

Basic Life Support and Defibrillation course in the Medical School: What is the best year of course to train the students?

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GS conceived and designed the study; MDA collected and analyzed the data; GG and LG, GR and NF interpreted the results of the experiments; LG prepared figures; MDA and GS drafted the first version of the manuscript. All authors edited and revised the manuscript. All authors have read and agreed to the published version of the manuscript.

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the study was approved by SIMED research board and consensus and information and consent to the processing of personal data was delivered to the participants.

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Professor Giuseppe Ristango is a member of the ERC, Giuseppe Stirparo and Luca Gambolò are ACLS and BLS instructor

Abstract

BLS (Basic Life Support and Defibrillation) training is essential to improve the chances of survival in cardiac arrest situations. However, in Italy, BLS training in medical school is not standardized, and only some universities offer it. A study at the University of Parma surveyed sixth-year medical students' BLS experience and self-perceived readiness for emergency intervention. Results showed that those who completed BLS training felt more autonomous and confident in handling cardiac arrest, particularly those who had witnessed such an event. Findings suggest introducing BLS training early in medical curricula, with additional training before graduation to enhance professional competence in emergency response.

Keywords: Resuscitation, BLS, Medical Students

Introduction

Basic life support and defibrillation (BLS) training is crucial in increasing the likelihood of return to spontaneous circulation (ROSC) of cardiac arrest (CA) patients.[1-4] In this regard, training of next-generation physicians remains a highly relevant but still debated issue, especially when deciding the best year for medical students to take the BLS course. In fact, not all Italian universities have implemented formal BLS training as part of the

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student curriculum, while no Italian national rules have been established for simulation training.[4,5] For this reason, BLS training experiences during medical school currently remain only local initiatives in some individual universities.

What would be the most correct year during the Medical School for BLS training?

In the project developed by a group of university professors, medical education experts, and the SIMED's Scientific Board, the SIMED NewDoc course [6] was defined. The course defines the practical skills of "Newly Licensed Physicians" (NLPs) physicians within 12 months of licensure. The sixth year of medical school appeared the best time to introduce BLS training. In fact, it is the time when

the student is close to graduation and the start of work as a full-fledged physician, but unfortunately demonstrates little autonomy in the management of emergencies, such as cardiac arrest.[7-8] We conducted a single-centre cross-sectional study to understand the opinion and experience of medical students at the University of Parma regarding the above issue. A questionnaire was distributed on a voluntary basis to all sixth-year medical students. Participants were informed of the research and the aim of the questionnaire and gave their consent. The questionnaire included 8 questions related to theoretical knowledge (in accordance with ERC 2021 guidelines) [9] and 3 questions related to previous experience of cardiac arrest (Figure 1A).

TABLE 1 - Regression model on self-evaluated autonomy

Variable	Stima	SE	Z	OR	p value
Sex	-1.653	0.571	-2.893	0.19	0.004
Age	0.047	0.125	0.380	1.05	0.704
Good theoretical knowledge	0.377	0.617	0.612	1.46	0.540
Have you ever witnessed a cardiac arrest?	1.399	0.628	2.229	4.05	0.026
Have you attended a BLS course?	2.038	0.589	3.460	7.68	<0.001

Results

Ninety-nine students were enrolled, accounting for 43% of all sixth-year students. Fifty-four percent were female and the average age was 25.7+/-2.1 years. Regarding theoretical knowledge, the average score on the questions was 5.8+/-1.4. Sixty-three percent of the students answered at least 6 questions correctly, thus demonstrating sufficient theoretical knowledge of the topic. With regard to the three questions on previous experience, 34% of the students had already attended a BLS course of at least 8 hours; however, only 33% of them felt prepared to intervene in the

event of cardiac arrest and 23% had already witnessed a cardiac arrest. Perceived autonomy in managing a cardiac arrest was higher in students who had taken a BLS course (OR: 8.8, 95% CI 3.4-23.0; p<0.001), and in those who had witnessed a cardiac arrest (OR: 4.6, 95% CI 1.7-12.3; p=0.003). Importantly, of the 23 subjects who had witnessed a cardiac arrest, only 13 (56%) had completed a BLS course. In order to understand the variables that most influence the perceived autonomy of NLPs, a logistic regression was performed on the variables analysed in the questionnaire. The logistic regression model presented in Fig.1B predicted about 31% of the items influencing the students' perceived

autonomy in coping with cardiac arrest (model fit measures: Deviance 88.8, AIC 100.8, R2 0.31).

Discussion and conclusion

Having attended a BLSD course increased perceived autonomy even more than having witnessed a cardiac arrest. Gender seemed to influence perceived autonomy, with males showing greater confidence. However, theoretical knowledge had no impact on perceived autonomy. As for age, the range was too narrow to have an impact. Therefore, correct knowledge, from a theoretical standpoint, in the absence of the development of practical skills, does not enable the student to be ready to intervene in the real-world scenario and students appeared to be aware of this phenomenon. Furthermore, those who have conducted a BLSD course generally also have more theoretical knowledge, and thus there may be a collinearity with those who have developed a BLSD course.

This article presents some limitations, including the lack of information regarding the student's school

of specialisation, if any, or where he or she is doing his or her thesis internship. In addition, it is possible that those who decided to do the course had a greater propensity for emergency courses. Finally, it would be interesting to compare the result with students at other universities where the course is provided.

This result could be relevant to medical training, since, according to traditional curricula, the most relevant part of the training includes only ward-based internship, in which the student observes daily clinical activity. Whereas, according to this preliminary survey, BLSD training with also simulation could have a greater impact on professional self-autonomy. Interestingly, about a quarter of final-year medical students may have already witnessed a cardiac arrest. Therefore, it would be relevant to discuss whether the BLSD training should be included during the early years of the medical students' curriculum, since they may encounter a cardiac arrest during their ward-based internships or in daily lives. Therefore, in our opinion, it will be optimal to implement undergraduate BLSD training projects at the entrance of medical school with a refresher during the final year.

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SUPPLEMENTARY 1 QUESTIONNAIRE

Gender:

Age:

1 - Indicate the incidence of cardiac arrest in Italy

- 2/1000
- 1/1000
- 5/1000
- 1/10000
- 2/10000

2 - Indicate the main cause of cardiac arrest in Italy

- Ischemic heart disease
- Genetic alterations
- Cardiac hypertrophy
- Major trauma
- Intoxication

3 - Indicate the frequency of chest compressions

- 75-95 Compressions/min
- 120-140 Compressions/min
- 100-120 Compressions/min
- 85-105 Compressions/min
- 105-125 Compressions/min

4 - Indicate the compression-to-ventilation ratio for a patient in cardiac arrest

- 30/5
- 15/2
- 30/1
- 15/1
- 30/2

5 - In the absence of personal protective equipment for mouth-to-mouth resuscitation

- Mouth-to-mouth resuscitation can be omitted
- Mouth-to-mouth resuscitation is always mandatory
- The frequency of breaths compared to compressions is reduced
- A handkerchief or a piece of cloth like a shirt sleeve must be used
- The jaw must be subluxated

6 - How deep should chest compressions be?

- At least 5 cm
- More than 4 cm
- Less than 5 cm
- At least 6 cm
- More than 3 cm

7 - To perform ventilations on an adult subject

- The head must be hyperextended
- The head must be moderately extended
- The head should not be extended
- The head should not be extended to prevent cervical fractures
- The jaw must be subluxated

8 - When should the AED be used?

- As soon as possible
- After 2 minutes
- After two compression cycles
- After 10 minutes
- After 1 cycle of compressions

9 - Have you completed a practical BLS course of at least 8 hours? Yes - No

10 - Have you ever witnessed a cardiac arrest? Yes - No

11 - Do you feel ready to intervene in front of a patient who goes into cardiac arrest? Yes - No