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INTEGRATIVE REVIEW

Pedagogical strategies for health care in cardiorespiratory arrest in pregnant women: integrative review

Estratégias pedagógicas voltadas à assistência em saúde na parada cardiorrespiratória em gestantes: revisão integrativa

Estrategias pedagógicas para la atención de la salud en paro cardiorespiratorio en mujeres embarazadas: revisión integrativa

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Abstract

Objective: To identify the pedagogical strategies used in teaching care for cardiorespiratory arrest in pregnant women. **Method:** Integrative review, carried out in April 2023 in seven information sources: Medical Literature Analysis and Retrieval System Online (Medline/PubMed®), Scopus, Latin American and Caribbean Literature in Health Sciences (LILACS), Web of Science, Science Diret and Excerpta Médica Database (Embase). The Rayyan application was used to select studies and thematic analysis was applied. **Result:** 778 studies were identified, of which eight comprised the final sample. Three categories were listed, namely: pedagogical strategies used in teaching care for cardiorespiratory arrest in pregnant women; clinical skills developed through pedagogical strategies and; existing guidelines, protocols and theoretical references used to guide care for cardiorespiratory arrest in pregnant women. **Conclusion:** The pedagogical strategies used were mainly based on simulation, followed by the multimedia e-learning tool and the conversation circle.

Descriptors: Teaching; Learning; Heart Arrest; Pregnant People; Hospitals.

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Resumo

Objetivo: Identificar as estratégias pedagógicas utilizadas no ensino do atendimento a parada cardiorrespiratória em gestantes. **Método:** Revisão integrativa, realizada em abril de 2023 em sete fontes de informação: *Medical Literature Analysis and Retrieval System Online* (Medline/PubMed®), Scopus, Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS), *Web of Science, Science Diret* e *Excerpta Médica Database* (Embase). Utilizou-se o aplicativo Rayyan para seleção dos estudos e aplicou-se a análise temática. **Resultado:** Identificaram-se 778 estudos, destes oito compuseram a amostra final. Elencaram-se três categorias, a saber: estratégias pedagógicas utilizadas no ensino do atendimento a parada cardiorrespiratória em gestantes; competências clínicas desenvolvidas por meio das estratégias pedagógicas e; diretrizes, protocolos e referenciais teóricos existentes usados para a orientação do atendimento da parada cardiorrespiratória na gestante. **Conclusão:** As estratégias pedagógicas utilizadas configuraram-se, principalmente, pela simulação, seguida da ferramenta multimídia de e-*learning* e da roda de conversa.

Descritores: Ensino; Aprendizagem; Parada Cardíaca; Gestantes; Hospitais.

Resumen

Objetivo: Identificar las estrategias pedagógicas utilizadas en la enseñanza del cuidado de la parada cardiorrespiratoria en mujeres embarazadas. **Método:** Revisión integrativa, realizada en abril de 2023 en siete fuentes de información: Medical Literature Analysis and Retrieval System Online (Medline/PubMed®), Scopus, Literatura Latinoamericana y del Caribe en Ciencias de la Salud (LILACS), Web of Science, Science Diret y Extracto de la base de datos Médica (Embase). Para la selección de estudios se utilizó la aplicación Rayyan y se aplicó el análisis temático. **Resultado:** Se identificaron 778 estudios, de los cuales ocho constituyeron la muestra final. Se enumeraron tres categorías, a saber: estrategias pedagógicas utilizadas en la enseñanza del cuidado de la parada cardiorrespiratoria en mujeres embarazadas; habilidades clínicas desarrolladas a través de estrategias pedagógicas y; Guías, protocolos y referencias teóricas existentes que se utilizan para orientar la atención de la parada cardiorrespiratoria en mujeres embarazadas. **Conclusión:** Las estrategias pedagógicas utilizadas se basaron principalmente en la simulación, seguida de la herramienta multimedia de e-learning y el círculo de conversación.

Descriptores: Enseñanza; Aprendizaje; Paro Cardíaco; Personas Embarazadas; Hospitales.

INTRODUCTION

Health professionals have sought to improve their technical and scientific knowledge with the intention of improving the quality of care, through the search for new teaching strategies capable of promoting safe and reliable learning, since the complexity of care is increasingly demanding professional qualifications.[1]

In the area of obstetrics it could not be different, the pregnant woman is monitored in prenatal care, labor, delivery and postpartum in which, at each stage, urgent and emergency situations may occur, such as cardiorespiratory arrest (CPA), which is characterized as the sudden and unexpected interruption of heartbeats and breathing, which requires safe, timely and

effective care from the health professional.[2]

Thus, teaching CPA care in pregnant women is an important topic, since CPA in pregnant women is a challenging condition for all health professionals, as incidence rates vary from 1.71 per 100,000 pregnant women outside the hospital, 2.78 per 100,000 in maternity wards, and 1.2 to 8.5 per 100,000 during hospitalization for childbirth.[3]

However, although it is rare, it is worth highlighting that in pregnant women this event is usually fatal and that performing appropriate Cardiopulmonary Resuscitation (CPR) maneuvers in this special situation can save the life of the mother and/or fetus.4 It is worth highlighting that in addition to the CPR technique, there is concern regarding the techniques recommended for obstetric patients, due to the specificities and particularities of the pregnancy-puerperal cycle.[4]

This concern is cited in the American Heart Association (AHA) guidelines, which highlight that deficits in resuscitation knowledge and skills can result in a poor prognosis.5 Therefore, for optimal treatment of cardiac arrest in pregnant women, it is recommended that students and health professionals receive adequate education, training, and preparation for such events.[3]

Even with the guidelines' recommendations, maternal death remains a serious public health problem worldwide, with an estimated maternal mortality rate of 223 deaths per 100,000 live births in 2020, primarily due to hypovolemic shock. This problem highlights a worrying gap in the teaching-learning process and training of students and health professionals.[6]

In this context, active pedagogical strategies emerge to promote the development of clinical skills characterized by cognitive, psychomotor and affective abilities, as well as critical and reflective training that is necessary in view of the progress of knowledge, technological advancement and increasing complexity of care, with the intention of enhancing the results of CPR and consequently, improving the prognosis of pregnant women.[7]

Despite the advantages of adopting active pedagogical strategies in the teaching process of students and health professionals, it is necessary to carry out a theoretical deepening on such strategies, since there is a lack of scientific evidence, which summarize an overview of the main active strategies that enable learning of the aforementioned topic.[7]

Given this scientific gap in teaching regarding CPA care in pregnant women, the question was: What pedagogical strategies have been used in teaching how to care for cardiorespiratory arrest in pregnant women in the in-hospital environment? Thus, the objective was to identify the pedagogical strategies used in teaching CPA care in pregnant women.

METHOD

This is an integrative literature review, following therecommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).[8] To develop the study, the following steps were followed: (1) definition of the review question, (2) search and selection of primary studies, (3) extraction of data from primary studies, (4) critical evaluation of primary studies, (5) synthesis of the review results and (6) presentation of the review.[9]

In the first stage, the research question was structured using the strategy *Population – Concept – Context* (PCCo), a variation of the Patient-Intervention-Comparison-Outcomes (PICO) strategy.[10] Thus, the acronym P (population) was defined, and students and professionals in the health field, as an acronym C (concept), pedagogical strategies aimed at teaching CPA care in pregnant women and the Co (context) intra-hospital environment. From this, the review question was developed: What pedagogical strategies have been used in teaching cardiac arrest care in pregnant women in the hospital setting?

In the second stage, the inclusion and exclusion criteria for articles were established, including primary studies that addressed the pedagogical strategies used in the care of CPA in pregnant women in the intra-hospital environment, without defining the time frame or language. Literature reviews, case studies, dissertations, theses, monographs, abstracts published in conference proceedings, and duplicate publications were excluded.

The search for scientific evidence was carried out by three researchers in April 2023, in the following databases: Medical Literature Analysis and Retrieval System Online (Medline/PubMed®), Scopus, Latin American and Caribbean Literature in Health Sciences (LILACS), Web of Science, Science Direct and *Excerpta Médica Database* (Embase).

The search strategy was adapted and validated by a librarian, using the health descriptors available on the Health Sciences Descriptors Portal (DeCS) in the Virtual Health Library (BVS), as well as the descriptors from Embase Subject Headings (Emtree) and Medical Subject Headings (MESH) in English, opting for:

“Health Sciences Students", "Health Personnel", "Teaching", "Learning", "Professional Training", "Vocational Education", "Cardiac Arrest", "Cardiopulmonary Resuscitation", "Pregnant Women", "Pregnancy", as exemplified below in Table 1.

Table 1 –Search strategy used in this integrative literature review, Uberaba, Minas Gerais, Brazil, 2023

Databases	Search strategy
Medline/ PubMed®	*(“Students, Health Occupations” OR “Health Personnel” OR “Healthcare Workers” OR “Teaching, Methods” OR “Academic Training” OR “Education, Professional” AND “Cardiopulmonary Resuscitation” OR “Basic Cardiac Life Support” OR “Code Blue” AND “Pregnant Women” OR Pregnancy)*and its terms.
Scopus	*TITLE-ABS-KEY(({Students, Health Occupations} OR {Health Personnel} OR {Healthcare Workers} OR {Teaching, Methods} OR {Academic Training} OR {Education, Professional}) AND ({Cardiopulmonary Resuscitation} OR {Basic Cardiac Life Support} OR {Code Blue}) AND ({Pregnant Women} OR Pregnancy))*and its terms.
LILACS	("Health Sciences Students" OR "Health Personnel" AND Teaching OR Learning OR “Professional Training” OR "Vocational Education" AND "Cardiac Arrest" OR "Cardiopulmonary Resuscitation" AND Pregnant Women OR Pregnancy), their terms and their English and Spanish versions.
Web of Science	*AK=("Students, Health Occupations" OR "Health Personnel" AND Teaching OR Learning OR "Professional Training" OR "Education, Professional" AND "Heart Arrest" OR "Cardiopulmonary Resuscitation" AND "Pregnant Women" OR Pregnancy)*and its terms.
Science Direct	*("Students, Health Occupations" OR "Health Personnel" AND Teaching OR "Professional Training" OR "Education, Professional" AND "Heart Arrest" OR "Cardiopulmonary Resuscitation" AND "Pregnant Women" OR Pregnancy)*and its terms.
Base	*(health student OR health care personnel AND teaching OR learning OR Professional Training AND heart arrest OR resuscitation AND pregnant woman OR pregnancy)*and its terms.

The initial selection took place through reading titles and abstracts, by two professionals with experience in the subject, using the Rayyan Qatar Computing Research Institute (Rayyan QCRI) application, responsible for excluding duplicate articles and facilitating the initial screening, blinding the auxiliary researcher and incorporating a high level of usability, effectiveness and reliability in the study selection process.[11] The selection occurred independently and a third reviewer resolved the discrepancies.

In the third stage, the articles were evaluated in full. The following data were extracted: author, year of publication, country of origin, objective, main results, type of study, and level of evidence[12], following the common criteria used in literature reviews.

The development of the fourth stage involved the thematic analysis of the studies, presented in three phases: pre-analysis (reading and selection of articles); exploration of the material (creation of

categories); processing of the results (interpretation).[13]

In the fifth and sixth stages, the information obtained was interpreted, presenting the narrative synthesis.

RESULTS

Initially, 778 studies were identified, of which eight comprised the final sample, as shown in the flowchart shown in Figure 1.

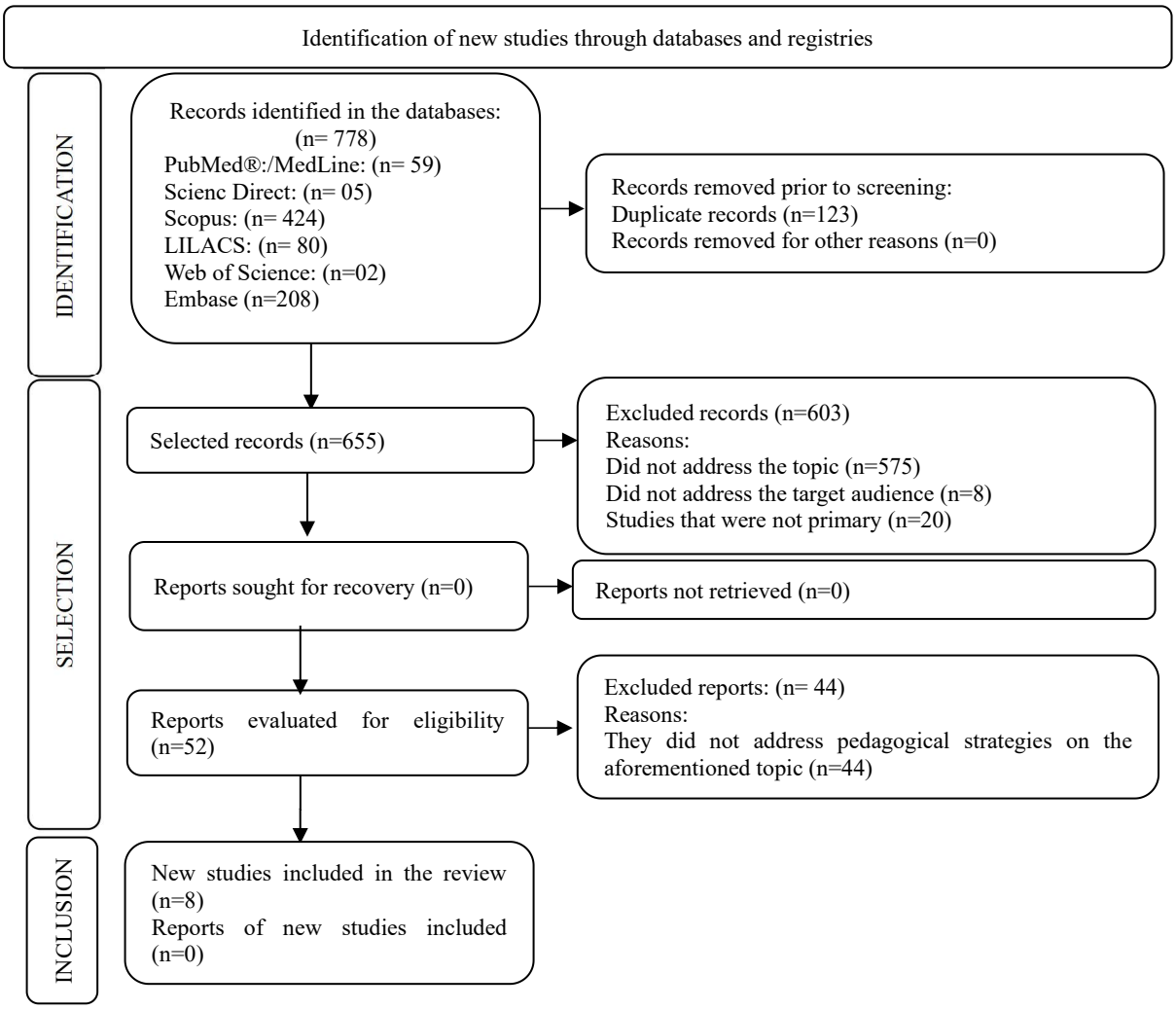

Figure 1 –Flowchart of identification, selection, and inclusion of studies, prepared based on the recommendation of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), Uberaba, Minas Gerais, Brazil, 2023

Regarding the eight (100%) studies included in the sample, there was a prevalence of four (50%) North American studies[14-17], three (37.5%) published in 2012.[4,14,15] The sample consisted of four (50%) descriptive studies with level of evidence six[4,14,15,18] and four (50%) quasi-

experimental studies with level of evidence

three[3,15,16,18], as demonstrated below.

Table 2 – Characterization of the studies that comprised the sample of this integrative review. Uberaba, MG, Brazil, 2023.

Author, year and country	**Objective,** type of study and level of evidence	**Main results and conclusion**
HARDELAND et al., 2023[3], Noruega	To assess the competence and knowledge of health professionals regarding cardiopulmonary resuscitation in pregnant women. Quasi-experimental study (3)	After training using simulation, greater clarity in understanding and comprehension of assistance was observed, and the importance of teamwork was identified.
KONG; TO, 2022[18], China	To assess the opinion of course participants about maternal cardiac arrest simulation training. Descriptive study (6)	Participants agreed that after the maternal cardiac arrest simulation training, it helped in their work with knowledge and skills, team training and coordination, and confidence in dealing with maternal cardiac arrest.
SIAULYS et al., 2019[19], Brasil	Present the experience of a public-private partnership that offered an obstetric emergency simulation training course. Quasi-experimental before-and-after study (3)	The simulated training achieved high satisfaction rates and significantly improved public health professionals' knowledge of how to diagnose and manage the leading causes of maternal mortality.
ADAMS et al., 2016[16], Estados Unidos	To assess confidence, knowledge, and competence after a simulation-based curriculum on maternal cardiac arrest in an Obstetrics and Gynecology residency program. Quasi-experimental study (3)	Through the simulation, the participating obstetrician-gynecologist residents demonstrated greater knowledge, confidence, and competence in managing maternal cardiac arrest.
SCHIMMEL-PFENNIG; STANFILL, 2012[14], Estado Unidos	Describe the need to implement Advanced Cardiovascular Life Support training with an obstetrician. Descriptive study (6)	From the division of the teams based on the recognition and knowledge of the topics of Advanced Cardiovascular Life Support with an obstetrician, a greater understanding of the requirements and use of clinical reasoning in cardiorespiratory arrest in pregnant women was observed.
BERKENSTADT et al., 2012[4], Israel	To assess competence in the simulated scenario of cardiorespiratory arrest in parturients. Descriptive study (6)	The results suggest that the two-phase simulation, including an oral component, can reveal disparities in knowledge not assessed by simulation alone, highlighting the importance of the theoretical framework.
HARDS et al., 2012[15], Canadá	To evaluate the management of maternal cardiac arrest by anesthesia residents using high-fidelity simulation and compare subsequent performance following didactic or e-learning. Prospective observational cohort study (6)	Learning and e-learning have shown similar benefits in terms of skills and early knowledge retention.
FISHER et al., 2011[17], Estados Unidos	To determine the impact of maternal simulation in cardiac arrest on performance, knowledge, and confidence among the Maternal-Fetal Medicine team. Quasi-experimental study (3)	Significant benefits were obtained by applying the simulation-based training program to improve team performance, knowledge and confidence.

The thematic analysis of the evidence enabled the development of three categories, namely: (1) pedagogical strategies used in teaching CPA care in pregnant women; (2) clinical skills developed through pedagogical strategies and; (3) existing guidelines, protocols and theoretical frameworks used to guide CPA care in pregnant women.

The first category addressed the description of the pedagogical strategies used by the findings to promote the teaching of care for CPA in pregnant women, with emphasis onssimulation[3,4,15-19], followed by the tool multimedia ofe-learning[3,15] and conversation circle.[3]

In the second category, it was detailed the clinical skills developed by each strategy such as cognitive skills (apprehension and mastery of knowledge)[3,4,14-19], psychomotor (manual or physical skills)[3,4,14-19] and affective (self-confidence, leadership, relationships, posture, feelings, attitudes, responsibilities and satisfaction).[3,4,14-17,19]

Already in the third category, the following were mentioned guidelines, protocols and theoretical frameworks used by the findings to guide the care of CPA in pregnant women, namely: Advanced Cardiovascular Life Support (ACLS)[4,14-18], American Heart Association (AHA)[3,14-17], Basic Life Support (BLS)[17,19], Advanced Cardiovascular Life Support with an obstetrician (ACLS OB)[14], Advanced Life Support in Obstetrics (ALSO).[18]

In short, it was observed that the strategies were effective, however, there is no standardization of the theoretical framework, which highlights the need for prior theoretical support for active strategies.

DISCUSSION

Based on the results identified, the pedagogical strategies used in teaching CPR care in pregnant women were highlighted, highlighting the clinical skills developed by each method, as well as the guidelines, protocols and theoretical references used to guide CPR, findings that provide originality and advance knowledge on the subject.[3,4,14-19]

Most studies that addressed pedagogical strategies were manuscripts published more than 10 years ago[4,14,15,17], which sought to describe or test some type of method to teach how CPA care is provided to pregnant women.[3,4,14-19]

In view of the synthesis of the findings, it was noted the scarcity of randomized clinical trials, methodologically well designed, that seek to test the effectiveness of the pedagogical strategies used in teaching CPA care in pregnant women, with the intention of

assisting in the choice of the best educational practices.[3,4,14-19]

A limited number of pedagogical strategies applied in teaching CPA care in pregnant women were evidenced by the studies in the sample. Among them, simulation stood out as it was the method most addressed by the studies evidenced in the present sample[3,4,15-19], involving the preparation, participation and debriefing stages.[18]

Research carried out in Israel with anesthesiologists found that when simulation was used as a teaching strategy, emergency maneuvers in pregnant women using CPR were more successful, and professionals were also encouraged to reflect, which led to greater development of cognitive aspects, as it clarified what was done, what the differential diagnosis was, and why the actions were performed.[15]

A systematic review developed with the intention of identifying the effectiveness of clinical simulation for the development of clinical skills regarding CPR in adults, showed that this strategy was cited by five studies that demonstrated its effectiveness for the development of knowledge, skills and attitudes, revealing itself as a powerful strategy in cases of teaching CPR in pregnant women.[20]

It is worth noting that most pedagogical strategies seek to develop clinical competencies that include cognitive, psychomotor, and affective skills. However, in the present study, a prevalence of methods that sought to develop knowledge about cardiac arrest care in pregnant women was evidenced.[3,4,14-19]

Research identified among the selected studies reported that almost all participants agreed that maternal cardiac arrest simulation training could help them in their work (97.8%), due to increased knowledge and skills (98.5%), team training and coordination (97.0%), and they also reported feeling more confident in dealing with maternal cardiac arrest after the training (97.0%).[18]

A national study carried out in the city of São Paulo that applied simulation in the training of doctors, nurses and nursing assistants in a public hospital, highlighted that these professionals had a significant acquisition of knowledge in a short period of time, which makes it possible to provide quality care to pregnant women victims of CPA and, consequently, can contribute to the reduction of maternal mortality.[19]

Although this study identified only three pedagogical strategies for teaching cardiac arrest care in pregnant women, several methods can facilitate the teaching

of this topic and, consequently, develop primarily cognitive skills, followed by affective or psychomotor skills. Among these strategies, we can mention: cooperative learning, team-based learning, case-based learning, collaborative case-based learning, project-based learning, problem-based learning, flipped classroom, educational games, Scratch, QUEST system, virtual patients, telesimulation, among others.[21]

To support the teaching process of this topic, the adoption of theoretical frameworks, protocols, and guidelines is necessary to standardize and facilitate the appropriate management of CPA in pregnant women. In this research, the guidelines of ACLS[4,15-19], followed by the guidelines proposed by the AHA.[3,14-17]

A study developed in Canada used both guidelines for the management of cardiac arrest during pregnancy because they demonstrate the step-by-step process of how to correctly perform this care. Furthermore, it highlighted the importance of continuous practice and the need to review the ACLS algorithm.[15]

Another study conducted in the United States also used current ACLS and AHA guidelines, using a maternal cardiac arrest algorithm to facilitate care for this event, observing a significant improvement in the execution of critical steps such as airway management, manual left uterine displacement, and the identification of common causes of maternal cardiac arrest.[15]

These guidelines were considered by an intervention study carried out in a public hospital located in Juazeiro do Norte, Ceará, as a world reference in CPR training, capable of increasing theoretical and practical knowledge, enabling updating, safety, self-confidence, reflecting in a better quality of care provided to pregnant women who are victims of CPA.[22]

It is important to highlight that, despite not being one of the guidelines most frequently addressed in articles, ALSO is considered one of the most widely used references by Brazilian researchers for the teaching and learning process of CPA management in pregnant women.[18]

The scarcity of primary manuscripts eligible to compose this integrative review, as well as the lack of clarity of the studies regarding methodological data, stands out as a limitation of this study.

CONCLUSION

The pedagogical strategies used to enable the teaching of CPR in pregnant women were identified, highlighting simulation as the most addressed by studies due to its ability to promote

increased knowledge, improved teamwork, obstetric management, reflection, among other skills, followed by the multimedia e-learning tool and conversation circles.

In addition to the strategies, the clinical skills developed by these strategies were also highlighted, with emphasis on cognitive skills characterized by knowledge. Furthermore, theoretical frameworks, protocols and guidelines capable of standardizing the appropriate management of CPA in pregnant women, with emphasis on the guidelines of ACLS and AHA.

This study contributes to the advancement of the area of teaching, research and health care, by structuring and presenting a theoretical framework on the pedagogical strategies that facilitate the teaching of CPR in pregnant women who are victims of CPA together with the clinical skills developed by the methods, as well as, theoretical frameworks, protocols and guidelines capable of supporting the execution of care.

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