

Introduction and evaluation of the ACS BCon basic course in Zaragoza, Spain

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ABSTRACT**Background** The American College of Surgeons Bleeding Control Basic (BCon) course aimed at teaching hemorrhage control techniques in the USA had not yet been taught in Spain. The purpose of this study is to assess its implementation among students and healthcare employees in the Lozano Blesa University Hospital of Zaragoza, a middle-sized Spanish city.**Methods** The study was conducted in a University Hospital and at the University of Zaragoza, scheduling four free B-Con sessions from 2017 to 2018. Two groups were identified as forming the population: healthcare employees and medical students. An anonymous questionnaire was completed at the end of the course regarding content, applicability, usefulness, relevance, and satisfaction. Study variables were ranked from 0 to 10: poor (when graded from 0 to 3), fair (4 to 6) and good (7 to 10). Results were compared between the groups, expressed in percentages and χ^2 tested to analyze significant differences if any.**Results** Among the 83 individuals who completed the course, 46 were medical students and 37 healthcare employees; 61% women and 39% men; aged 21 years to 52 years. Attendees evaluated satisfaction with the highest grade (84%), followed by usefulness (73%), applicability (70%), and relevance (66%). There was no variable graded as poor. The comparison of perceptions between groups did not reveal statistical differences based on a 0.05 significance level.**Conclusion** We concluded that the B-Con course was valued as good for relevance, usefulness, applicability, and satisfaction by the majority of the studied population.**Level of evidence** Level III.**BACKGROUND**Bleeding is the leading cause of potentially preventable death in trauma victims,¹ and bleeding control techniques are considered essential to improve victims' survival. Tactical Combat Casualty Care has emphasized the need to identify and control extremity hemorrhage by applying tourniquets in extremity wounds. These concepts, born on the battlefield, expanded to the civilian world. After the Sandy Hook Elementary School shooting in 2012, a committee assembled by the American College of Surgeons (ACS) met to discuss how to enhance survivability from mass casualty shootings.^{2,3} The result of these meetings is known as the Hartford Consensus. It outlined actions for first responders after active shooter events, summarized by the THREAT acronym(T-threat suppression, H-hemorrhage control, RE-rapid extrication, and T-transport to definitive care).^{4,5} One of its messages was that no one should die from uncontrolled bleeding.The Hartford Consensus, conceived for mass casualties, soon expanded to all causes of bleeding and set the basis for the *Stop the Bleeding* campaign in 2015.⁶ In an effort to educate the public and professionals about methods for bleeding control, the Committee on Trauma of the ACS founded the Bleedingcontrol.org website and developed the Bleeding Control Basics (B-Con) course.⁷ This course was developed to teach the general public without medical experience⁸ and health professionals, to identify and stop life-threatening bleeding. Today it is a 2-hour session, and consists of a lecture followed by hands-on training, practicing techniques of wound packing and use of the Combat Application Tourniquet. The course started in 2017 as a US domestic program and spread worldwide, but to our knowledge has not yet been introduced in Spain at the time of this study.

The purposes of this study were to implement the Spanish version at the University of Zaragoza among students and hospital healthcare employees, and to assess their perceptions regarding selected variables after course participation.

METHODS**Study design**

In October 2017, the authors assisted a B-Con course in a level 1 Trauma Center at California and the study project presented in Spain. The goals were introduction of the course to a population of college students of the Zaragoza University and healthcare employees of the Lozano Blesa University Hospital of Zaragoza, assessing their perceptions about its applicability, usefulness, relevance, and satisfaction. The study population was formed by fourth-year and fifth-year medical students, as well as physicians and nurses, who applied using an institutional web-page registration form. Each session was limited to a maximum of 25 attendees. The level of response allowed to schedule four different sessions, two per population group, between December 2017 and March 2018. Each session consisted of a lecture and a hands-on training module. After course completion, an anonymous survey was presented to the participants, to assess perceptions about the course.

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**Table 1** Count and percentage of the different variables: relevance, usefulness, applicability, and overall satisfaction for each of the categories studied in the two groups: students and healthcare employees (n=83)

	Relevance	Usefulness	Applicability	Satisfaction
Fair				
Students	14/46 (30.4%)	9/46 (19.5%)	10/46 (21.7%)	4/46 (8.7%)
Healthcare employees	14/37 (37.8%)	9/37 (24.3%)	15/37 (40.5%)	9/37 (24.3%)
Total	28/83 (23%)	18/83 (21.6%)	25/83 (30%)	13/83 (15.6%)
Good				
Students	32/46 (69.5%)	37/46 (80.4%)	36/46 (78.2%)	42/46 (91.3%)
Healthcare employees	23/37 (62.2%)	28/37 (75.6%)	22/37 (59.4%)	28/37 (75.6%)
Total	55/83 (66.2%)	65/83 (78.3%)	58/83 (69.8%)	70/83 (84.3%)
χ^2 of comparison between students vs. employees	p=0.6	p=0.7	p=0.1	p=0.1

Study variables and statistical procedure

Demographical data collected were gender, age, and occupation. Participants' perceptions were surveyed about course content applicability, usefulness, relevance, and satisfaction, graded from 0 to 10 (poor to good scale). Their answers were grouped into three categories, poor (0 to 3), fair (4 to 6), and good (7 to 10). Analyses were performed with SPSS Basic Statistics for Windows. Categorical data were reported as count and percentage. The Pearson's χ^2 test was used to compare within variables per study group and analyze whether there was a difference between them, based on a 0.05 significance level.

RESULTS

A total of 83 individuals attended the course in four sessions from December 2017 to March 2018, with an average of 20 participants per session. The majority in both groups was women (61%) compared with men (39%). Their ages ranged from 21 years to 52 years, with an average of 26 years. University students accounted for 56% of those who participated, and healthcare employees were 44%, identifying themselves as nurses (67.6% out of the 37) or physicians (32.4%) (table 1).

Results of the χ^2 tests between groups comparing each of the variables revealed no statistical differences based on a 0.05 significance level (table 1). The four variables submitted to scrutiny were ranked as good by majority of the participants, satisfaction being ranked the highest. There were no variables ranked as poor by any of the respondents. The students assigned a higher ranking to the four aspects submitted than did the employees, although with a differing ranking.

DISCUSSION

Although there is an effort to instruct US public in hemorrhage control techniques, the same is not true in Spain due to cultural differences and firearm access. The target population in the majority of the hemorrhage control campaigns is the public^{9 10} and few courses are developed in hospitals for healthcare employees.^{11 12} This study intended to bring and evaluate these US publicly accepted teaching practices to Zaragoza. Despite these differences between the USA and Spain, results showed that the studied population valued the content of the course as useful. There seemed to be a higher degree of satisfaction and usefulness by the students, but there was no statistical difference between the groups, due to the reduced population size. Participants were convinced that the technical content and hands-on practice with tourniquets and hemostatic dressings could help them save lives; they suggested

performing longer hands-on workstations and emphasizing on blunt trauma injuries. A significant result to highlight is that none of the course participants valued any of the studied variables as poor; this reflects the high level of interest in this type of training. Similar response to these programs has also been shown in USA.

There were many challenges to this initiative: the study lacked funding for the instructor's accreditation and course equipment. It is possible that this is a result of a low incidence of mass casualty events in Spain that may influence the priority of resource assignment by the healthcare administration. However, recent terrorist attacks in Europe are changing this perception. The European Union Agency for Law Enforcement Cooperation 2018 Terrorism Situation and Trend report mentions 205 foiled, failed, and completed terrorist attacks in 2017 in nine EU member states.¹³ Public awareness is changing due to these events, demanding more knowledge of bleeding control techniques. We think that personal motivation of the health professionals who dedicate time and effort to promote these workshops may contribute to help improve funding by the administration.

The authors acknowledge that there were limitations to this study. First, the study population was small and does not represent all the general public. Second, we have not evaluated the capacity of the population taught to use this knowledge in real life situations.

CONCLUSIONS

The perception of university students and public health employees of Zaragoza, Spain about the B-Con course for teaching the techniques of hemorrhage control, was graded as good for relevance, usefulness and applicability by most the studied population. The overall satisfaction of attendees was the best rated of the studied variables.

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