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THE USE OF REALISTIC SIMULATION AS A BASIC SUPPORT TEACHING STRATEGY FOR HIGH SCHOOL STUDENTS: REPORT ON EXTENSION ACTIVITIES IN THE BRAZILIAN AMAZON

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ABSTRACT

Introduction: Report experience using realistic simulation as a basic life support teaching strategy for high school students. **Method:** Report of an extension activity, linked to the extension project “Realistic Simulation in Urgency and Emergency” of the Universidade da Amazonia (UNAMA), held from April 5 to June 29, 2018, with students from public and middle schools. Belém Metropolitan Region, State of Pará, Brazil. **Results:** In total, five educational interventions were carried out, using as a teaching strategy the realistic simulation of basic life support maneuvers. 500 students from 1st to 3rd year of high school participated in the educational activity. They were taught to perform cardiopulmonary resuscitation maneuvers, with an emphasis on basic life support for lay people under the assumptions of resuscitation science proposed by the American Heart Association, Guideline 2015. Participants expressed satisfaction and interest in the activity and methodology used. All actively participated in the practice stations, with demonstration of the technique on the dummy and Automatic External Defibrillator (AED) simulator, as well as showing interest in clarifying their doubts on the subject in the debriefing stage. **Conclusion:** We conclude that there was interest from the students, and such interest is attributed to the active methodology used. Given this, it is recommended that activities such as this should be encouraged more strongly in the various contexts of society, as it is believed to be an educational action with significant potential to save lives and reduce mortality and avoidable sequelae in cardiac arrest.

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INTRODUCTION

Despite significant advances in the care of victims of cardiac arrest (CA), there is still considerable variability in survival rates that cannot be attributed solely to the momentary clinic.

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In order to increase the survival chances of CPR victims by allowing these individuals to receive high quality care, CPR training should use appropriate evidence-based scientific techniques and reach as many people as possible (AMERICAN HEART ASSOCIATION, 2015; NOGUEIRA et al. 2017). CA is characterized by arrest of mechanical myocardial function, leading to dysfunction of other vital organs due to lack of oxygenation, and the chance of survival depends

fundamentally on the identification of CA signs and early initiation of care, which can also be initiated by layman (FERREIRA *et al.* 2013). Signs of cardiac arrest include loss of consciousness, apnea or agonized breathing, and absence of central pulsation (DALLACOSTA *et al.* 2017). 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, ranging from 180.00 to 400.00 cases / year. However, it is considered that accurate data are not yet possible due to different definitions of MSC used, studies based on retrospective death declaration analysis or even the absence of a structured reporting system 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 leading causes of death, and more than 30% of deaths (MARQUES *et al.* 2015). They account for about 20% of all deaths in individuals over 30 years old, reaching an adult population in full production (MANSUR *et al.* 2012).

Despite the beneficial effect of CPR is already well established in the scientific community, out of every three CA victims, only one receives correct care from a lay person outside the hospital setting. Approximately 200,000 new cases of CA are estimated per year in Brazil, with half of them occurring outside the hospital, such as homes, shopping malls, airports, stadiums, etc (FERNANDES *et al.* 2014; NOGUEIRA *et al.* 2017). In this scenario, it is understood that the teaching of Basic Life Support (BLS) to the community is paramount, especially for adolescents, who are able to perform CPR maneuvers as effectively as adult individuals, and schools are an ideal laboratory for spread knowledge about this kind of scientific praxis (TAVARES *et al.* 2015). The BLS consists of a set of sequentially executed steps and maneuvers, which include immediate assessment and intervention in each phase of CPR, identified by the acronym, C - circulation (evaluation of circulation signals and chest compressions), A - opening of airways (assessment and correct positioning of the airways), B - breath (assessment of respiratory movements and performance of ventilations) and D - early defibrillation. These recommendations are defined in the guidelines of the International Liaison Committee on Resuscitation - ILCOR and AHA's international scientific consensus (SILVA *et al.* 2015; NOGUEIRA *et al.* 2017). Care in a CPR is always complex. However, basic CPR maneuvers can be performed by anyone, and, if well performed, result in the maintenance of vital organs circulation until the arrival of specialized care. Considering the significant number of CA occurring daily, the availability of Automated External Defibrillators (AEDs) in crowded public places and lay training is a dynamic strategy with the potential to save lives and reduce avoidable sequelae (DALLACOSTA *et al.* 2017; NOGUEIRA *et al.* 2017).

Cardiorespiratory resuscitation is characterized by thoracic compression and its purpose is to maintain myocardial contraction, ensuring artificial circulation with a small but crucial oxygen supply to vital organs. In order for this prehospital care to be performed effectively and as early as possible, it is necessary to train non-health individuals with an interest in learning CPR maneuvers (FERREIRA *et al.* 2013; DALLACOSTA *et al.* 2017; NOGUEIRA *et al.* 2017). Higher education institutions are currently include in their extracurricular activities, learning methods that can add benefits to both academia and society, an approach, inserted

within extension activities, which permeate actions that facilitate learning and also corroborate. To disseminate knowledge to an audience not included in the academic environment, enabling direct contact of the student with society, in which they will exercise their professional functions and skills acquired within the future (DALLACOSTA *et al.* 2017). Realistic simulation represents an active methodology directed to previous training, which can be applied in the teaching of BLS, in order to provide an appropriate academic setting for both society and the undergraduate student, favoring the development of their skills. Competences and skills with scientific knowledge acquired during the academic period that cross the university walls, when linked to extension activities (BRANDÃO *et al.* 2014; NOGUEIRA *et al.* 2017). Resuscitation maneuvers should be performed by laymen with chest compressions only, as they are easy to perform and can simply be directed by an emergency professional. 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 use the barrier mask to protect both the victim and rescuer (AMERICAN HEART ASSOCIATION, 2015). For CPR to be quality and effective, interruptions in chest compressions must be minimal and performed at a frequency and depth appropriate to maintain cardiac and vital organ circulation. In adult patients it is recommended to maintain the frequency of 100 to 120 compressions per minute (GONZALEZ *et al.* 2013; AMERICAN HEART ASSOCIATION, 2015; 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 BLS directed to lay people, using realistic simulation as a teaching tool. Given the above, this study aimed to report the experience of using realistic simulation as a basic life support teaching strategy for high school students.

MATERIALS AND METHODS

Experience report with qualitative approach and participatory method, elaborated from actions carried out in the activities of extensionists, linked to the extension project "Realistic Simulation in Urgency and Emergency", carried out by Nursing students from the 7th and 8th period of the Universidade da Amazônia (UNAMA). In total, five interactive educational interventions, through realistic simulation of BLS maneuvers, were carried out for 500 students from 1st to 3rd grade of different public and private schools in the metropolitan region of Belém, State of Pará, Brazil. Students were instructed to perform resuscitation maneuvers according to the resuscitation science assumptions proposed for the BLS by the American Heart Association, 2015. The educational intervention was performed through the use of realistic simulation, which is a technique for staging real situations, reproducing a scenario that enables the prior 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, aged 16-19 years, from April to June 2018, participated in the study, in a structured environment for in-house training, from the university itself. The support materials used were: media resource, TV, internet, banner, dummy simulator (*Resusci Anne - LAERDAL*®), for cardiopulmonary arrest training and AED simulator. The execution and management of the whole simulation process was performed by nursing students with the supervision and guidance of instructor teachers linked to the

extension project. The action was divided into two moments. The training program followed the layman's recommendations published in the American Heart Association Guidelines (2015). The training was conducted in the classroom, started with a dialogued lecture bringing basic concepts about CA and CPR. This activity lasted 20 minutes.

There was a brief explanation of the links of the BLS-focused survival chain in providing outpatient outpatient CA care, highlighting each step through demonstration and simulation on the CPR doll, followed by the practical implementation of what was explained. Then, the instructor assisted the victim to the CA victim. So, each student did the same simulation on the dummy under supervision. In order for the instructors / professors to start the practical activities stage, there was first a briefing of how this stage would take place, in order to guide them on how to proceed, that is, a systematic observation of the care provided by student and record by the researcher but without intervention, 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 CA situation. Each student was directed by a clinical case: "Male, 45 years old, obese, with chest pain suggestive of heart attack. Chest discomfort, indigestion and fainting pain. He becomes unconscious and falls to the ground! Being the clinical case the trigger of the simulated practical activity. Students were instructed to perform the safe approach to the scene, and to position themselves next to the simulated mannequin, kneeling on the floor, and instructed to follow the conducts listed under the American Heart Association 2015 protocol: 1- Assess the safety of the scenario, 2- assess the responsiveness of the victim, 3- call the emergency, 4- initiate chest compression, in this case placing the hand (hypotenary edge / heel of the hand) on the bottom of the sternum (in the infra-nipple line), simulating the thorax without flexing the arms, at an angle of 90°, at a frequency of at least 100, not exceeding 120 compressions per minute, at a depth of 5 to 6 cm, always allowing the chest to return after each compression", among other guidelines, of importance in this context. At the end of each simulated attendance, the instructor individually summarized the attendance, a brief explanation of the critical points, errors and debriefing allowing participants feedback, as well as a group assessment focusing on collective feedback.

RESULTS AND DISCUSSION

Most participants were unaware of the theme, presenting difficulties in performing CPR. 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. Participants showed interest and curiosity from the outset regarding the methodology used, due to the ease of applicability in the current context, making learning didactic and enjoyable. The action demonstrated that the lack of knowledge about BLS among lay people is a relevant problem that deserves attention and is easy to solve, because people tend to show interest in learning everything that becomes didactic and interesting, but there is a lack in the scientific environment and academic in the sense of conducting training aimed at society, hindering access to knowledge, which can significantly impact the rates of sequelae and mortality from out-of-hospital CA. 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 performed through an accessible language, providing an essential practice for breaking myths about CPR (TERASSI *et al.* 2015). Lack of knowledge about BLS by lay people is a serious public health problem. A survey conducted in public and private schools in Manaus-AM, Brazil, showed that 8.7% of 665 students did not know the number of the Mobile Emergency Care Service, a worrying fact, because without the emergency service and as a request for help, there is a break in the survival current and consequently an unfavorable outcome in the survival of the individual in CA (ALVES *et al.* 2016). A study of 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 dissemination of knowledge through practice, allowing the student to learn without misconduct in Real patients. On this subject, BARRETO *et al.* (2014) in an integrative literature review, showed that 76.9% of 26 articles analyzed showed no evidence of disadvantages in the use of realistic simulation. In view of this, the actions carried out by the extension activity, linked to the extension project "Realistic Simulation in Urgency and Emergency", were successful, since the students were able to pass on the knowledge acquired during the graduation to the participants, and they showed willingness and enthusiasm for them to pass on to your friends and family the knowledge gained about CPR maneuvers.

CONCLUSION

Considering that half of the CAs occur in out-of-hospital settings and are usually witnessed by lay people, most of whom are unprepared to perform the BLS, where simple attitudes such as calling for help requesting emergency services in a timely manner, start Resuscitation maneuvers with early and correct quality chest compressions substantially increase the chances of a better prognosis. Comprehendemos ser fundamental a atuação do enfermeiro como educador nesse contexto, atuando de maneira ativa na difusão de conhecimentos sobre CA e CPR. Thus, it is envisaged to foster discussions about successful educational actions that value the practice aimed at lay people, strengthening the survival and response chain in CA situations, 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 problematizing resources such as realistic simulation as a methodological teaching strategy. From this perspective, we conclude that educational actions on BLS aimed at high school students emerge as possibilities for meaningful learning tools, helping individuals to be able to effectively intervene in their health and disease determinants, and in this context, improve prognosis and decrease sequelae and avoidable CA deaths. We found in this study that the participants showed interest in the theme addressed, since they can observe the direct and motivated participation in the application 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 cardiological emergencies and teaching. We aim to contribute to the development of new studies, which may stimulate reflections on the teaching of BLS to students of basic education and society in general. Moreover, to cooperate with the statement that the methodological strategy of realistic simulation favors the educational process, being a relevant strategy for the prevention of death by CA and permanent sequelae in an out-of-hospital setting.

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