

# Basic support teaching for Lay People using Realistic Simulation: Reporting Extensionist activities with High School Students in the Brazilian Amazon

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**Abstract**— *Objective: To report the experience of using realistic simulation as a teaching strategy for Basic Life Support for high school students. Method: I report the experience of extension activities, linked to the extension project “Realistic Simulation in Urgency and Emergency” of Universidade da Amazônia (UNAMA), held from April 5 to June 29, 2019, with middle school students from public and private schools in the metropolitan region of Belém, State of Pará, Brazil. Results: In total, ten educational interventions were carried out, using as a teaching strategy, the realistic simulation of the Basic Life Support maneuvers. 600 students from the 1st to the 3rd year of high school participated in the educational activities. These were taught to perform cardiopulmonary resuscitation maneuvers, with an emphasis on Basic Life Support for lay people according to the assumptions of resuscitation science proposed by the American Heart Association 2015. It was found that the participants expressed satisfaction and interest in the proposed and applied activity and methodology. Conclusion: It is concluded that there was significant interest on the part of the students, and the proposed and applied active methodology is attributed such interest. In view of the results of this experience, it is recommended that activities of this nature should be encouraged more vigorously in the various contexts of society, as it is believed that it is an educational action with significant potential to make individuals capable of providing care at the first level response to Cardiopulmonary Arrest, reduce mortality and preventable sequelae.*

**Keywords**— *Simulation Training. Cardiopulmonary Resuscitation. Training. Education, Primary and Secondary.*

## I. INTRODUCTION

Sudden cardiac arrest is the leading cause of death in Europe, the United States of America and Canada. Estimates show an incidence of Sudden Cardiac Death (SCD) in the United States, between 180.00 to 400.00 cases / year. However, it is considered that accurate data are not yet possible due to the different definitions of MSC used, studies based on retrospective analysis of death certificates or even the absence of a structured system to report cases in some regions (BRAGGION et al. 2015).

In Brazil according to data from the Ministry of Health (MS), diseases of the circulatory system are the main causes of death, and more than 30% of deaths (MARQUES et al. 2015). They are responsible for about 20% of all deaths in individuals over 30 years of age, reaching an

adult population in full productive phase (MANSUR et al. 2012).

Cardiorespiratory arrest (CRP) is characterized by the abrupt interruption of the mechanical function of the myocardium, leading to dysfunction of the other vital organs due to the absence of oxygenation, and the chance of survival depends fundamentally on the identification of the signs of CRP and the early start of care, which can also be initiated by a layman (FERREIRA et al. 2013). The signs of a cardiac arrest are loss of consciousness, apnea or agonized breathing (gaspings, present in 40% of out-of-hospital cardiac arrest) and absence of central pulse (DALLACOSTA et al. 2017).

In this scenario, it is understood that the teaching of Basic Life Support (BLS) for the community is essential, especially for adolescents, who are able to perform

Cardiopulmonary Resuscitation (CPR) maneuvers as effectively as adults, being school's basic education, an ideal laboratory to spread such knowledge (TAVARES et al. 2015).

The BLS consists of a set of steps and maneuvers performed sequentially, which include assessment and immediate intervention in each phase of CPR, identified by the acronym, C - circulation (assessment of signs of circulation and chest compressions), A - opening of pathways airways (assessment and correct positioning of the airways), B - breathing (assessment of respiratory movements and ventilation) and D - early defibrillation. These recommendations are based on the guidelines of the International Alliance of Resuscitation Committees (ILCOR) and the international scientific consensus of the American Heart Association - AHA (SILVA et al. 2015; NOGUEIRA et al. 2017).

The attendance at one (CPR) is always complex, however, the basic CPR maneuvers can be performed by any trained person, and, as long as well performed, may result in the maintenance of the circulation of vital organs until the arrival of a specialized service. In this context, considering the expressive number of CPRs that occur daily, the availability of Automatic External Defibrillators (AEDs) in public places of great circulation of people, the training of lay people is a dynamic strategy with the potential to reduce mortality and preventable sequelae (DALLACOSTA et al. 2017; NOGUEIRA et al. 2017).

Despite significant advances in the care of cardiac arrest victims, there is still considerable variability in survival rates that cannot be attributed exclusively to the patient's momentary clinic. In order to increase the chances of survival, allowing these individuals to receive high quality care, CPR training must use appropriate techniques and strategies, based on scientific knowledge, based on scientific evidence and reach the largest number of people (AMERICAN HEART ASSOCIATION, 2015; NOGUEIRA et al. 2017).

Despite the beneficial effects of CPR, it is already well established in the world scientific community, in every three victims of CPA, only one receives correct care performed by a layperson in the extra-hospital environment. Approximately 200,000 new cases of CPR are estimated in Brazil in a year, with half of the cases occurring in the extra-hospital environment, such as: homes, shopping centers, airports, stadiums, fairs, supermarkets, roads, among other scenarios (FERNANDES et al. 2014; NOGUEIRA et al. 2017).

CPR is characterized by chest compression and aims to maintain myocardial contraction, ensuring artificial

circulation with small but crucial oxygen supply to vital organs. For this prehospital care to be carried out effectively and as early as possible, it is necessary to train individuals not from health, with an interest in learning CPR maneuvers, and apply them above all (FERREIRA et al. 2013; DALLACOSTA et al. 2017; NOGUEIRA et al. 2017).

Resuscitation maneuvers should be performed by laymen only with chest compressions, as they are easy to perform and can simply be guided by a health professional, with knowledge based on emergency science. If the inexperienced rescuer is instructed and able to perform rescue breaths, the recommendation remains to apply 30 compressions for every 2 rescue breaths, and must use the Pocket Mask to protect both the victim and the rescuer (AMERICAN HEART ASSOCIATION, 2015).

For CPR to be of quality and effective, it is necessary to have minimal interruptions of chest compressions, which are performed with frequency and adequate depth to maintain cardiac and vital organ circulation. In adult patients it is recommended to keep the frequency at least 100, not exceeding 120 compressions per minute (GONZALEZ et al. 2013; AMERICAN HEART ASSOCIATION, 2015; NOGUEIRA et al. 2017).

Faced with this scenario, higher education institutions (HEIs) are currently investing and included in their extracurricular activities, learning methods that can add values both for the academic environment and for society; this approach, inserted within the extension activities, which permeate actions that facilitate learning and also corroborate to spread the knowledge, skills and competences to an audience not initially included in the academic environment, allowing direct contact of students with the society in which they will exercise in the future their functions and professional skills acquired within the university, thus allowing the realization of the axis, teaching-service integration and community (DALLACOSTA et al. 2017).

In the meantime, realistic simulation emerges as an active methodology aimed at prior training, in a controlled setting, which can be applied in BLS teaching in a very effective way as already described in several studies, in order to provide an appropriate training environment, both for society in general and for the undergraduate health student, favoring the development of their skills and abilities, adding the scientific knowledge acquired during the academic period, which linked to extension activities, bring together characteristics that allow to cross the walls of the university (BRANDÃO et al. 2014; NOGUEIRA et al. 2017).

In this conception, the study proposes to add relevant aspects of the experience of extension activities, linked to Undergraduate Nursing courses in the Brazilian Amazon, in the training for the realization of the BLS directed to lay people, using realistic simulation as a teaching strategy. Given the above, the study aimed to report the experience in using realistic simulation as a teaching strategy for Basic Life Support for high school students.

## II. METHOD

This is an experience report with a qualitative approach and participatory method, elaborated from actions carried out in extension activities, linked to the extension project "Realistic Simulation in Urgency and Emergency", carried out by Nursing students from the 4th and 8th semester of Universidade da Amazônia (UNAMA).

In total, ten interactive educational interventions were carried out, using realistic simulation about BLS maneuvers, for 600 students from the 1st to the 3rd year of high school from different public and private schools in the metropolitan region of Belém, State of Pará, Brazil. It should be noted that the students were divided into a group of 60 participants per action.

The students were instructed to perform the resuscitation maneuvers according to the assumptions of resuscitation science proposed for the BLS by the American Heart Association 2015.

The educational intervention was carried out through the use of realistic simulation, which is a technique to stage real situations, reproducing a scenario that allows the previous training of the desired practice (ABREU et al. 2014).

High school students from public and private schools in the metropolitan region of Belém, State of Pará, Brazil, aged between 16 and 19 years old, participated in the study from April to June 2019, in a structured environment for the training, with practical scenarios organized within schools.

They were listed as material and methodological resources: media resource, TV, internet, banner, simulator mannequin (Resusci Anne - LAERDAL®) for cardiopulmonary arrest training and AED simulator. The execution and management of all simulation processes were carried out by Nursing students under the supervision and guidance of instructing teachers linked to the extension project.

The action was divided into two moments. The training program followed the recommendations for laypersons published in the American Heart Association Guidelines

2015. The training was carried out in the spaces destined for training, organized in practical stations. It started with a dialogical lecture, bringing basic concepts about PCR and CPR in addition to demonstrating the steps of the BLS for laypeople; this activity lasted 30 minutes.

There was a brief explanation about the links that make up the survival chain with a focus on the BLS in the care of extra-hospital PCR for laypeople, highlighting each stage, through demonstration and simulation on the doll / mannequin for CPR, followed by practical execution, based on which was explained initially.

Then, the instructors simulated the care for the victim of CPA. Then, each student performed the same simulation on the mannequin, under supervision.

So that the instructors / teachers could start the stage of practical activities, first there was an explanation (briefing) of how this step would take place, in order to guide them on how to proceed, that is, that there would be a systematic observation of the care provided by the student and registration by the instructor, but without intervention; that the instructors were only there to observe and offer some material if requested by the student. At this stage, it was reiterated that even if the student realized that he performed an incorrect action, he should follow the care as if he were in a real situation of CPR.

Each student was guided by a clinical case: "Male, 50 years old, obese, with chest pain suggestive of heart attack. Chest / chest discomfort, indigestion and feeling like you are going to faint. He becomes unconscious and falls to the ground! ", With the clinical case triggering the simulated practical activity.

The students were instructed to perform a safe approach on the scene, and to position themselves next to the simulator mannequin, kneeling on the floor, and instructed to follow the procedures listed in accordance with the American Heart Association 2015 protocol, namely: 1) Assess safety of the scenario, 2) Assess the victim's responsiveness, 3) Call SAMU 192, 4) Check breathing and pulse, if absent, initiate chest compressions, in this case by placing the hand (hypotenuse edge / heel of the hand) at the bottom of the sternum bone (in the infra nipple line), simulating the victim's chest, without flexing the arms, at an angle of 90°, at a minimum frequency of 100, not exceeding 120 compressions per minute, at a depth of at least 5cm, not exceeding 6cm, always allowing the full return of the chest after each compression, among other important guidelines in this context.

At the end of each simulated service, the instructor performed the summary of the service individually, a succinct explanation of the critical points, errors and

successes (debriefing) allowing feedback and feedback to the participants, in addition to a group evaluation focused on collective feedback.

### III. RESULTS AND DISCUSSION

Most participants had no prior knowledge about the topic addressed, presenting initial difficulties in performing CPR and BLS stages. After the simulation, it was observed that these students were able to perform the technique correctly, but some still showed difficulties and doubts, which were clarified, commented and exemplified by the instructors, in order to remedy them.

The participants showed interest and curiosity from the beginning, regarding the proposed and applied methodology, due to the ease of possible applicability in the current context, making the didactic learning, meaningful and pleasurable. The observed results showed that ignorance about BLS among lay people is a relevant problem that deserves attention and is easy to solve, as people tend to show an interest in learning everything that becomes didactic and interesting, however there is a lack in the environment scientific and academic in the sense of conducting training aimed at society in general, hindering access to knowledge, which can have a negative impact on the sequelae and mortality rates preventable by out-of-hospital CPR.

The results found in the present study suggest that the realistic simulation methodology is an effective and relevant resource for teaching BLS to adolescents in a school environment, when carried out systematically, with an accessible language, providing an essential practice for breaking "myths" about PCR and CPR (TERASSI et al. 2015).

The ignorance of BLS on the part of lay people is a serious public health problem. A survey carried out in public and private schools in Manaus-AM, Brazil, showed that 8.7% of 665 students surveyed did not know the number of the Mobile Emergency Service (SAMU 192), a worrying fact, because without the activation emergency service and help request, there is a break in the chain of survival and consequently an unfavorable outcome in the individual's survival in PCR (ALVES et al. 2016).

A study carried out with 28 nursing students recommended that BLS training should be applied regularly, quarterly or semi-annually, with the justification that there is a significant decline in knowledge and skills after this period (NOGUEIRA et al. 2017).

In order to address the benefits of technological tools for teaching, SALVADOR et al. (2015), developed a study

based on the principles of andragogy and conceptualized different innovative technologies in the teaching-learning process, highlighting realistic simulation as a resource that offers the diffusion of knowledge through practice, allowing the student to learn without resulting from erroneous behaviors in real patients. On this subject, BARRETO et al. (2014) in an integrative literature review, showed that 76.9% of 26 articles analyzed did not present evidence of disadvantages in the use of realistic simulation.

In view of this, the actions carried out by extension activities, linked to the extension project "Realistic Simulation in Urgency and Emergency" were successful, since the academics were able to pass on the knowledge acquired during graduation to the participants, and they were willing and enthusiastic to pass it on to your friends and family the knowledge acquired about CPR maneuvers.

### IV. CONCLUSION

Considering that half of the PCRs occur in extra-hospital environments and are generally seen by lay people, who are mostly unprepared to perform BLS, where simple attitudes like calling for help requesting emergency services (SAMU 192) in timely, start resuscitation maneuvers with quality chest compressions early and correctly, substantially increase the chances of a better prognosis, we understand that the role of nurses as educators in this context is fundamental, acting actively in the dissemination of knowledge about PCR and CPR.

In this sense, it is envisaged to encourage discussions about successful educational actions that value the practice aimed at lay people, strengthening the chain of survival and response in situations of CPA, through training with effective methodologies on BLS continuously. In the meantime, we strongly recommend that these strategies be carried out in the various contexts and segments of society, using dynamic and problematic resources such as realistic simulation as a methodological teaching strategy.

In this study, we found that the participants showed interest in the theme addressed, given that, it is possible to observe direct and motivated participation in the proposed and applied activities.

As a team, teachers and students, the experience made it possible to strengthen and relate theory and practice based on current scientific knowledge, through active methodological strategies, which provided the improvement of these skills in situations of cardiological emergencies and in teaching, strengthening the Teaching-service axis and community, through extension activities.

We aim to contribute to the development of new studies, which can stimulate reflections about the teaching of BLS for students of basic education and society in general.

Furthermore, cooperate with the statement that the methodological strategy of realistic simulation favors the educational process, being a relevant strategy for the prevention of deaths by PCR and permanent sequelae in an extra-hospital environment.

We conclude that educational actions on BLS aimed at high school students emerge as possibilities for meaningful learning tools, contributing so that individuals can become able to intervene in their determinants of health and diseases effectively, and in this context improve the prognosis and reducing preventable sequelae and deaths from PCR.

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