



ORIGINAL ARTICLE

Evaluation of an Advanced Trauma Life Support course in Taiwan



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Summary Purpose: The Advanced Trauma Life Support (ATLS) course was implemented in Taiwan by the Taiwan Surgical Association in 1996. The purpose of this study was to examine whether the ATLS course increases physicians' ability to care for severely injured patients and to identify areas for improvement in running the course.

Methods: We prospectively collected the demographic data of participants for the ATLS provider and refresher courses held in 2012. We analyzed the passing rates (PRs) of the courses stratified by age, sex, types of hospitals, levels of trauma centers, and participant subspecialty. We also compared the students' pre- and post-test responses to multiple-choice questions (MCQs). Statistical significance was set at $p < 0.05$.

Results: A total of 274 and 258 participants attended the provider and refresher courses, respectively. Five hundred (94%) participants were from either medical centers or regional hospitals and 437 also worked at trauma centers. The PR was affected by the age and the levels of the trauma centers in which the participants worked but not by sex or levels of training. More post-test MCQs on initial assessment and airway management topics were answered correctly than were pretest MCQs on the same topics ($p < 0.0001$). By comparison, more responses to shock-management MCQs were answered incorrectly ($p < 0.0001$).

Conclusion: The ATLS course is a critical learning experience for physicians treating trauma patients. Junior house staff and physicians working at local hospitals, particularly those in rural areas, should be encouraged to attend the ATLS course.

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1. Introduction

Trauma, a severe social problem in Taiwan, is a leading cause of death for people aged ≤ 44 years. The impact of trauma on the loss of wages and productivity also severely affects patients' families and society as a whole; however, the care for trauma patients is inadequate compared with many other diseases. Trauma is a complicated surgical disease that requires timely, specialized, and team-approached care. The extent and severity of injuries can frequently challenge even the most capable surgeons. Common causes leading to trauma death that can be prevented are the failure to recognize the severity of an injury or inadequate resuscitation of patients by physicians. Many published papers have shown that trauma patients have optimal clinical outcome if they are cared for in designated centers with a dedicated trauma care team whose members function as an effective unit.¹ Training in the field of trauma surgery determines the effectiveness of these teams. However, many critically injured patients are unable to be transported directly from the accident site to these trauma centers and have to be treated in nearby local hospitals. Owing to the limited hospital resources and inadequate consultant support in these hospitals, severely injured patients create a difficult challenge for emergency room (ER) physicians and hospitals. Physicians must acquire adequate knowledge and skills to treat trauma patients and manage life-threatening injuries without wasting precious time prior to transfer; this can be easily achieved through an organized trauma educational program.

The Advanced Trauma Life Support (ATLS) course was developed by the American College of Surgeons, Committee on Trauma in the 1980s. The ATLS course provides participants with a safe and reliable method for the immediate treatment of injured patients. The scope of the ATLS course includes rapid assessment of a patient's condition, resuscitation, and stabilization in addition to the arrangement of transfer when the patient's needs exceed a facility's resources. Many clinical studies have demonstrated the positive impact of the ATLS course on the outcome of trauma patients in several countries.^{2,3} The Taiwan Surgical Association (TSA) implemented the ATLS course in Taiwan in 1996. Currently, 63 countries are a part of the ATLS international community. Despite the effort of the TSA to promote superior trauma care through the ATLS course, it remains unknown whether this course improves physicians' ability to care for severely injured patients or is responsible for the recent decline in trauma deaths in Taiwan. Therefore, the purpose of this study was to report our experience in conducting the ATLS course in Taiwan and to identify areas for improvement.

2. Materials and methods

2.1. Overview of the ATLS course

The objective of the ATLS course is to allow physicians to acquire attitudes, knowledge, and skills to treat trauma patients effectively. Each ATLS provider course is conducted for 2 days in which 13 topics are covered: initial

assessment and management, airway and ventilatory management, shock, thoracic trauma, abdominal and pelvic trauma, head trauma, spine and spinal cord trauma, musculoskeletal trauma, thermal injuries, pediatric trauma, geriatric trauma, trauma in pregnancy, and transfer to definitive care. The educational design and the teaching format incorporate these topics into interactive lectures, demonstrations, triage scenarios, group discussions, interactive skill stations, simulated patient scenarios, and written and practical evaluation. A participant who attends the entire course and passes the written and practical examinations receives a certificate that is recognized worldwide and valid for 4 years. The certificate can be extended for another 4 years after the student successfully completes a 1-day refresher course. Since the inception of the ATLS in Taiwan, > 4000 physicians have taken the provider course or been recertified every 4 years (Fig. 1). Currently, 2200 physicians hold valid ATLS certificates; among these, 715 have been recertified once or more.

2.2. Study design

We prospectively collected the demographic data of all the participants who enrolled for the provider or refresher ATLS courses in 2012. We calculated the passing rate (PR) of these courses as the ratio of participants who passed the written and practical tests without remediation to the total number of participants. We ensured that each pre- and post-test multiple-choice question (MCQ) accurately represented the course material. The pre- and post-test scores were compared. Correct and incorrect responses to each question were tabulated and collated with the topics covered in the course. Furthermore, a course evaluation form was distributed and collected at the end of each course.

Data are expressed as mean \pm standard deviation. The comparisons between groups were performed using Student *t* tests and Chi square tests for nominal and categorical data, respectively. Statistical significance was set at $p < 0.05$.

3. Results

In 2012, a total of 274 students attended the provider courses and 258 students attended the refresher courses. The demographic data of these participants are presented in Table 1. Most of the participants were men. The age distribution is shown in Fig. 2. The provider course consisted of more participants from regional hospitals, whereas the refresher course had more participants from medical centers ($p < 0.0001$). The provider course had an almost equal number of doctors from Levels I and II trauma centers, whereas the refresher course had a majority of doctors from Level I trauma centers. The provider course had 125 (45.6%) participants who were residents and the refresher course had 17 (12%) residents. More surgeons than ER physicians participated in both types of ATLS courses.

The results of the course evaluation for 2012 are summarized in Table 2. As shown, the course met the participants' personal expectations of the learning objectives of

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