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REVIEW

EDUCATIONAL CARDIOPULMONARY RESUSCITATION STRATEGIES FOR LAYPEOPLE: AN INTEGRATIVE LITERATURE REVIEW

ESTRATÉGIAS EDUCATIVAS DE RESSUSCITAÇÃO CARDIOPULMONAR PARA LEIGOS: REVISÃO INTEGRATIVA DA LITERATURA

ESTRATEGIAS EDUCATIVAS PARA LA REANIMACIÓN CARDIOPULMONAR PARA LEGOS: REVISIÓN INTEGRATIVA DE LA LITERATURA

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ABSTRACT

Objective: to identify teaching and learning strategies for cardiopulmonary resuscitation aimed at laypeople. **Method:** integrative review carried out in the National Library of Medicine sources; National Institutes of Health; Cumulative Index to Nursing and Allied Health Literature; Latin American and Caribbean Literature in Health Sciences; Web of Science; and SCOPUS. **Results:** 932 studies were identified and 11 were included. The strategies were: lecture; training with dummy/instructor; dummy/instructor/feedback device; video class and web. The dummy/instructor was often adopted, however, it proved to be more effective to associate a feedback device and/or video class. The studies were considered of good quality by the Joanna Briggs Institute instrument and of moderate quality by the Medical Education Research Study Quality Instrument. **Conclusion:** the evidence on the teaching of cardiopulmonary resuscitation to laypeople indicated the main and most effective strategies for the adoption of best practices.

Keywords: Teaching; Learning; Cardiopulmonary Resuscitation; Health Strategies.

RESUMO

Objetivo: *identificar as estratégias de ensino e aprendizagem da ressuscitação cardiopulmonar voltadas para pessoas leigas.* ***Método:*** *revisão integrativa realizada nas fontes National Library of Medicine; National Institutes of Health; Cumulative Index to Nursing and Allied Health Literature; Literatura Latino-Americana e do Caribe em Ciências da Saúde; Web of Science; e SCOPUS.* ***Resultados:*** *identificaram-se 932 estudos e incluíram-se 11. As estratégias foram: aula expositiva; treinamento com manequim/instrutor; manequim/instrutor/dispositivo de feedback; videoaula e web. Adotou-se, frequentemente, o manequim/instrutor, no entanto, demonstrou-se mais efetivo associar dispositivo de feedback e/ou videoaula. Os estudos foram considerados de boa qualidade pelo instrumento do Instituto Joanna Briggs e de moderada qualidade pelo Medical Education Research Study Quality Instrument.* ***Conclusão:*** *as evidências sobre o ensino da ressuscitação cardiopulmonar para leigos indicaram as principais e mais efetivas estratégias para a adoção de melhores práticas.*

Palavras-chave: *Ensino; Aprendizagem; Reanimação Cardiopulmonar; Estratégias.*

RESUMEN

Objetivo: *identificar estrategias de enseñanza y aprendizaje de la reanimación cardiopulmonar dirigidas a legos.* ***Método:*** *revisión integrativa realizada en fuentes de la National Library of Medicine; National Institutes of Health; Cumulative Index to Nursing and Allied Health Literature; Literatura Latinoamericana y del Caribe en Ciencias de la Salud; Web of Science; y SCOPUS.* ***Resultados:*** *se identificaron 932 estudios y se incluyeron 11. Las estrategias fueron: clase expositiva; entrenamiento con maniquí / instructor; maniquí / instructor / dispositivo de feedback; clase de video y web. El muñeco / instructor se adoptó a menudo, sin embargo, demostró ser más efectivo asociar un dispositivo de feedback y / o una clase de video. Los estudios fueron considerados de buena calidad por el instrumento del Instituto Joanna Briggs y de calidad moderada por el Medical Education Research Study Quality Instrument.* ***Conclusión:*** *la evidencia sobre la enseñanza de la reanimación cardiopulmonar a legos indicó las principales y más efectivas estrategias para la adopción de mejores prácticas.*

Palabras clave: *Enseñanza; Aprendizaje; Reanimación Cardiopulmonar; Estrategias de Salud.*

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INTRODUCTION

Cardiorespiratory arrest (CPA) is considered an extreme emergency, defined by the sudden and unexpected cessation of systemic circulation, due to the finiteness of the ventricular and ventilatory mechanical and/or electrical activity of an individual, capable of causing irreversible outcomes if efficient cardiopulmonary resuscitation is not applied (CPR).[1]

Basic life support (BLS) measures are the first measures applied to victims of CPA and include correct identification, activation of the emergency service, high-quality compressions and ventilations, and early defibrillation. If CPA occurs in a hospital environment, the victim will be assisted by health professionals, however, if the arrest occurs outside the hospital, it is expected that the first measures will be taken by a lay rescuer, who is not part of the assistance network, but has been trained to assist in the emergency when the event occurs.[2-3]

It should be considered that the increase in survival of victims of CPA is significantly greater when compressions are started immediately, by lay rescuers, before the arrival of emergency medical care. Also, that half of CPAs that occur outside the hospital are experienced by lay spectators, which reinforces the need for their training for this service.[3]

Although there is a variety of scientific studies[4-5] focused on this theme, there are still gaps to be explored, such as: the identification of pedagogical possibilities for teaching CPR to laypeople; the clinical skills valued by studies in this area; the strategies most adopted by instructors for teaching CPR to laypeople; the most effective in the teaching and learning process; and, mainly, what is the methodological rigor of these manuscripts, a crucial factor that determines the best pedagogical practices in a safe way, based on evidence.[5] Thus, this study aimed to identify the teaching and learning strategies of cardiopulmonary resuscitation aimed at laypeople.

METHOD

This is an integrative literature review carried out from August to December 2020 at a public university in the countryside of São Paulo, Brazil, based on the steps: a) identification of the theme and guiding question; b) search and selection of studies; c) categorization of studies; d) analysis; e) presentation of the review.[6]

The Patient-Intervention-Outcomes (PIO) strategy was adopted - a variation of the Patient-Intervention-Comparison-Outcomes (PICO) strategy[7] -, considering P- population: lay rescuers; I- intervention: synthesis of teaching and learning strategies used to train lay rescuers in CPR; O-outcome: CPR teaching and learning process. The guiding question was determined: what are the main teaching and learning strategies for cardiopulmonary resuscitation aimed at lay rescuers?

The search for studies was carried out in November 2020, through the following information sources: PubMed®, Latin American and Caribbean Literature on Health Sciences (LILACS), Scopus, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and Web of Science. The descriptors, relevant to each database, keywords, search strategy, were validated by a librarian and described below.

In PubMed® and Scopus, the controlled descriptors, in English, were identified in Medical Subject Headings (MeSH): Teaching; "Cardiopulmonary Resuscitation"; Learning. The keyword laypeople and the following search strategy were adopted: (*Laypeople AND Teaching OR Training OR Techniques OR "Technique, Training" OR "Techniques, Training" OR "Training Technique" OR "Training Technics" OR " "Technic, Training" OR "Technics, Training" OR "Training Technic" OR Pedagogy OR Pedagogies OR "Teaching Methods" OR "Method, Teaching" OR "Methods, Teaching" OR "Teaching Method" OR "Academic Training" OR "Training, Academic" OR "Training Activities" OR "Activities, Training" OR "Training Activity" OR "Techniques, Educational" OR "Technics, Educational" OR "Educational Technics" OR "Educational Technic" OR "Technic, Educational" OR "Educational Techniques" OR "Educational Technique" OR "Technique, Educational" AND "Cardiopulmonary Resuscitation" OR "Resuscitation, Cardiopulmonary" OR CPR "Cardio-Pulmonary Resuscitation" OR "Cardio Pulmonary Resuscitation" OR "Resuscitation, Cardio-Pulmonary" OR "Code Blue" OR "Mouth-to-Mouth Resuscitation" OR "Mouth to Mouth Resuscitation" OR "Mouth-to-Mouth Resuscitations" OR " "Resuscitation, Mouth-to-Mouth" OR "Resuscitations, Mouth-to-Mouth" OR "Basic Cardiac Life Support" OR " Life Support, Basic Cardiac" AND learning.*

In CINAHL, the controlled descriptors, in English, were identified in titles, configuring as follows: Teaching; "Cardiopulmonary Resuscitation"; Learning. The keyword laypeople and the following search strategy were used:

(Laypeople AND Teaching AND Cardiopulmonary Resuscitation AND Learning).

In the Latin American and Caribbean Health Sciences Literature (LILACS), the controlled descriptors were identified in Health Sciences Descriptors (DeCS): Teaching; Cardiopulmonary Resuscitation; Learning and its variations in Portuguese and Spanish. The keyword laypeople and the search strategy were used: (Laypeople AND Teaching AND Cardiopulmonary Resuscitation AND Learning); (Lay Person AND *Enseñanza* AND *Reanimación Cardiopulmonar* AND *Aprendizaje*); (Lay person AND Teaching AND Cardiopulmonary Resuscitation AND Learning).

In the Web of Science, the following controlled descriptors were used, in English: Teaching; Cardiopulmonary Resuscitation; Learning and the keyword: laypeople, with the following search strategy: (Laypeople AND Teaching AND Cardiopulmonary Resuscitation AND Learning). It is justified that the keyword Laypeople was adopted to specify the strategy, directing it to the desired population: laypeople.

Studies exclusively focused on the teaching and learning process of adult CPR for laypeople were included, without a time frame or language, whose learners were 18 years old or older, were not health students or had been exposed to any type of CPR training within the last two years. Review studies, theses, dissertations, opinion articles, comments, essays, previous notes, and manuals were excluded.

For the selection of studies, titles and abstracts were read by two independent reviewers, with the aid of a free web review program, with a single version, named Rayyan Qatar Computing Research Institute[8] (Rayyan QCRI).

Subsequently, the full reading of the selected studies and their critical evaluation to define the sample were carried out. The information were extracted using a validated and adapted script[9] that considered the criteria: authors; year of publication; language; country of origin; objective, type of study, teaching strategy used; main results. The level of evidence of the studies was classified, considering the nature of their clinical question, categorized as: a) intervention/treatment or diagnosis/test, consisting of seven levels of evidence, the strongest (level I) being the evidence from systematic review or meta-analysis of all relevant randomized clinical trials; b) prognosis/prediction or etiology, with five levels of evidence, in which the strongest (level I) consists of synthesis evidence from cohort or case-control studies; c) and meaning, with five levels of evidence, the strongest (level I) characterized by evidence of meta-synthesis from qualitative studies.[10]

The studies were categorized based on the assumptions of thematic analysis,[11] following three steps: pre-analysis, configured by the floating reading of evidence and organization of convergences (registration units); then grouping the registration units; and the treatment of data, determining the categories.

The methodological evaluation of the selected studies was carried out according to the critical evaluation instruments of the Joanna Briggs Institute (JBI)[12] and the Medical Education Research Study Quality Instrument (MERSQI).[13] We opted for the adoption of both, in order to obtain a broad scenario assessment of the methodological quality of the articles included and risk of bias, as these tools have different assessment criteria, namely: the instrument referring to the JBI has nine components of methodological assessment aimed at quasi-experimental studies and 13 for experimental, classified, from a qualitative perspective, such as present, absent, whether there is clarity or does not aplly.[12] The risk of bias was determined as follows: a) low risk of bias, if the studies reached more than 70% rating "yes "; b) moderate risk of bias, if the "yes" scores were between 50 and 69%; c) and high risk of bias, if the "yes" score was less than 49%.[14]

The MERSQI is made up of six domains, composed of criteria that assess the methodological course of the study from a quantitative perspective, capable of generating a score on the methodological quality of the article, namely: study design (only one group or one post- test, 1 point; pre-test and post-test of a single group, 1.5 points; two non-randomized groups, 2 points and randomized study, 3 points); sample (one institution studied, 0.5 point; two institutions, 1 point; three institutions studied, 1.5 point and sample response rate <50%, 0.5 point; 50 to 74%, 1 point and >75%, 1.5 point); type of data (evaluation made by the participants 1 point and objective evaluation, 2 points); validity of the assessment instrument (unreported internal structure, zero point; reported, 1 point; unreported content, zero point; reported content, 1 point; relationships with other unreported variables, zero point and reported relationships, 1 point); data analysis (inappropriate for study design or data type, zero point; appropriate for study design, 1 point; descriptive analysis only, 1 point; in addition to descriptive analysis, 2 points); and results (acquisition of knowledge and skills, 1.5 points;

satisfaction, attitudes, perceptions, opinions, general facts and confidence, 1 point). The maximum score is 18, studies with scores ≤10 are considered of low quality; >10 to <15 of moderate quality; and ≥15, high quality.[13]

RESULTS

Nine-hundred thirty-two manuscripts were identified and 11 were selected for the final sample. The selection of studies was demonstrated according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[15] (Figure 1).

The studies included in the sample date from 2005[16-20] to 2019[21-26]. The main countries that developed articles on this topic were the United States,[21,26] Spain[22,24] and Denmark.[16,20] There were no national studies that met the inclusion criteria. The studies are of the experimental and quasi-experimental type, most quasi-experimental.[16,22,24] And they intended to compare the effectiveness of CPR teaching and learning strategies for laypeople, characterized below (Table 1).

Two categories were developed: a) CPR teaching and learning strategies for laypeople; b) and skills assessed by studies on teaching CPR to laypeople. The teaching and learning strategies category of CPR for laypeople highlighted five pedagogical possibilities: a) expository class; b) CPR skills training with dummy and instructor; c) CPR skills training with dummy, instructor, and feedback device; d) self-instructional video for CPR; e) web-based education.

CPR skill training with a dummy and instructor was the most prevalent strategy for teaching CPR aimed at laypeople, adopted by all studies that comprised the sample,[16,26] however, CPR skills training with a dummy, instructor, associated with a feedback device[19,24] and training with a video class[16-18,20,21,24,25] demonstrated statistically

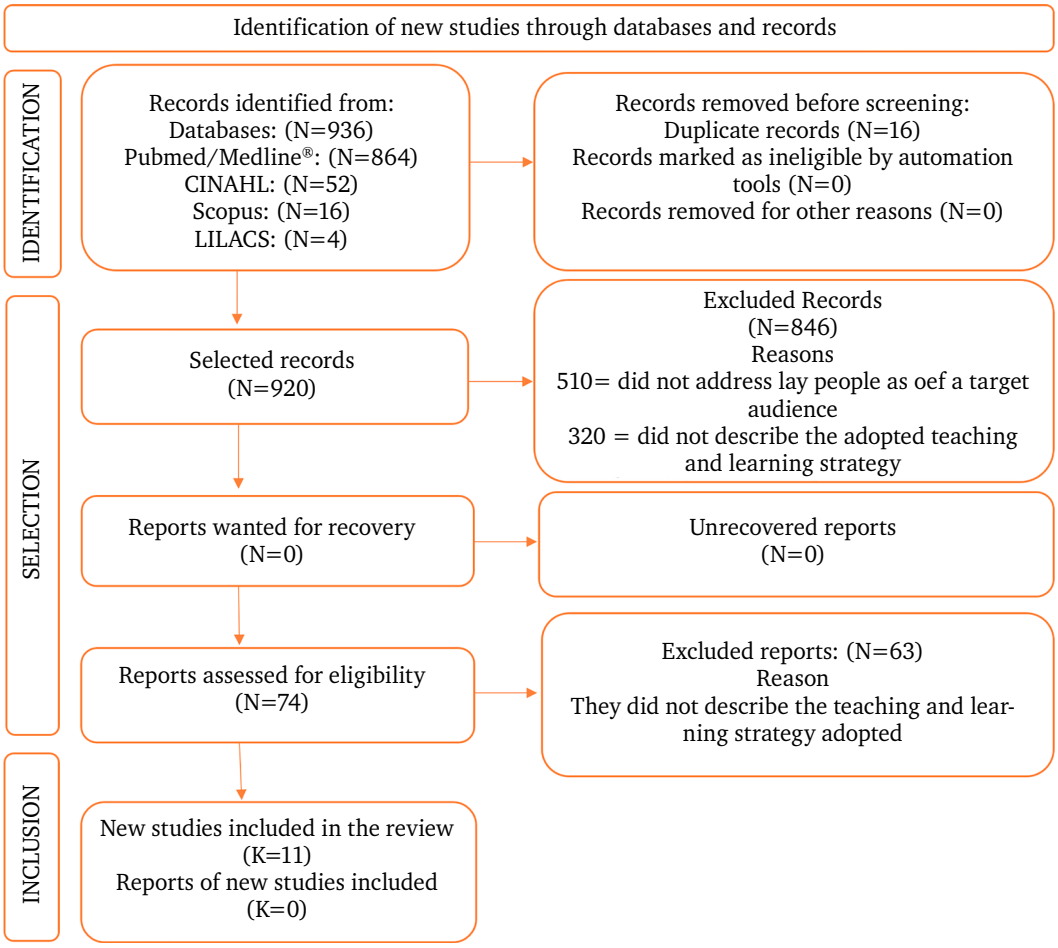

Figure 1 - Presentation of the selection of studies to compose the integrative review sample according to PRISMA, 2020.
Source: data obtained from the study itself

Table 1 - Characterization of the studies that comprised the sample of this research. *Ribeirão Preto*, SP, 2020

Authors, year, origin and language	Objective, Type of Study and Teaching Strategy	Results and Evidence Level
Isbye *et al*., 2005[16] Denmark/English	Compare the efficiency of a self-instructional CPR course associated with a dummy. Quasi-experimental study. Strategies: self-instructional video and instructor-led training	Experimental group: self-instructional video associated with skills training (n=156). Control group: skills training (n=36). There was no significant difference between groups. Level of evidence III (intervention/treatment or diagnosis/test)
Jones *et al*., 2007[17] Wales/English	Compare the effectiveness of the self-instructional DVD with instructor-led lab skills training. Quasi-experimental study. Strategies: Instructor-led lab skills training, lecture, and self-instructional video	Experimental group: video (n=24). Control group: skills training and lecture (n=23). The groups had similar results in ventilation (p=0.71) and chest compression (p=0.64). In depth (p=0.003) and time (p=0.018), the control group performed better. Level of evidence III (intervention/ treatment or diagnosis/test)
Chung *et al*., 2010[18] China/English	Compare CPR self-instruction and instructor- and classroom-based skills training. Experimental study. Strategies: self-instructional video; skills/ instructor training; expository class	Experimental group: self-instructional video and skills training (n=124). Control group: lecture and skills training (n=132). There was no significant difference between the two groups. Level of evidence II (intervention/treatment or diagnosis/test)
Krasteva *et al*., 2011[19] Bulgaria/English	Analyze lay person's abilities to perform hands-only CPR with a feedback device. Experimental study. Strategies: Skills training with feedback device and without instructor-led feedback device	Only one group was established (n=63) that received in the 1st stage: skills training without a feedback device. In the 2nd step: skills training with feedback device. The study showed that this device optimizes learning for laypeople and proves to be effective. Level of evidence III (intervention/treatment or diagnosis/test)
Nielsen *et al*., 2012[20] Denmark/English	Evaluate the effect of video classes associated with lectures and training and video classes. Quasi-experimental study. Strategies: instructor skills training; self-instructional video and class	Experimental group: skills training and video (n=55). Control group: video training and lecture (n=68). There was no statistically significant difference between the two groups at 3 and 5 months of training. Level of evidence III (intervention/treatment or diagnosis/test)
Blewer *et al*., 2016[21] United States/English	Compare layman CPR skill retention with video only and with video and training. Experimental study. Strategies: instructor-led skills training and self-instructional video	Experimental group: video training and dummy skills (n=769). Control group: video (n=695). The experimental group had a higher cardiac compression rate compared to the control group. Level of evidence III (intervention/treatment or diagnosis/test)
López MP, *et al*. 2017[22] Spain/Spanish	Evaluate a classroom training and skills training and feedback devices. Quasi-experimental study. Strategies: instructor-led skills training and feedback device and class	Only one group was held, submitted to skills training with a feedback device and lecture (n=87). There was a statistically significant improvement in chest compressions. Level of evidence III (intervention/treatment or diagnosis/test)
Ko *et al*., 2018[23] Singapore/English	Compare instructor- and instructor-led CPR training. Randomized experimental study. Strategy: instructor-led lab skills training with and without feedback device	Experimental group: laboratory skills training with instructor and feedback device (n=44). Control group: laboratory skills training with an instructor (n=41). The experimental group performed better when compared to the control group. Level of evidence II (intervention/treatment or diagnosis/test)
Patón *et al*., 2018[24] Spain/Spanish	Compare the effectiveness of educational strategies for training laypeople. Quasi-experimental study. Strategies: instructor skills training and feedback device, instructor skills training, video and classroom training	Experimental group: skills training with instructor and feedback device (n=40). Control group 1: skills training with an instructor (n=40). Control group 2: video training and class (n=44). The experimental group had a significant advantage in compressions. Level of evidence III (intervention/treatment or diagnosis/test)
Bylow *et al*., 2019[25] Sweden/English	Compare the effectiveness of self-learning and instructor-led training. Experimental, randomized study. Strategies: instructor skills training and video and instructor skills training, video, and lecture	Experimental group: skills training and video (n=678). Control group: skills training, video, and instructor-led class (n= 580). There were no significant differences, but training with an instructor had better results for willingness to act and knowledge (p<0.0001). Level of evidence II (intervention/ treatment or diagnosis/test)
Bylow *et al*., 2019[26] United States/English	Compare SBV learning with and without the web. Experimental study. Strategies: expository class; skills training with instructor and web	Experimental group: web-based education (n=1,212). Control group: lecture and skills training (n=1,213). The web was more effective for skills. Level of evidence II (intervention/ treatment or diagnosis/test)

Source: data obtained from the study itself.

more significant results for the development of cognitive and psychomotor skills.

As for the second category, skills assessed by studies on teaching CPR to laypeople, the assessment of psychomotor skill (CPR practical skills) was mostly identified,[16,26] followed by cognitive skill (knowledge in CPR)[22,25,26] and, finally, affective ability (development of attitudes towards CPR).[18,25]

The assessment of psychomotor and cognitive skills addressed the teaching and learning process of the following themes: a) verification of the safety of the scene; b) checking the responsiveness and breathing of the CPA victim; c) request for help from the emergency medical service; d) start of external chest compressions and ventilation; e) correct placement of the hands under the victim's chest; f) depth of external chest compressions; g) average compression rate; h) total time interval between cycles of external chest compression; i) chest return after chest compression; j) use of automatic external defibrillator (AED); k) and immediate return to CPR after the shock.16,26 The assessment of affective skills addressed the development of trust[24] and the lay person's willingness to act when faced with a CPA.[18]

Then, there was a critical assessment of the methodological quality of the selected studies, presenting the quasi-experimental type articles, according to the JBI[12] assessment instrument (Table 2).

Of the quasi-experimental studies included in this review, most had low risk of bias[16,17,20,24] and two indicated moderate risk.[19,22]

Only the criterion that addresses the use of multiple outcome measures over time was not met in five studies.[16,17,19,22,24] Then, the critical assessment of the methodological quality of randomized clinical trials was presented, according to the JBI assessment instrument (Table 3).

In the experimental studies evaluated, most had a low risk of bias[18,25,26] and in two,[21,23] a moderate risk. The methodological weakness was identified, regarding the blinding criterion, referring to the researcher, participants, responsible for providing the treatment and outcome evaluators.[18,21,23,25] The MERSQI was also used for methodological evaluation (Table 4).

Through the use of the MERSQI, it is possible to state that the studies included in the sample of this review had, for the most part, moderate methodological quality (10<n<15), with a score above 10 points, mean value of 12.82 points, value minimum of 11.5 and maximum of 15.5 points. One study was considered to be of high quality,[25] with a score of 15.5 points. The criteria responsible for conferring methodological weakness on the studies, according to the MERSQI, were performing only the objective assessment of the participants in most studies and obscurities regarding the validation of the instruments used, especially regarding the non-description of the relationships with other variables.

DISCUSSION

The scientific evidence synthesized in this research made up a body of knowledge about the teaching and learning process of cardiopulmonary resuscitation for laypeople, supported by methodologically well-designed

Table 2 - Critical assessment of the methodological quality of quasi-experimental studies, according to the assessment instrument of the Joanna Briggs Institute. *Ribeirão Preto*, SP, Brazil, 2020

Studies / Questions	Isbye *et al.*, 2005[16]	Jones *et al.*, 2007[17]	Krasteva *et al.*, 2011[19]	Nielsen *et al.*, 2012[20]	Lópes, *et al.*, 2017[22]	Patón *et al.*, 2018[24]
1. Is it clear what "cause" and "effect" are?	Yes	Yes	Yes	Yes	Yes	Yes
2. Are group participants similar?	Yes	Yes	NA	Yes	NA	Yes
3. Were participants compared with similar treatment?	Yes	Yes	NA	Yes	NA	Yes
4. Was there a control group?	Yes	Yes	No	Yes	No	Yes
5. Were there multiple measurements?	No	No	No	Yes	No	No
6. Was follow-up complete or were differences between groups described?	Yes	Yes	Yes	Yes	Yes	Yes
7. Were participant outcomes measured in the same way?	Yes	Yes	Yes	Yes	Yes	Yes
8. Were the results measured reliably?	Yes	Yes	Yes	Yes	Yes	Yes
9. Were appropriate analyzes used?	Yes	Yes	Yes	Yes	Yes	Yes

*NA= not aplicable.
Source: data obtained from the study itself.

Table 3 - Critical methodological assessment of experimental studies, according to the assessment instrument of the Joanna Briggs Institute. *Ribeirão Preto*, SP, Brazil, 2020

Studies / Questions	Chung *et al.*, 2010[18]	Blewer *et al.*, 2016[21]	Ko *et al.*, 2018[23]	Bylow *et al.*, 2019[25]	Bylow *et al.*, 2019[26]
1. Was randomization used?	Yes	Yes	Yes	Yes	Yes
2. Was the researcher blind?	Yes	No	No	Yes	Yes
3. Were the groups similar?	Yes	Yes	Yes	Yes	Yes
4. Were participants blinded?	No	No	No	No	Yes
5. Who applied the treatment was blinded?	No	No	No	No	Yes
6. Were the evaluators blinded?	Yes	No	No	Yes	Yes
7. Were the groups treated identically?	Yes	Yes	Yes	Yes	Yes
8. Is the follow-up completed?	Yes	Yes	No	Yes	Yes
9. Were the participants in the groups analyzed?	Yes	Yes	Yes	Yes	Yes
10. Were the results measured in the same way for the groups?	Yes	Yes	Yes	Yes	Yes
11. Were the results measured reliably?	Yes	Yes	Yes	Yes	Yes
12. Was appropriate statistical analysis used?	Yes	Yes	Yes	Yes	Yes
13. Was the study design appropriate?	Yes	Yes	Yes	Yes	Yes

Source: data obtained from the study itself.

Table 4 - Assessment of the methodological quality of the studies, according to the Medical Education Research Study Quality Instrument. *Ribeirão Preto*, SP, Brazil, 2020

Studies / Domains	Isbye *et al.*, 2005[16]	Jones *et al.*, 2007[17]	Chung *et al.*, 2010[18]	Krasteva *et al.*, 2011[19]	Nielsen *et al.*, 2012[20]	Blewer *et al.*, 2016[21]	Lópes, *et al.*, 2017[22]	Ko *et al.*, 2018[23]	Patón *et al.*, 2018[24]	Bylow *et al.*, 2019[25]	Bylow *et al.*, 2019[26]
Design	No-Randomized: 2	Randomized: 3	Randomized: 3	Not-Randomized: 2	No-Randomized: 2	Randomized: 3	No- Randomized: 2	Randomized: 3	No-Randomized: 2	Randomized: 3	Randomized: 3
Number of Center and % of Response	2: 1.0 >75%: 1.5	>3: 1.5 >75%: 1.5	1: 0.5 >75%: 1.5	1: 0.5 >75%: 1.5	1: 0.5 >75%: 1.5	>3: 1.5 <50%: 0.5	> 3: 1.5 >75%: 1.5	1: 0.5 >75%: 1.5	1: 0.5 >75%: 1.5	>3: 1.5 >75%: 1.5	>3: 1.5 >75%: 1.5
Type of Assessment	Objective: 2.0	Objective: 2.0	Objective: 2.0 Subjective: 1.0	Objective: 2.0	Objective: 2.0	Objective: 2.0	Objective: 2.0	Objective: 2.0	Objective: 2.0	Objective: 2.0 Subjective: 1.0	Objective: 2.0
Validity of the Instrument	Content: 1	Content: 1	Content: 1	Content: 1	Content: 1	Content: 1	Content: 1	Content: 1	Content: 1	Content: 1	Content: 1
Data Analysis	Correct and beyond descriptive: 3	Correct and beyond descriptive: 1 3	Correct and beyond descriptive: 3	Correct and beyond descriptive: 1 3	Correct and beyond descriptive: 3	Correct and beyond descriptive: 1 3	Correct and beyond descriptive: 3	Correct and beyond descriptive: 3	Correct and beyond descriptive: 3	Correct and beyond descriptive: 3	Correct and beyond descriptive: 3
Results	Knowledge and Skill: 1.5	Knowledge and Skill: 1.5	Conhecimento e Habilidade: 1.5 Attitude: 1	Knowledge and Skill: 1.5	Knowledge and Skill: 1.5	Knowledge and Skill: 1.5	Knowledge and Skill: 1.5	Knowledge and Skill: 1.5	Knowledge and Skill: 1.5	Knowledge and Skill: 1.5 e Attitude: 1	Knowledge and Skill: 1.5
Score	12.0	13.5	14.5	11.5	11.5	12.5	12.5	12.5	11.5	15.5	13.5

studies, with a high level of evidence (levels 2 and 3). Only four studies[24-26] are current, a fact that encourages the need to explore the theme, given the accelerated technological transformation of health education, and the inclusion of innovative pedagogical strategies.

This study confers scientific novelty in the context of CPR, for compiling teaching and learning strategies aimed at laypeople and for indicating the most adopted and effective educational approaches. To this end, the skills that have been valued and evaluated in this context are highlighted, a crucial factor for understanding the educational weaknesses that still exist in terms of competence development. Also, for evaluating the quality obtained in the methodological path of the included studies and promoting evidence-based practice.

Training with a dummy and instructor was identified as the most used pedagogical mechanism. Providing lay persons with the opportunity to participate in courses and training on CPR with an instructor increases their ability to practice and makes them more confident, which is essential for the survival of victims of CPA, given its exacerbated incidence in the extra- hospital - 50-60 per 100,000 people/year.[4]

An experimental study conducted in 2019, which compared CPR training for laypeople using an instructor and a low-fidelity dummy, corroborates this assertion, as it is an easy-to-apply strategy for this audience, when compared to teaching through the web. This study did not reveal statistically significant differences in the development of cognitive skills in CPR but indicated the possibility of articulating training with a mannequin and instructor and educational technologies for an effective teaching of CPR to laypeople.[26]

It was noted that associating a feedback device[19-22-24] with CPR training with an instructor and dummy enhances learning outcomes, as well as adopting the video class on this topic.[16-18,20,21,24,25] In this research, both educational resources have been shown to be more effective in developing cognitive and psychomotor skills in laypeople.

Feedback devices for CPR are technologies capable of guiding the rescuer during the assistance, analyzing the frequency and depth of compressions, and sending a text and voice command so that he can adapt the maneuvers in real time.[24]

An experimental study carried out in 2018 in Singapore aimed to compare the instructor-led CPR training for laypeople with the instructor-led training associated with the feedback device and concluded that participants who underwent training with a feedback device had better results for learning CPR, possibly because they are able to modify their performance in real time.[23]

Other studies reinforce the assertion that associating a feedback device with training with a dummy and instructor enhances the teaching and learning process in CPR for laypeople.[17,21,24]

The video class is also a good alternative for obtaining learning results in CPR, as it allows the learner to access the material and study in the necessary and desired frequency, according to the individual pace and availability, providing ease of access in different places, through a variety of devices, including mobile.[24-25]

Experimental research that compared the video class to the lecture or skills training with dummy and instructor[17,18,20] observed that the video class achieved results as effective for CPR education for laypeople as other strategies, making it a potential technological resource to be associated with other methods.[24,25]

The second category covered the skills assessed by the studies that made up the sample on teaching CPR to laypeople. Cognitive skills (knowledge in CPR) and especially psychomotor skills (practical skills) were widely valued by research in this area.

To assess the influence of training on lay person's knowledge, the most frequently used strategy has been to compare the participant's level of knowledge before and after being submitted to the educational event. And the assessment of psychomotor skills involves demonstrating how actions are performed, usually identified by the objective structured clinical examination (OSCE), characterized by a set of procedures related to CPR, which generates a score and quantifies performance.[27]

It is essential, however, to value the assessment of affective skills, that is, the attitudes of laypeople in relation to learning CPR, a variable addressed in an incipient way by the studies that comprised the present research sample.[25] The devaluation of attitudes towards the process teaching and learning of CPR can negatively affect the training of the person for the service, by disregarding the development of their self-confidence, self-efficacy, leadership, proactivity, satisfaction with learning and their perceptions regarding the experience.[28]

An experimental study carried out with 256 laypeople compared learning strategies for CPR, aiming to assess the development of confidence in this population regarding the service, and demonstrated that the use of video classes and lectures is able to increase the lay person's confidence to apply CPR.[18]

It is noteworthy that, in order to develop clinical competence for CPR in laypeople, it is necessary to articulate theoretical knowledge (knowing), practical resourcefulness (acting) and attitude (wanting, being able, acting), and that this scenario is impacted by the level of security, satisfaction and self-confidence of the learner, who must feel able to carry out the activities, free from errors, and believe in their abilities to act quickly, efficiently and autonomously.[18]

The evaluation of the methodological path of the studies included in the sample, using the JBI tool, revealed good quality, highlighting weaknesses only in the absence of multiple measurements of results and in the blinding of those involved in the studies.

It is suggested that future research is dedicated to the development of methodological studies capable of building and validating more innovative and attractive technologies, such as, for example, video simulation, to promote the teaching and learning process in CPR for laypeople, as well as clinical studies that test the effectiveness of these educational technologies against existing strategies to choose best practices. In addition, there is a need for new studies to have the intention of evaluating the behavioral skills of laypeople when learning CPR.

The limitation to develop this study was the possible neglect of references that are in other databases not included, since only five databases were inserted for the search for studies. This may not have been enough to exhaust the scientific literature on the subject and, consequently, the non-inclusion of eligible research to compose this review.

CONCLUSION

The following were highlighted as pedagogical possibilities for teaching cardiopulmonary resuscitation to laypeople: the lecture; skills training with dummy and instructor; skills training with mannequin, instructor and feedback device, self-instructional video, and web-based education. Skill training with a mannequin and instructor was the most prevalent strategy, however, skills training with a feedback device and video class proved to be more effective. The assessment of psychomotor and cognitive skills is more valued by studies, to the detriment of affective skills.

The methodological assessment instrument of the Joanna Briggs Institute demonstrated good quality of the studies and identified weaknesses in the absence of multiple measurements of results and the blinding of those involved in the research. The Medical Education Research Study Quality Instrument revealed moderate methodological quality for most studies and gaps in the assessment of participants and in the description of the validation of the instruments used in the experiments. This study contributes to health research, assistance, and education by providing a framework of knowledge based on reliable scientific evidence that supports the best and most effective practices for teaching cardiopulmonary resuscitation to laypeople.

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