RESEARCH ARTICLE

TEACHING OF BASIC LIFE SUPPORT IN UNDERGRADUATE NURSING: AN INTEGRATIVE REVIEW

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ARTICLE INFO	ABSTRACT
	Objective: To analyze in the literature the available evidence about the teaching of Basic Life Support in undergraduate nursing. **Methods:** An integrative review of the literature. The search was performed in PUBMED, LILACS and BDENF databases. Nine complete articles were found, they were published between 2010 and 2016. The productions studied were grouped into two thematic pillars. **Results:** Few publications on the subject were evidenced as well as a multiplicity of methods and strategies in the teaching of Basic Life Support. There were major gaps in the knowledge of health professionals, making it necessary to develop research in this field, especially studies that focus on strategies of theoretical and practical teaching with use of simulation, considering that these are capable of bringing real impacts in the knowledge and skills of the professionals. **Conclusion:** It can be concluded that teaching focused on the individuality and reality of the target public, taking into account the epidemiological reality and characteristics of the students is fundamental in this process.

INTRODUCTION

Basic Life Support (BLS) consists of a set of sequentially executed steps and maneuvers, which include assessment and immediate intervention in each phase of cardiopulmonary resuscitation (CPR) (Silva *et al*., 2015). Cardiorespiratory arrest can be defined as abrupt cessation of cardiac mechanical activity confirmed by unconsciousness, absence of central pulse, and apnea or gasping (Nola *et al*., 2010). CPR is the set of maneuvers performed after a cardiorespiratory arrest with the objective of artificially maintaining the arterial flow to the brain and other vital organs until the return of the spontaneous circulation occurs (Nacer and Barbieri, 2015).

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Cardiorespiratory arrest remains a major public health problem, acquiring a worldwide dimension despite the advances in recent years related to its prevention and treatment (Gonzalez *et al*., 2013). Although the potential beneficial effect of CPR is well established in the global scientific community, less than one in three victims of out-of-hospital cardiorespiratory arrest, and witnessed, receive rescue assistance from a viewer. Approximately 200,000 cases of cardiorespiratory arrest per year are estimated in Brazil, half of which are in hospital, and the other half in out-of-hospital settings (Fernandes *et al*., 2014). A qualitative outcome of cardiopulmonary resuscitation depends on a logical sequence of procedures that can be synthesized in the concept of survival current; a mnemonic composed of links that reflect fundamental actions to be developed, whose survival impacts are significant (Field *et al*., 2010). The current of survival

emphasizes the need for rapid response through surveillance and prevention, early recognition of cardiorespiratory arrest and triggering emergency, high quality and immediate CPR, early defibrillation, immediate advanced life support and post-cardiorespiratory arrest care (AHA, 2015; Canova, 2015). Cardiopulmonary arrest recently had the synonym of death, since no more than 2% of individuals survived this event. Today the survival rate reaches more than 70% if the treatment is early and effective and is substantially related to the time between the incident and the beginning of the resuscitation, and the technical efficacy of the CPR maneuvers (Menezes and Rocha, 2013). Cardiopulmonary arrest care must be performed quickly, firmly, safely and calmly, in order to avoid panic and mismatch between professionals. However, what is observed is that, most of the time, resuscitation efforts are tumultuous, with non-systematized actions that lead to overlapping of tasks, culminating in repetitive acts that lead to a crucial time loss for survival (Boaventura *et al.*, 2010). Nursing professionals are often the first to respond to cardiorespiratory arrest and initiate BLS maneuvers while awaiting the advanced support team. The immediate, competent and safe application of CPR maneuvers by the team that first participates are factors that contribute to the success of care (Bertoglio *et al.*, 2008). It is described that professionals and health graduates do not have satisfactory scientific knowledge both theoretical and practical in cardiorespiratory arrest and cardiopulmonary resuscitation. This lack of knowledge is a consequence of the academic training, in which the approaches on the subject are punctual and superficial, therefore, insufficient to provide the acquisition of solid knowledge necessary for the performance of a cardiorespiratory arrest (Neves *et al.*, 2010; Gomes and Braz, 2012). It is important to expose students early to this procedure, that is, to promote these skills at the beginning of the course to be perfected in the following years of graduation (Kawakame and Miyadahira, 2015). Training should include students in realistic contexts, which leads to the acquisition of solid knowledge and skills (Tavares *et al.*, 2015). Several nursing schools include in their curricula content with learning objectives for the BLS. However, most nurses do not feel able effectively to deal with the cardiorespiratory arrest (Sardo and Sasso, 2008). One of the objectives of graduation is BLS proficiency, however, there is a great diversity in the form and in content oriented to the theme, among the different schools, so that the training offered does not meet the criteria described in the consensus of the science of resuscitation (Ruijter *et al.*, 2014). In view of the above, the objective of this research was to analyze in the literature the available evidence about the teaching of Basic Life Support in undergraduate nursing.

MATERIALS AND METHODS

It is an integrative review of the literature, a study that offers quick access to the relevant results of research and evidence that supports the conduct or the 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 (Pereira *et al.*, 2017). The research question was built through the PICO strategy, which guides the construction of the research question and the bibliographic search and allows the researcher, when having a doubt or questioning, to find the best available scientific information in an accurate and fast way (Santos *et al.*, 2007) (Table I). After the use of the PICO strategy, the questions consisted of: in undergraduate nursing,

do the teaching strategies provide support for the retention of knowledge and acquisition of skills in BLS according to the recommendations of the guidelines? What scientific evidences are available in the literature related to the teaching of BLS in undergraduate nursing?

Table 1. Construction of the research question through the PICO strategy

P (Patient)	Nursing undergraduate students
I (Intervention)	Basic Life Support teaching strategies
C (Comparison)	Identification of articles that contain teaching methods that demonstrate the best ways to teach BLS.
O (Outcomes)	Obtain the best teaching strategies capable of increasing the retention of knowledge and learning skills to perform BLS.

The search for publications was made in June 2016, in the following databases: PUBMED, LILACS and BDENF. The following descriptors and Boolean operators were used to searching the data: PubMed - (education OR teaching OR knowledge AND retention AND Technological Development) Nursing Education, Baccalaureate AND heart arrest OR cardiopulmonary resuscitation; LILACS e BDENF - education AND basic life support AND bachelors degree in nursing, resulting in 69 articles (38-PubMed, 13-LILACS e 18-BDENF). The inclusion criteria were: articles in Portuguese and English languages, published between 2010 and 2016 years, that addressed the teaching of BLS for undergraduate students in nursing, aimed at adults, children and newborns, and complete articles in the free version. The exclusion criteria were: articles that addressed the teaching of BLS for care nurses, other categories of health professionals and lays, and articles where only abstracts were available. For the systematization of the articles selected in the search, an instrument validated by Ursi (Souza *et al.*, 2010) was defined. The analysis of the selected studies was carried out in a descriptive way, allowing to observe, describe and classify the data, in order to gather the knowledge produced on the subject. The productions had been grouped into two thematic pillars which will be presented and discussed below.

RESULTS

From the articles that constituted this study, four had as objective, to analyze, to evaluate, to verify and to investigate the knowledge (theory) and performance of the ability (practice) in cardiopulmonary resuscitation maneuvers with the use of the automatic external defibrillator (AED); two studies showed the development and evaluation of a Virtual Learning Environment focused on nursing education; a study analyzed the knowledge of undergraduate students in health sciences in objective tests; and two studies compared the impact of training programs on CPR in almost experimental studies using a teaching-learning strategy before and after. Regarding the year of publication of the studies, three articles were added (33.33%) in 2010, three (33.33%) in 2013 and three (33.33%) in 2015. The countries that produced the most studies on the subject were Brazil with 77.77%, and others 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, the "Journal of Nursing School of USP" being the most published on this subject, with 33.33% of publications. Two articles of applied research of technological development have been found (22,22%), two cross-sectional studies (22.22%), two

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

Author. Title. Year	Database	Methodological procedure	Research findings
Gonçalves GR, Peres HHC, Rodrigues RC, Tronchin DMR, Pereira IM. Virtual educational proposal on care of cardiopulmonary resuscitation in the newborn. 2010	BDENF	Applied research, technological development	Development of an interactive virtual educational proposal about cardiopulmonary resuscitation in newborns. The group work, the quality of teaching material, the choice of the teaching support platform and the methodology adopted were the determining factors for the success of the project.
Boaventura AP, Miyadahira AMK, Sugisawa AHR, Gonçalves AAP, Nunes TR. Basic life support for undergraduate nursing students. 2010	LILACS	Exploratory, descriptive research	This study was carried out with 52 students of the undergraduate nursing, through a questionnaire on BLS questions and the use of an automatic external defibrillator. The overall average of the students was less than 85%. Knowledge in basic life support and use of AED in this study was insufficient.
Chandrasekaran S, Kumar S, Bhat SA, Saravanakumar, Shabbir PM, Chandrasekaran V. Awareness of basic life support among medical, dental, nursing students and doctors. 2010	PUBMED	Cross-sectional study	None of the participants had complete knowledge about BLS. Only two participants (0.19%) achieved 80-89% of correct answers. Basic Life Support awareness among medical, dental, and nursing students is insufficient and needs to be improved.
Rodrigues RCV, Peres HHC. Development of a Virtual Nursing Learning Environment on cardiorespiratory resuscitation in neonatology. 2013	LILACS	Applied research, technological development	The Virtual Learning Environment was perceived as predominantly excellent. The application of virtual learning environments in a coherent, responsible and consistent way in aiding traditional teaching has been proving to be an efficient way to build knowledge.
Dal U, Sarpkaya D. Knowledge and psychomotor skills of nursing students in North Cyprus in the área of cardiopulmonary resuscitation. 2013	PUBMED	Almost experimental, longitudinal study	90.4% of the participants had not received any CPR training prior to the study. 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 versus Preservice Nursing Professionals following an Informal Training Program in Pediatric Cardiopulmonary Resuscitation: A Repeated-Measures Quasi experimental Study. 2013	PUBMED	Experimental, prospective study.	The training improved the overall pediatric CPR competence of nurses, but they failed to maintain the same competence, even for a short period. In contrast, nursing students with self-motivation and willingness to learn retained skills learned during the training session better than care nurses.
Kawakame PMG, Miyadahira AMK. Evaluation of the teaching-learning process of health students: cardiopulmonary resuscitation maneuvers. 2015	PUBMED	Experimental, prospective study	After the theoretical lesson strategy with practical demonstration and simulated practical training. It enabled us to infer that both knowledge (theory) and ability (practice) is essential in the construction of the teaching-learning process.
Tavares LB, Bezerra IP, Oliveira FR, Sousa LA, Raimundo RD, Sousa ED, *et al.* Knowledge of undergraduate students in health sciences in objective tests on basic life support. 2015	LILACS	Observational, descriptive and cross-sectional study	Only one participant scored at or above 84%. The results implied that efforts must be made to ensure that BLS actions are introduced into curricula from the first year of graduation and during subsequent years.
Silva DV, Jesus AS, Lima AA, Santos MA, Alves SL. Knowledge of Nursing undergraduates about basic life support. 2015	LILACS	A descriptive, exploratory, quantitative approach	The theoretical knowledge about BLS among nursing undergraduates was unsatisfactory for the care of the victim of cardiorespiratory arrest, evidencing that, although the subject matter is discussed in the undergraduate course, it has not been enough to build a solid knowledge.

descriptive, exploratory studies with a quantitative approach (22.22%), an almost experimental, longitudinal study (11.11%) and two prospective experimental studies (22.22%). Some characteristics of the studies found are in Table II.

DISCUSSION

Academic education, the fundamental base and impact of CPR training programs in nursing graduation

The training of the nursing professional is the focus of great changes in our historical process, being influenced by the representation that such profession had in the course of time. In 2001, however, an important advance was consolidated, when, through Resolution CNE / CES No. 3, of November 7, 2001, the National Curricular Guidelines of the undergraduate nursing course were instituted. Synthetically, the pedagogical principles elucidated by the curricular guidelines of Nursing are: pedagogy of the competences, the principle of learning to learn, the generalist formation, humanist, critical and reflexive; and teacher-centered training as facilitator. We believe that in

the current context of education, there is a demand for opinion makers. Thus, new teaching-learning practices emerge, with the use of didactic and technological resources, encouraging and favoring the improvement and qualification of nurses, as well as enabling autonomous learning (Gonçalves *et al.*, 2010). In this understanding, a health professional has been sought from the point of view of complexity and holism, acting in a multiprofessional way, meeting the needs of the health system in force (Salvador *et al.*, 2012). Much of the success of CPR is due to Nurses' ability to perform qualitative care in this context. Thus, nurses need to know how to act effectively against these occurrences (Silva *et al.*, 2015). A study carried out with 664 students (Tavares *et al.*, 2015) graduated from the medical, nursing, physiotherapy, pharmacy, nutrition and occupational therapy courses of seven higher Education Institutions of São Paulo (Brazil), found that only one participant reached a grade equal to or greater than 84 % and the remainder fell short of this indicator of the American Heart Association (AHA). The results imply that efforts must be made to ensure that BLS actions are introduced into curricula from the first year of undergraduate and subsequent years so

that knowledge and skills are improved and implemented in an effective manner.

A study carried out with 84 students (Kawakame and Miyadahira, 2015) of the undergraduate course in health showed that only the theoretical class with demonstration of the practice were not enough for the development of the psychomotor skills employed in the CPR, being extremely necessary the practical training, so that the correctness index to 90%. Simulation strategies are more realistic and meaningful learning, because they allow students to get in touch with the practice. Both knowledge (theory) and ability (practice) are essential in the construction of the teaching-learning process. Both complement each other and become inseparable in the conception of the final product, evidencing the importance of the theoretical classes associated to the practical classes. Still on this subject, a study conducted with 32 undergraduate nursing students (Silva *et al.*, 2015), 4 of the last semester and 28 of the penultimate one, found a knowledge deficit, since only 25% of the students reached a percentage of correct answers to the BLS questionnaire equal or greater than 75%, considered satisfactory in this study. The study concluded that the theoretical knowledge about BLS among nursing undergraduates was unsatisfactory for the care of the victim of cardiorespiratory arrest, evidencing that, although the subject matter is discussed in the undergraduate course, it has not been sufficient for the construction of solid knowledge. The academic preparation of nurses demands the need for conceptual and methodological theoretical training that enhances competencies for completeness. Thus, among the essential competences for the practice of nursing practice in emergencies, clinical reasoning for decision making and the ability to perform interventions promptly stand out (Salvador *et al.*, 2012). The American Heart Association, on teaching is a planned experience that facilitates learning, affirms that it is fundamental to target education to the appropriate public and that a training program represents an ideal opportunity to reach a large number of individuals with skills in maneuvering CPR and other BLS interventions (AHA, 2015). Educational interventions should be evaluated to ensure that they reliably achieve learning objectives. The aim is to ensure that students acquire and retain the skills and knowledge that will enable them to act properly before a cardiorespiratory arrest and to improve outcomes in neurologically intact survival (Soar *et al.*, 2010). Nowadays, 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 (Cavalcante *et al.*, 2012). The adoption of new information and communication 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 (Rodrigues and Peres, 2013).

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

The nursing professional has competence to act in situations of cardiorespiratory arrest, through the Nursing Professional Exercise law No. 7.498 / 86, which establishes as a private activity of the nurse direct assistance to the critical patient and the execution of activities of greater technical complexity,

which require scientifically based knowledge and the ability to take immediate decisions. According to AHA (2015) it is considered to be qualified individuals who obtain 84% or more of use in a standard structured questionnaire used for the evaluation of the training. Of concern, in a survey carried out in the State of São Paulo (Tavares *et al.*, 2015) through the application of 664 questionnaires on BLS, answered by students of higher education in the health area, similar to that used by the AHA in the BLS course, only one reached an equal score or greater than 84%. Regarding the care of victims of sudden cardiorespiratory arrest, little knowledge or incorrect knowledge about BLS can compromise the care provided (Tavares *et al.*, 2015). In a similar study about the knowledge of undergraduate nursing students (Boaventura *et al.*, 2010), after applying a form containing 40 objective questions, a high percentage of incorrect answers regarding the use of AED was found, in which 80% of the responses were unsatisfactory For simple questions such as the positioning of the blades of the device (Silva *et al.*, 2015). Thus, it is important to observe in this study the lack of knowledge mainly among nursing professionals, taking into account that the findings showed that the percentage of correctness was lower than expected, according to the correctness index established for the basic life support course of the AHA. Nursing students have been the target of discussions and research that have demonstrated their knowledge about CPR maneuvers. A study carried out with nursing undergraduates of the 8th period (Gomes and Braz, 2012) found that few students had sufficient knowledge to act in the cardiorespiratory arrest. This lack of knowledge, among other reasons, may be related to the academic formation, which leads to reflect on the teaching-learning process related to the approach of this subject in undergraduate. In a study carried out at a private University of Porto (Portugal) with 149 students from the 1st, 2nd, 3rd and 4th years of nursing, they showed that they had enough theoretical knowledge about BLS in adults, since the majority obtained scores higher than 70% in all series of the course. However, it is important to note that this is the reality of another country (Silva *et al.*, 2015). Successful experiments, in before-and-after studies, however, demonstrate that the knowledge and skills of nurses and nursing students seem to improve in the follow-up of CPR training. However, in six weeks, knowledge and skills begin to decline, although they remain significantly larger than the initial one. Training programs improve competence in CPR, but individuals cannot maintain the same competence, even for a short period (Sankar *et al.*, 2013).

A similar study with 83 third-year undergraduate nursing students, in which 90.4% of the participants had not received any CPR training prior to the study, concluded that theoretical information and CPR practiced had a positive impact on the level of knowledge and Practical skills of the nurses the following month (Dal and Sarpkaya, 2013). However, there was a significant decrease in the level of information and correct preservation of the practical application six months after the training. In this understanding, it is described that the knowledge and skills of BLS deteriorate in less than three to six months. The use of frequent evaluations will identify individuals who need refresher courses (Soar *et al.*, 2010). BLS education is designed to fill gaps between actual and desired performance and should enable self-efficacy skills and knowledge acquisition to BLS providers, enhancing their ability to recognize and respond to patients at risk for cardiac arrest; improving resuscitation performance; and ensuring continuous quality improvement activities, starting from the

understanding that ensuring that victims of cardiorespiratory arrest receive care consistent with the current state of scientific knowledge presents a great potential for saving thousands of lives (Bhanji *et al.*, 2015).

Conclusion

The research provided the construction of a synthesis of the scientific knowledge produced in the last six years about the teaching of BLS in undergraduate courses in health with focus on the nursing course. 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 strategies of theoretical and practical teaching with use of simulation, considering that these are capable of bringing real impacts in the Knowledge and skills of the professionals. Few publications on the subject have been shown, as well as a multiplicity of methods and strategies in teaching BLS. From this perspective, it can be concluded that teaching focused on the individuality and reality of the target public, taking into account the epidemiological reality and characteristics of the students, is fundamental in this process. Thus, we hope to contribute to the development of new studies, which can foster reflections about the teaching of BLS in nursing graduation, and, above all, cooperate with the affirmation of the educational process as the north of the professional qualification, therefore, for the improvement of the health work process. In addition, we seek to understand the aspects that must permeate the academic training of the nurse and, with this, to contribute to the elucidation of teaching strategies that facilitate the learning process, so that through general education and problematizing educational practices that promote knowledge, develop skills and abilities essential for a qualitative action against cardiopulmonary arrest.

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