowledge and skills within the scenario. The implementation of teamwork approach and scenario is different from previously made ATLS training programs. There is no study on how participants assess ATLS training programs applied and developed for the first time with this approach and method in Turkey.

The purpose of this study is to share the design method, the content and the evaluation results of an Advanced Trauma Life Support (ATLS) course which was developed based on the "European Trauma Course the Team Approach (ETC)" course.

METHODS

Study Design and Participants

This study has a One-shot case study design (14,15). Physicians, health officers, nurses, ambulance and emergency care technicians and emergency medical technicians (n = 104) who attended the ATLS course given by the Education Department of the Izmir Provincial Ambulance Service between March 2015 and June 2015 comprised the target population of the study. In the study, no sample was selected; all those who participated in the training were targeted to reach.

Instructional design implemented in the ATLS course

In the instructional design of the ATLS course, the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model was used. The phases of this model are described below:

***1. Analysis:** At this phase, a one-week-long workshop was organized by the trainers of Manisa and Izmir Ambulance Services in order to determine requirements for the development of the training program. In this workshop, the themes of the scenario contents and skills training were determined by taking into account the purpose and objectives of the training program, roles and responsibilities of the team members, and trauma statistics.*

***2. Design:** At this phase during which learning objectives and learning methods used to achieve these objectives are defined and the content of these objectives is determined, the targeted outcomes and competency of the program are determined (16). In the training program, the importance of teamwork was emphasized and roles and responsibilities of the teams were defined by the trainers. Theoretical content and scenarios regarding airway and shock management, and thoracic, abdominal, extremity, pelvic, pediatric, head-spinal trauma were designed. It was aimed to gain the participants the knowledge, skills and attitudes defined in the training program during both theoretical phase and applications of trauma scenarios (see Table 1). During the trauma scenario management practices, such techniques as group work, problem-based learning, brainstorming, discussion, question-answer, feedback, simulation and case management were used. During the implementation of skills, video shows, demonstrations and coaching techniques were used.*

Table 1. Scenarios and content of scenarios, and skills acquired within scenarios

Scenarios	Content of Scenarios	Skills Practice
Abdominal trauma	25 year-old male patient with penetrating abdominal trauma injuries (stab)	Eviscerated organ management
Extremity trauma	35 year-old male patient with an amputated leg	Amputated organ management
Head trauma	20 year-old male patient, victim of a motorcycle accident	Removing the motorcycle helmet
Thoracic and pediatric trauma	6 year-old boy, having fallen from a tree	Needle thoracentesis
Airway management	45 year-old male patient, car accident victim	Needle cricothyrotomy
Shock management	40 year-old woman, having falling down the stairs	Pelvic belt implementation

***3. Development:** At this phase during which targeted goals are designed in accordance with the contents, and teaching approaches and teaching methods are developed, pre-*

implementation of the program is achieved. Preparation of skills guidelines, writing of the scenario scripts, preparation of flashcards and video recordings were carried out by the trainers. In addition, who would take part in the scenario was determined. During the training program process, teaching methods were revised through the evaluation of the content in line with the needs of the participants. The differences between the training program developed and the European Trauma Course the Team Approach (ETC) course were as follows: not three- but four-day training, judicial approach, inclusion of the topics such as trauma triage in the field and management of exceptional cases in the training, improvement of scenarios used by considering the common cases.

4. Implementation: *At this phase, the training program developed is implemented. The scenarios created were carried out through teamwork. When this design is implemented, goals and objectives are constantly revised (16). The course was first performed in November 2013. The length of the course is four full days. In the course, after the theoretical presentation of airway and shock management, and approaches toward thoracic, abdominal, extremity, pelvic, pediatric, head-spinal trauma, the participants were divided into small groups of six. Scenarios were carried out in small groups under the supervision of educational counsellors with a teamwork approach on low-tech simulation models. The participants who were not in the team were given the role of an observer. When the scenario was changed, the participants' roles were changed too. After the scenario management, the implementation of the targeted skills was achieved under the coaching of the trainers. After the implementation of each scenario, feedback was given to the participants. When scenarios were acted out, such techniques as group work, problem-based learning, brainstorming, discussion, question-answer, feedback, simulation and case management were used. Six simulation rooms were prepared for the implementation. Each trauma scenario was based on a different problem to be solved by the team. The participants were divided into groups, each consisting of four people. While three people in the group carried out the scenario, the fourth person had the role of an observer. The trauma scenario was given to each team verbally by the trainers. After they were given the trauma scenario, the team was asked to make predictions about kinematics, impact and severity of the trauma in 2-3 minutes using the brainstorming technique. Then, the trauma case displayed on a mannequin was evaluated using the question-answer, discussion and case management techniques.*

In addition, on the last day of the course, the legal dimension of the trauma, and trauma-related ethical issues were presented using the interactive question-response method.

5. Evaluation: *At this phase, the changes arising after the implementation of the program and whether the targeted objectives were achieved by the learners were evaluated. The ATLS course was evaluated with the participants' views obtained through the survey and the test scores they obtained from the pre-test, post-test and practice exam. The survey was developed by EV and NDY based on a literature review. The pilot study of the survey was conducted by the participants who were not included in the research. The internal consistency coefficient was calculated for the reliability analysis of the survey. Proficiencies and competencies to be tested while the pretest and posttest were developed were defined within the framework of the duties and responsibilities defined by the Ministry of Health.*

5.1. Evaluation of the participants' opinions

To evaluate the participants' opinions about the course, a 54-item questionnaire developed by the researchers based on literature was used.

The questionnaire consists of two parts:

Perception of competence: In this part, the participants asses their perception of competence related to trauma management using a 10-point scale (1: completely unconfident - 10: completely confident).

The evaluation of the course: This part contains the following subscales: content of the scenarios used during the course (7 items), materials, educational environment, length of the course (8 items), training methods and skills training (6 items), trainers (3 items), teamwork (8 items), leadership (5 items), situational awareness (4 items), mutual support (4 items), communication (5 items) and contribution of education to the profession (4 items). The items in the questionnaire are rated on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). At the end of the course, the participants were asked open-ended questions about their opinions and recommendations regarding the course. The questionnaire also includes a part involving variables questioning the participants' age, gender, title, education level, workplace, and in-service trainings they have participated in and whether they have chosen the profession of their own free will.

5.2. Participants' achievement status

The participants' success was assessed with the pretest, posttest and practice exams.

Trauma related knowledge Pretest and posttest: To determine the participants' knowledge level in the cognitive domain, they were administered a 40-question multiple-choice test before and after the course. The responses had four options with one correct answer. Each correct answer was given 2.5 points. The lowest and highest possible scores to be obtained from the test were 0 and 100 respectively.

Skills exam: After the posttest, the participants were administered the practice exam. Skills (airway management, pelvic belt implementation, helmet removal, amputation management, needle thoracentesis, burn management) were assessed by experienced instructors using the observation forms which were developed as check lists. Each skills was evaluated out of 100 points.

Data Analysis

Descriptive statistics were used to analyze the study data. Participants' mean pre- and post-test scores were compared with the paired-sample t test. For the reliability analysis of the survey, the Cronbach alpha coefficient was calculated. Data were analyzed using the SPSS 21.0 software.

RESULTS

The response rate is 98.1 % (n= 102). The mean age of the participants was 26.9 ± 6.2 (min: 20 - Max: 49). Of the participants, 74.5 % (n = 76) were female, 95.1 % took the basic module training, 35.3 % took the Pediatric Advanced Life Support (PALS) training, 54.9 % took the Adult Advanced Life Support (AALS) training. The distribution of the participants in terms of the variables such as the participants' title, education level, workplace, and choosing the profession of their own free will is given in Table 2.

Table 2. Distribution of the participants in terms of some variables

Variables		**n= 102**	**%**
Title	Emergency medical technicians	57	55.9
	Ambulance and emergency care technicians	33	32.4
	Nurses	5	4.9
	Health officers	2	2.0
	Physicians	5	4.9
Education level	Vocational School of Health	37	36.3
	Associate degree	50	49.0
	Undergraduate	10	9.8
	Postgraduate	5	4.9
Workplace	Ambulance	84	82.4
	Emergency service	10	9.8
	Others	8	7.8
Choosing the profession of their own free will	Yes	82	80.4
	No	16	15.7
	No answer	4	3.9

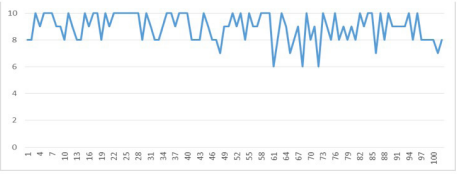
KAYNAKLAR

Evaluation of the views of the participants

The evaluation of the participants' perceptions of competence related to trauma management revealed that 39.2 % of them (n = 40) considered

themselves as completely confident, 57.8 % (n = 59) as confident and 2.9 % (n = 3) as moderately confident. The participants' perceptions of competence related to trauma management are given in Figure 1.

Figure 1. The participants' perceptions of competence



According to these findings, it can be said that the participants' perception of competence levels regarding trauma management were high and that they were self-confident.

The results of course assessment revealed that the participants' satisfaction with the items (content of the scenarios, teaching methods, educational media, trainers, contribution of education to the profession) and with the items related to non-technical skills such as teamwork, leadership, situational awareness and communications was quite high (see Table 3).

Table 3. Participants' responses to the evaluation questionnaire

Items	n= 102 Unsatisfied (1-2) n (%)	Neutral (3) n (%)	Satisfied (4-5) n (%)
The way the theoretical subjects were presented within scenarios contributed to my learning.	-	4 (3.9)	98 (96.1)
Trauma scenarios included topics which helped me solve the problems I encountered in practice.	-	2 (2.0)	100 (98.0)
Appropriate materials and simulation models for trauma scenarios were provided.	-	6 (5.9)	96 (94.1)
The halls where the trauma scenarios were performed were arranged in line with the purpose.	-	9 (8.8)	93 (91.2)
We were given opportunities to effectively participate in the implementation of skills.	-	3 (2.9)	99 (97.1)
A good communication environment was established between the participants and trainers.	-	4 (3.9)	98 (96.1)
Trainers proficiently demonstrated how to implement skills.	-	4 (3.9)	98 (96.1)
Information presented with the scenarios enabled me deal with problems related to trauma cases.	-	1 (1.0)	101 (99.0)
Feedback given at the end of scenario implementations contributed my learning.	-	2 (2.0)	100 (98.0)
The educational method was helpful.	-	1 (1.0)	101 (99.0)
We as team members shared our tasks in line with the purpose.	-	4 (3.9)	98 (96.1)
We understood our own roles and responsibilities as team members.	-	2 (2.0)	100 (98.0)
Sharing knowledge enabled us to make timely decisions for the management of trauma patients.	-	3 (2.9)	99 (97.1)
We as team members were able to effectively utilize our sources (materials, equipment, knowledge sharing etc.).	-	-	102 (100.0)
This course given with the teamwork approach contributed to my learning.	-	3 (2.9)	99 (97.1)
I believe that the method used in this course would be helpful in other trainings.	-	3 (2.9)	99 (97.1)
The team leader took note of information from team members in decision making for the management of trauma patients.	-	7 (6.9)	95 (93.1)
The team leader resolved conflicts between team members successfully.	-	12 (11.8)	90 (88.2)
The team members observed each other's working.	-	2 (2.0)	100 (98.0)
I believe team collaboration improved my learning skills.	-	1 (1.0)	101 (99.0)
The scenarios gave an opportunity to display my skills.	-	3 (2.9)	99 (97.1)
Discussions held in the team taught me to respect others' views.	-	3 (2.9)	99 (97.1)
I recommend that other colleagues should have this training.	-	1 (1.0)	101 (99.0)
The training improved my confidence related to trauma management	-	2 (2.0)	100 (98.0)
I believe that I will use the knowledge and skills I gained in this training in my professional applications in the future.	-	-	102 (100.0)
The scope of the training met my expectations.	-	1 (1.0)	101 (99.0)

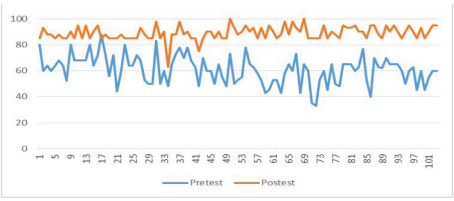
Evaluation of the participants' responses to open-ended questions revealed that they were satisfied with the course in general, and that practice skills exams should be on the basis of one-to-one method so that they could recognize their errors and correct them. On the other hand, the participants stated that the length of the course was short. Cronbach's alpha internal consistency coefficient calculated for the reliability study of the survey was determined as 97.6.

Participants' achievement scores

While the mean scores the participants obtained from the pretest were determined to be low (x = 60.7; SD = 10.9), their mean scores for the post-test were very high (x = 89.6; SD = 4.9) (see figure 2).. The comparison of the scores the participants received from the trauma related knowledge pre- and post-tests revealed that their achievement scores after the course were statistically significantly higher (t = 26.5, p <0.00).

The mean score the participants obtained from the skills exam was found to be high (x = 94.5; SD = 5.1).

Figure 2. Participants' pre- and post-test scores



DISCUSSION

In this study, the Advanced Trauma Life Support (ATLS) course developed based on the "European Trauma Course the Team Approach (ETC)" course was evaluated.

Most of the participants of this study were physicians, nurses, health officers, ambulance and emergency care technicians and emergency medical technicians working in the field of pre-hospital healthcare. The participants of other studies in the literature are generally the members of the teams in the field of pre-hospital healthcare (17-19) and hospital trauma centers (8,17,20-24).

According to the data obtained from the present study, the participants stated that they had enough confidence about the trauma management after the course. In a study conducted by Frank et al. (2014), the participants' perception of competence regarding trauma management was found to be high (18). Since a person's belief in his/her self-competence affects his/her behavior, the participants' high levels of perception of competence are of importance. In addition, as a person's perception of competence increases so do his/her targets and thus his/her efforts towards achieving these targets.

The participants in the present study were found to be satisfied with the course in general. Similar to the our results, other studies' results showed that trauma training given using the teamwork approach contributed to team performance, team work, team communication, leadership, non-technical skills, crisis resource management positively (7-9,25-29). In their study, Hamilton et al. (2009) determined that the team performance training given in the Advanced Trauma Life Support training positively contributed to competence skills, feedback and communication (25). In another study, a significant difference was determined between the performances of the group that received teamwork training on trauma management and those of the group that did not (8). In Miller et al.'s study (2012), the impact of teamwork training was assessed and a significant difference was found between the communication skills of those who participated in theoretical courses and implementation of scenarios than those who did not (20).

In the study, the participants were very successful not only in the domains of technical skills but also domains of non-technical skills such as teamwork, leadership, situational awareness and communication. In the literature, it is recommended that trauma training should include topics which help participants to develop non-technical skills (NTS) such as teamwork, leadership, situational awareness, mutual support and communication (7-9,29). It is also emphasized that if trauma training is given within the framework of the team approach, it has positive effects on Crisis Resource Management (CRM) (27). In a study conducted with a team comprising assistants of emergency physicians, surgical assistants and emergency nurses and their assistants, non-technical skills were determined to have effects on cognitive skills and critical performances of the team members and the team leader (7).

Our results indicated that the participants were quite satisfied with the implementations of skills. In Turkey, in a study conducted for the evaluation of the trauma resuscitation course,

the participants stated that practical training was not long enough and that more emphasis should be given to practical training and video sessions (30). The participants also reported that the length of the course was short. The length of Advanced Trauma Life Support training programs is regulated by the legislation; therefore, no changes can be made relating to the length of the course. It is recommended that these issues should be taken into consideration by the authorities.

The mean posttest scores were found higher than pretest. The participants' skills practice exam mean scores were quite high. These results are similar to the results obtained in other studies (8,17,20-24,31). In several studies, it was determined that the participants' knowledge and skills after the trauma training including theoretical and practical skills increased, and that the difference between the participants' pre and post-test scores was significant (21,31). Similarly, in Falcone et al.'s study (2008), post-training performances of the participants attending a multidisciplinary pediatric trauma course in the domains such as teamwork, communication skills, leadership and CRM were higher than their pre-training performances (17).

CONCLUSION

The course improved the participants' knowledge, technical, non-technical skills and scenario management knowledge. The team approach with the prescriptive ADDIE model for The Advanced Trauma Life Support course can be used as an effective training method.

Limitations of the study

The participants' post-training perceptions of competence related to trauma management were not compared with their pre-training perceptions, which can be considered as the limitation of the study.

Ethical approval: The study was approved by Ege University Faculty of Medicine the Clinical Research Ethics Committee (Decision number: 14-11 / 3). After the aim of the study was explained to the participants and trainers, their informed consents were obtained.

Conflicts of interest: *none*

REFERENCES

1. World Health Organization. Injuries and violence the facts. Available at: (http://apps.who.int/iris/bitstream/10665/149798/1/9789241508018_eng.pdf?ua=1&ua=1); 2014 cited 30.06.2016.

2. Turkish Statistical Institute. Ölüm nedeni istatistikleri. Available at: (http://www.tuik.gov.tr/PreHaberBultenleri.do?id=18855); 2014 cited 07.04.2015.

3. NAEMT. PHTLS Prehospital Trauma Life Support In Division 1: PHTLS Past , Present , and Future. (7th ed., pp. 1-14). USA: Jones & Bartlett Learning, 2010.

4. Thies, K., Gwinnutt, C., Driscoll, P., Carneiro, A., Gomes, E., Araújo, R., Cassar, M.R., Davis, M. (2007). The European Trauma Course - from concept to course. Resuscitation, 74 (1), 135–141.

5. Baker, G.R., Norton, P.G. (2006). Adverse events and patient safety in Canadian health care. BC Medical Journal, 48 (7), 326–328.

6. Maurette, P. (2002). To err is human: building

a safer health system. Annales Françaises d'Anesthésie et de Réanimation, 21, 453–4.

7. Briggs, A., Raja, A.S., Joyce, M.F., Yule, S.J., Jiang, W., Lipsitz, S.R. (2015). The Role of Nontechnical Skills in Simulated Trauma Resuscitation. Journal of Surgical Education, (617), 1–8.

8. Capella, J., Smith, S., Philp, A., Putnam, T., Gilbert, C., Fry, W., Harvey, E., Wright, A., Henderson, K., Baker, D., Ranson, S., ReMine, S. (2010). Teamwork Training Improves the Clinical Care of Trauma Patients. Journal of Surgical Education, 67 (6), 439–443.

9. Steinemann, S., Berg, B., Ditullio, A., Skinner, A., Terada, K., Anzelon, K., Ho, H.C. (2012). Assessing teamwork in the trauma bay: Introduction of a modified "nOTECHS" scale for trauma. American Journal of Surgery, 203 (1), 69–75.

10. Turkish Government's Official Gazette. Available at: (http://www.resmigazete.gov.tr/default.aspx#) cited 28.10.2016.

11. Lott, C., Araujo, R., Cassar, M.R., Di Bartolomeo, S., Driscoll, P., Esposito, I et al. (2009). The European Trauma Course (ETC) and the team approach: Past, present and future. Resuscitation, 80 (10), 1192–1196.

12. Davis, M., Cassar, M., Driscoll, P., Gwinnutt, C., Lott, C., Thies, K. (2011). The European Trauma Course: Using experience to refine an educational initiative. Trauma, 13 (2), 101–112.

13. Gwinnutt, C., Driscoll, P., Grünfeld, M., Hüpfl, M., Kuhn, S., Lott, C., Perfetti, P., Thies, K. (2013). European Trauma Course The Team Approach. (3rd ed., pp. 357-381). Belgium: European Trauma Course Organization.

14. Campbell, D.T. Stanley, J.C. (1963). Experımental and Quasi-Experiment al Designs for Research. (pp. 6). USA: Mifflin Company.

15. Fraenkel, J.R., Wallen, N.E. (2006). How to Design and Evalaute Research in Education. (6th ed., pp. 271). NY: McGraw-Hill Companies Inc.

16. Allen, W.C. (2006). Overview and Evolution of the ADDIE Training System. Advances in Developing Human Resources, 8 (4), 430–441.

17. Falcone, R.A., Daugherty, M., Schweer, L., Patterson, M., Brown, R.L., Garcia, V.F. (2008). Multidisciplinary pediatric trauma team training using high-fidelity trauma simulation. Journal of Pediatric Surgery, 43 (6), 1065–1071.

18. Frank, C.B., Wölfl, C.G., Hogan, A., Suda, A.J., Gühring, T., Gliwitzky, B., Münzberg, M. (2014). PHTLS ® (Prehospital Trauma Life Support) provider courses in Germany – who takes part and what do participants think about prehospital trauma care training? Journal of Trauma Management & Outcomes, 8 (1), 7.

19. Jayaraman, S., Sethi, D., Wong, R. (2014). Advanced training in trauma life support for ambulance crews. Cochrane Database of Systematic Reviews, 8, Art. No: CD003109. doi:10.1002/14651858.CD0031.

20. Miller, D., Crandall, C., Washington, C., McLaughlin, S. Improving teamwork and communication in trauma care through in situ simulations. Academic Emergency Medicine, 19 (5), 608–612.

21. O'Reilly, G.M., Fitzgerald, M., Dewan, Y., Chou, K., Mathew, J., Peters, N. (2011). The Alfred Trauma Team Training Program in India and Sri Lanka. Emergency Medicine Australasia, 23 (5), 632–639.

22. Shapiro, M.J., Morey, J.C., Small, S.D., Langford, V., Kaylor, C.J., Jagminas, L., Suner, S., Salisbury, M.L., Simon, R., Jay, G.D. (2004). Simulation based teamwork training for emergency department staff: does it improve clinical team performance when added to an existing didactic teamwork curriculum? Quality & Safety in Health Care, 13 (6), 417–421.

23. Steinemann, S., Berg, B., Skinner, A., Di Tulio, A., Anzelon, K., Terada, K., Oliver, C., Ho, H.C., Speck, C. (2011). In situ, multidisciplinary, simulation-based teamwork training improves early trauma care. Journal of Surgical Education, 68 (6), 472–477.

24. Wisborg, T., Brattebø, G., Brinchmann-Hansen, A., Hansen, K.S. (2009). Mannequin or standardized patient: participants' assessment of two training modalities in trauma team simulation. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, 17, 59.

25. Hamilton, N., Freeman, B.D., Woodhouse, J., Ridley, C., Murray, D., Klingensmith, M.E. (2009). Team Behavior During Trauma Resuscitation: A Simulation-Based Performance Assessment. J Grad Med Educ, 1 (2), 253–259.

26. Peckler, B., Campbell, T., Prewett, M., Brannick, M. (2012). Teamwork in the trauma room evaluation of a multimodal team training program. Journal of Emergencies, Trauma, and Shock, 5 (1), 23.

27. Ziesmann, M.T., Widder, S., Park, J., Kortbeek, J.B., Brindley, P., Hameed, M., Patton-Gay, J.D., Engels, P.T., Hicks, C., Fata, P., Ball, C.G., Gillman, L.M. (2013). S.T.A.R.T.T.: development of a national, multidisciplinary trauma crisis resource management curriculum-results from the pilot course. J Trauma Acute Care Surg, 75 (5), 753–758.

28. Gjeraa, K., MØller, T.P., Østergaard, D. (2014). Efficacy of simulation-based trauma team training of non-technical skills. A systematic review. Acta Anaesthesiologica Scandinavica, 58 (7), 775–787.

29. Roberts, N.K., Williams, R.G., Schwind, C.J., Sutyak, J.A., McDowell, C., Griffen, D., Wall, J., Sanfey, H., Chestnut, H., Meier, A.H., Wohltmann, C., Clark, T.R., Wetter, N. (2014). The impact of brief team communication, leadership and team behavior training on ad hoc team performance in trauma care settings. The American Journal of Surgery, 207 (2), 170–178.

30. Taviloğlu, K., Ertekin, C., Güloğlu, R., Tokyay, R., Akgün, Y. (2001). Trauma and resuscitation course (TRC) evaluation of the first 2 years. Turkish Journal of Trauma & Emergency Surgery, 7 (1), 8–12.

31. Bergman, S., Deckelbaum, D., Lett, R., Haas, B., Demyttenaero, S., Munthali, V., Razek, T. (2008). Assessing the impact of the trauma team training program in Tanzania. The Journal of Trauma, 65 (4), 879–883.