https://dx.doi.org/10.22161/ijaers.75.17 *ISSN: 2349-6495(P) | 2456-1908(O)*

Basic life support training methods in nursing education: An integrative literature review

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https://dx.doi.org/10.22161/ijaers.75.17 *ISSN: 2349-6495(P) | 2456-1908(O)*

Abstract*— *Objective: to analyze the evidence available in the literature on the Basic Life Support training methods in nursing education. Method: it is an integrative literature review. The search was carried out in the PUBMED, LILACS and BDENF databases. 69 articles were initially selected for full reading from the inclusion criteria, considering the time frame from 2010 to 2016, of which nine full texts were listed for in-depth reading and synthesis. Results: there were few publications on the topic as well as a multiplicity and heterogeneity of methods and strategies for the training of Basic Life Support in the training of nurses. Large gaps in knowledge were observed, making it necessary to develop research in this field, especially studies that focus on practical theoretical teaching strategies with the use of simulation in view that these are capable of bringing real impacts on the knowledge and skills of professionals. Conclusion: teaching aimed at the individuality and reality of the target audience, taking into account the epidemiological reality and characteristics of the students is fundamental in this process. Despite the variety of information resulting from the studies, multiplicity and heterogeneity in the approaches and forms of evaluation, we conclude that practical theoretical teaching strategies with the use of simulation, use of dummies and feedback emerge as more effective strategies, capable of promoting learning more effectively other available resources.

Keywords*— *Teaching. Simulation Training. Cardiopulmonary Resuscitation. Education, Nursing, Baccalaureate.

I. INTRODUCTION

Basic Life Support (BLS) consists of a set of steps and maneuvers performed sequentially, which include assessment and immediate intervention in each phase of Cardiopulmonary Resuscitation (CPR)[1]. Cardiorespiratory arrest (CRP) can be defined as the abrupt cessation of cardiac mechanical activity confirmed by unconsciousness, absence of central pulse and apnea or agonized breathing (gasping)[2]. Cardiopulmonary resuscitation is the set of maneuvers performed after a CRP with the aim of artificially maintaining arterial flow to the brain and other vital organs until spontaneous circulation returns[3].

Cardiorespiratory arrest remains a major public health problem, gaining worldwide dimension, despite advances in recent years related to its prevention and treatment[4]. Although the potential beneficial effect of cardiopulmonary resuscitation is well established in the global scientific community, less than one in three victims of out-of-hospital cardiopulmonary arrest, and witnessed, receives rescue assistance from a spectator. Approximately 200,000 cases of CRP are estimated per year in Brazil, half of which occur in hospitals, and the other half in out-of-hospital settings[5].

A qualitative outcome of CPR depends on a logical sequence of procedures that can be summarized in the concept of survival current; mnemonic composed of links that reflect fundamental actions to be developed, whose impacts on survival are significant[6]. The chain of survival emphasizes the need for rapid response through surveillance and prevention, early recognition of cardiorespiratory arrest and emergency services, high-quality and immediate CPR, early defibrillation, advanced immediate life support and post-cardiorespiratory care[7,8].

Cardiorespiratory arrest until recently was synonymous with death, since no more than 2% of individuals survived this dramatic event. Today, the survival rate reaches more than 70% if care is early and effective and is directly related to the time between the incident and the beginning of resuscitation, and the technical effectiveness of CPR maneuvers[9].

Care for cardiorespiratory arrest must be performed quickly, firmly, safely and calmly, in order to avoid panic and mismatch among professionals. However, what is observed is that, in most cases, resuscitation efforts are disruptive, with non-systematic actions that lead to overlapping tasks, culminating in repetitive acts that lead to a loss of crucial time for survival[10].

Nursing professionals are usually the first to respond to a CRP and initiate BLS maneuvers, while waiting for the advanced support team. The immediate, competent and safe application of CPR maneuvers by the team that first intervenes are factors that contribute to the success of the service[11]. It is described that health professionals and undergraduates do not have satisfactory scientific knowledge, both theoretical and practical, in CRP/CPR. This knowledge deficit is a consequence of academic training, in which approaches to the topic, when they exist, are punctual and superficial, therefore, insufficient to provide the acquisition of solid knowledge necessary for performance in the face of cardiopulmonary arrest([12,13]).

It is considered relevant to early exposure of nursing students to basic support training of life; confirming that

https://dx.doi.org/10.22161/ijaers.75.17 *ISSN: 2349-6495(P) | 2456-1908(O)*

these skills should be promoted right at the beginning of the course and reinforced in the following years[14]. Training should insert students in realistic contexts, which allows for the acquisition of solid knowledge and skills[15]. Several nursing schools include in their curricula content with learning objectives aimed at the BLS. However, most nurses do not feel effectively trained to work in front of a person in cardiorespiratory arrest[16].

One of the objectives of the training is proficiency in BLS, however, there is a great diversity in the form and content focused on the theme, between the different schools, so that the training offered does not meet the criteria described in the resuscitation science consensus[17]. Given the above, the objective of this research was to analyze the evidence available in the literature about the Basic Life Support training methods in nursing education.

II. METHOD

It is an integrative literature review, a study that offers quick access to relevant research results and evidence that underlie the conduct or decision making, providing critical knowledge. The following steps were carried out: establishment of the research question, literature review, categorization of studies, evaluation of studies and interpretation of results and synthesis of knowledge [18].

The research question was constructed using the PICO strategy, which guides the construction of the research question and the bibliographic search and allows the researcher, when having a question or question, to locate the best available scientific information accurately and quickly[19] (Table 1). After using the PICO strategy, the questions consisted of: in nursing education, do teaching strategies provide subsidies for retaining knowledge and acquiring BLS skills and competencies in accordance with the recommendations of the guidelines of resuscitation science? What are scientific evidences available in the literature about Basic Life Support training methods in nursing education?

Table 1: Construction of the guiding question through the PICO strategy.

P (Patient or problem)	Training methods for undergraduate nursing students
I (Intervention)	Basic Life Support training methods and strategies
C (Control or comparison)	Identification of articles that contain information about the training methods that demonstrate the best results in BLS training, following the recommendations of the guidelines
O (Outcomes)	Obtaining the best evidence about learning methods and strategies capable of enabling the acquisition and retention of knowledge and skills to perform BLS according to current international scientific recommendations

Source: own author, adaptation[19]

The search for publications was carried out in June 2019, in the following databases: PUBMED, LILACS and BDENF. For the search, the following Boolean descriptors and operators were used: PubMed - (education OR teaching OR knowledge AND retention AND Technological Development) Nursing Education, Baccalaureate AND heart arrest OR cardiopulmonary resuscitation; LILACS and BDENF - education AND basic life support AND baccalaureate in nursing, making it possible to locate 69 articles (38-PubMed, 13-LILACS and 18-BDENF).

The inclusion criteria were: articles in Portuguese and English, published between 2010 and 2016, that addressed the teaching of BLS for undergraduate nursing students, aimed at adults, children and neonates, and full articles in the free version. The exclusion criteria were: articles that addressed BLS teaching for care nurses, other categories of health professionals and lay people in isolation, and articles where only abstracts were available, theses, dissertations, monographs, course completion papers, annals events, editorial letters. An instrument validated by Ursi[20] was defined to systematize the articles selected in the search. The analysis of the selected studies was carried out in a descriptive way, making it possible to observe, count, describe, classify and synthesize the data, in order to gather the knowledge produced on the topic. The productions were grouped into two thematic pillars which will be presented and discussed below.

III. RESULTS

Of the articles that constituted this integrative literature review, four aimed at analyzing, evaluating, verifying and investigating knowledge (theory) and skill performance (practice) in cardiopulmonary resuscitation maneuvers using the AED (BLS); two studies sought to develop and evaluate a Virtual Learning Environment aimed at nursing education; one analyzed the knowledge of undergraduate health sciences students in objective tests; and two to compare the impact of CPR training

https://dx.doi.org/10.22161/ijaers.75.17 *ISSN: 2349-6495(P) | 2456-1908(O)*

programs in quasi-experimental studies using a before-and-after teaching-learning strategy. Regarding the year of publication, there were three articles (33.33%) in 2010, three (33.33%) in 2013 and three (33.33%) in 2015. The countries that produced the most studies on the theme it was Brazil with 77.77%, the other 22.22% India and Northern Cyprus.

All articles are original, found in the following databases: four articles in LILACS, four in PubMed and one in BDENF, published in seven different journals, with the Revista da Escola de Enfermagem da USP being the most published on this theme, with 33.33% of publications. Two articles of applied research on technological development were found (22.22%), two cross-sectional studies (22.22%), two descriptive, exploratory studies with a quantitative approach (22.22%), a quasi-experimental, longitudinal study (11, 11%) and two experimental, prospective studies (22.22%) (Table 2).

Table 2: Synthesis of articles according to author, title, periodic, year, methodological procedure and research findings

Author. Title. Periodic. Year	Data Base	Methodological Procedure	Research Findings
Gonçalves GR, Peres HHC, Rodrigues RC, Tronchin DMR, Pereira IM. Proposta educacional virtual Sobre atendimento da ressuscitação cardiopulmonar no recém-nascido. Rev Esc Enferm USP. 2010[21]	BDENF	Applied research, technological development	Research carried out with undergraduate nursing students. Development of an interactive virtual educational proposal on care for cardiopulmonary resuscitation in newborns. The group work, the quality of the didactic material, the choice of the teaching support platform and the methodology adopted were the determining points for the success of the project.
Boaventura AP, Miyadahira AMK, Sugisawa AHR, Gonçalves AAP, Nunes TR. Suporte básico de vida para os alunos do curso de graduação em enfermagem. J Health Sci Inst. 2010[10]	LILACS	Exploratory, descriptive research	Research carried out with 52 undergraduate nursing students (3rd and 4th year), using a form with questions about BLS and use of AED. The general average obtained by the students was less than 85%. Insufficient knowledge on BLS using AED identified in this study.
Chandrasekaran S, Kumar S, Bhat SA, Saravanakumar, Shabbir PM, Chandrasekaran V. Awareness of basic life support among medical, dental, nursing students and doctors. Indian Journal of Anaesthesia. 2010[22]	PUBMED	Transversal study	Research carried out with 1,054 participants in the health area. None of the participants had complete knowledge about BLS. Only two participants (0.19%) reached 80-89% of correct answers. The awareness of Basic Life Support among medical, dental and nursing students is insufficient and needs to be improved.
Rodrigues RCV, Peres HHC. Desenvolvimento de Ambiente Virtual de Aprendizagem em Enfermagem sobre ressuscitação cardiorrespiratória em neonatologia. RevEscEnferm USP. 2013[23]	LILACS	Applied research, technological development	Research carried out with 3 undergraduate nursing students, 2 computer specialists; 1 specialist physician in Neonatology; 3 nurses. The Virtual Learning Environment was perceived as predominantly excellent. The application of virtual learning environments in a coherent, responsible and consistent way to assist traditional teaching has been proving to be an efficient way of building knowledge.
Dal U, Sarpkaya D. Knowledge and psychomotor skills of nursing students in North Cyprus in the área of cardiopulmonary resuscitation. Pak J MedSci. 2013[24]	PUBMED	Quasi-experimental, longitudinal study	Research carried out with 83 students of the third year of the undergraduate nursing course. 90.4% of the participants had not received any CPR training before the study. Theoretical information and CPR in practice had a positive impact on the level of knowledge and

https://dx.doi.org/10.22161/ijaers.75.17 *ISSN: 2349-6495(P) | 2456-1908(O)*

			practical skills of the participants in the following month. However, there was a significant decrease in the level of information and correct practical application of CPR six months after the training.
Sankar J, Vijayakanthi N, Sankar MJ, Dubey N. Knowledge and Skill Retention of In-Service versusPreservice Nursing Professionals following an InformalTraining Program in Pediatric Cardiopulmonary Resuscitation:A Repeated-MeasuresQuasiexperimental Study. BioMed Research International. 2013[25]	PUB MED	Experimental, prospective study	Research carried out with 28 nursing assistants from the intensive care unit and urgency, and 46 nursing students. The training improved nurses' general pediatric CPR competence, but they were unable to maintain competence, even for a short period. In contrast, nursing students due to self-motivation and willingness to learn maintained the skills learned during the training session better than the nurses in care.
Kawakame PMG, Miyadahira AMK. Avaliação do processo ensino-aprendizagem de estudantes da área da saúde: manobras de ressuscitação cardiopulmonar. RevEscEnferm USP. 2015[14]	PUB MED	Experimental, prospective study	Research carried out with 84 undergraduate students in the health area. After the lecture strategy with practice demonstration and simulated practical training. It made it possible to infer that both knowledge (theory) and skill (practice) are essential in the construction of the teaching-learning process.
Tavares LB, Bezerra IP, Oliveira FR, Sousa LA, Raimundo RD, Sousa ED, et al. Conhecimento de estudantes de graduação em ciências da Saúde em testes objetivos sobre suporte básico de vida, JournalofHumanGrowthandDevelopment. 2015[15]	LILACS	Observational, descriptive and cross-sectional study	Research carried out with 664 undergraduate students from the courses of medicine, nursing, physiotherapy, pharmacy, nutrition and occupational therapy from seven higher education institutions in São Paulo. Only one participant achieved a score equal to or greater than 84%. The results implied that efforts must be made so that the actions related to the BLS are introduced in the curricula from the first year of graduation and during subsequent years..
Silva DV, Jesus AS, Lima AA, Santos MA, Alves SL. Conhecimento de graduandos em Enfermagem sobre suporte básico de vida. Revista Baiana de Enfermagem. 2015[1]	LILACS	Descriptive, exploratory study, quantitative approach	Research conducted with 32 undergraduate nursing students. Theoretical knowledge about BLS among undergraduate nursing students was unsatisfactory for the care of victims of cardiorespiratory arrest, showing that, although the topic is discussed at graduation, it has not been sufficient to build solid knowledge.

IV. DISCUSSION

Academic education the fundamental foundation and the impact of CPR training programs on the training of nurses

The training of nursing professionals has undergone major changes throughout history, being influenced by the representation that this profession had in society over time. In 2001, however, a great advance was achieved when, through Resolution CNE / CES nº 3, of November 7, 2001, the National Curriculum Guidelines for the Undergraduate Nursing Course were instituted. In summary, the pedagogical principles elucidated by the national nursing curriculum guidelines are: the pedagogy of competences, the principle of learning to learn, generalist, humanistic, critical, ethical and reflective training; and training centered on the student and the teacher as a facilitator[26].

We are convinced that, in the current context, there is a demand for increasingly reflective, critical and opinion-forming professionals. Thus, the need for new teaching-learning practices emerges, with the use of didactic and technological resources, encouraging and favoring the improvement and training of nurses, as well as enabling

https://dx.doi.org/10.22161/ijaers.75.17 *ISSN: 2349-6495(P) | 2456-1908(O)*

autonomous learning[27]. In this understanding, what is sought is the training of a health professional from the perspective of complexity and holism, who acts in a multidisciplinary way, meeting the needs of the current health system[28].

Much of the success of CPR is due to the nurses' ability to perform qualitative care in this context. Thus, nurses need to know how to act efficiently in the face of these occurrences[1].

A survey carried out with 664 undergraduate students[15] from the courses of medicine, nursing, physiotherapy, pharmacy, nutrition and occupational therapy from seven Higher Education Institutions in São Paulo, found that only one participant reached a score equal to or greater than 84% and the others fell short of this AHA indicator. These results suggest that efforts should be made so that the actions related to the BLS are introduced in the curricula from the first year of graduation and strengthened during the subsequent years, so that knowledge and skills are improved and, in turn, are implemented effectively during professional practice.

A study carried out with 84 students[14] of the undergraduate health course showed that only the theoretical class with demonstration of the practice was not sufficient for the development of the psychomotor skills employed in CPR, and practical training is extremely necessary for the success rate to reach 90%. Simulation strategies are more realistic and meaningful learning, as they allow students to get in touch with practice. Both knowledge (theory) and skill (practice) are essential in the construction of the teaching-learning process. Both complement and become inseparable in the design of the final product, highlighting the importance of theoretical classes associated with practical classes.

Still on this subject, a study conducted with 32 undergraduate nursing students (1), 4 from the last semester and 28 from the penultimate, found a lack of knowledge; since only 25% of the students reached the percentage of correct answers in the BLS questionnaire equal to or greater than 75%, considered in this research as satisfactory. It concluded that the theoretical knowledge about BLS among nursing students was unsatisfactory for the care of victims of cardiorespiratory arrest, showing that, although the theme is discussed at graduation, it has not been sufficient to build solid knowledge.

The academic training of nurses demands the need for theoretical-conceptual and methodological training that enhances competencies for comprehensiveness. Thus, among the essential competencies for the practice of nursing in the emergency, clinical reasoning for decision making and the ability to execute interventions promptly stand out[28]. The American Heart Association (AHA), assuming that teaching is a planned experience that facilitates learning, states that it is essential to target teaching to the appropriate audience and that a training program represents an ideal opportunity to reach a large number of individuals with knowledge in CPR maneuvers and other BLS interventions[8].

Educational interventions should be evaluated to ensure that they achieve learning goals reliably. The objective is to ensure that students acquire and retain the skills and knowledge that will enable them to act correctly in the face of real CRP's and improve results with regard to neurologically intact survival[29].

Currently we are experiencing the advent of technological innovations, we can emphasize that human beings are immersed in an information society characterized by the development of information and communication technologies (30). The adoption of new information technologies in education has brought significant changes to the traditional educational paradigm, promoting new ways of teaching and learning, inducing new behaviors in teachers and students and new ways of thinking and producing knowledge[23].

Competencies and skills essential to the training of nurses about cardiopulmonary resuscitation maneuvers using the AED (BLS)

The nursing professional is competent in face of a person who has suffered a cardiorespiratory arrest, supported by the Nursing Professional Exercise Law No. 7,498 / 86, which establishes as a private activity of the nurse the direct assistance to the critical patient and the execution of more complex activities and that require knowledge of a scientific basis and the ability to make an immediate decision[31].

According to AHA[8], qualified individuals who obtain 84% or more of use in a standard structured questionnaire used for training evaluation are considered qualified. Concerningly, in a survey conducted in the State of São Paulo, Brazil[15] through the application of 664 questionnaires on BLS, answered by students of higher education courses in the health area, similar to the one used by AHA in the BLS course, only one reached grade equal to or greater than 84%.

With regard to the care of victims of sudden cardiorespiratory arrest, little or incorrect knowledge about BLS can compromise the care provided[15]. In a similar study on the knowledge of undergraduate nursing students[10], after the application of a form containing 40 objective questions, a high percentage of incorrect answers

https://dx.doi.org/10.22161/ijaers.75.17 ISSN: 2349-6495(P) | 2456-1908(O)

was evidenced regarding the use of the AED, in which 80% of the answers were unsatisfactory for simple questions such as the positioning of the device's blades[1]. Thus, attention is drawn in this study to the knowledge deficit, especially among nursing professionals, taking into account that the findings showed that the percentage of correct answers was below the expected, according to the correct index established for the BLS course of the AHA.

Nursing students have been the subject of discussions and research that have demonstrated their knowledge about CPR maneuvers. A study carried out with nursing students from the 8th period[13] found that few students had enough knowledge to work in PCR. This lack of knowledge, among other reasons, may be linked to academic training, which leads to reflect on the teaching-learning process related to the approach of this content in undergraduate courses.

In a research carried out at a private University of Porto (Portugal) with 149 students from the 1st, 2nd, 3rd and 4th years of nursing, it was shown that they had sufficient theoretical knowledge about BLS in adults, since most of them obtained correct answers above 70% in all series. However, it is important to note that this is the reality of a developed country[1].

Successful experiences, in studies before and after, however, demonstrate that the knowledge and skills of nurses and nursing students seem to improve following CPR training. However, in six weeks, knowledge and skills begin to decline, although they remain significantly higher than the initial one. Training programs improve CPR competence, but individuals are unable to maintain the same competence, even for a short period[25].

A study with 83 students in the third year of the undergraduate nursing course, in which 90.4% of the participants had not received any CPR training before the study, concluded that theoretical information and practiced CPR had a positive impact on the level of knowledge and skills nurses' practices in the following month[24]. However, there was a significant decrease in the level of information and correct preservation of practical application six months after training. In this understanding, it is described that BLS knowledge and skills deteriorate in less than three to six months. The use of frequent assessments will identify individuals who need refresher courses[29].

Education in basic life support aims to fill the gaps between real and desired performance, and should enable the acquisition of knowledge and skills of self-efficacy to BLS providers, improving their ability to recognize and respond to patients at risk. cardiac arrest; improving resuscitation performance; and ensuring the activities of continuous quality improvement, based on the understanding that ensuring that victims of cardiorespiratory arrest receive care consistent with the current state of scientific knowledge presents itself as a great potential to save thousands of lives[32].

V. CONCLUSION

The study enabled the construction of a synthesis of the scientific knowledge produced about the BLS training methods in nursing education. The results showed great gaps in the knowledge of health professionals, making it necessary to develop research in this field, especially studies that focus on theoretical-practical teaching strategies, using simulation, considering that they are capable of bringing impacts real and significant in the knowledge and skills of professionals.

After the analysis, it was possible to conclude that the nurse is an essential and trained professional to diagnose and attend a cardiorespiratory arrest. The topic addressed in this study is not exhaustive, always deserving updates and scientific productions, in order to be updating and showing the importance of nursing care in the face of cardiopulmonary arrest, and it is essential that nurses are in constant technical and scientific improvements.

There were few publications on the topic, as well as a multiplicity of methods and strategies in teaching BLS. From this perspective, it can be concluded that teaching aimed at the individuality and reality of the target audience, taking into account the epidemiological reality and characteristics of the students, is fundamental in this process. Despite the variety of information resulting from the studies, multiplicity and heterogeneity in the approaches and forms of evaluation, we conclude that practical theoretical teaching strategies with the use of simulation, use of dummies and feedback emerge as more effective strategies, capable of promoting learning more effectively. other available resources.

In this way, we hope to contribute to the development of new studies, which can foster reflections on the teaching of BLS in nursing education, and above all, cooperate with the affirmation of the educational process as the north of professional qualification, therefore, for the improvement of the health work process.

Furthermore, we seek to apprehend the aspects that must permeate the academic education of nurses and, with this, contribute to the elucidation of teaching strategies that facilitate the teaching-learning process, so that through training based on problematizing educational practices, which promote solid knowledge, the nurse can develop the

https://dx.doi.org/10.22161/ijaers.75.17 *ISSN: 2349-6495(P) | 2456-1908(O)*

essential skills and abilities for a qualitative performance in the face of cardiorespiratory arrest.

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