

## EDUCATIONAL METHODOLOGIES IN LEARNING FIRST AID IN SCHOOLS: SCOPE REVIEW

### METODOLOGIAS EDUCATIVAS NA APRENDIZAGEM DE PRIMEIROS SOCORROS EM ESCOLAS: REVISÃO DE ESCOPO

### METODOLOGÍAS EDUCATIVAS EN EL APRENDIZAJE DE LOS PRIMEROS AUXILIOS EN LA ESCUELA: REVISIÓN DEL ALCANCE

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#### ABSTRACT

**Objective:** to describe educational methodologies and their results in teaching first aid to elementary school teachers and students. **Method:** scoping review with articles published in Portuguese, English or Spanish. Original articles, review articles and experience reports on teaching-learning methodologies in first aid were included. The review covered 21 studies published between 2015 and 2020. **Results:** traditional educational approaches of the theoretical-practical training type predominated; however, as more effective, methodologies that provide the active participation of students in the construction of learning scenarios and challenges were highlighted. Competencies for first aid education require mastery of skills, knowledge, and attitudes, and can be developed by lay people (teachers and students) if they receive the appropriate training. Pre- and post-test application was the resource used to assess the results of the teaching-learning relationship, with significant variability in terms of sampling and temporal criteria. **Conclusion:** regardless of the educational methodology and evaluation method used, learning first aid in schools has a positive impact on self-efficacy in responding to emergency situations, both for students and teachers. Teaching must be encouraged in the school environment, according to the specificities of the age group and on an annual basis.

**Keywords:** First Aid; School Health Services; Teaching Materials; Education, Primary and Secondary; Health Education.

#### RESUMO

**Objetivo:** descrever as metodologias educativas e seus resultados no ensino de primeiros socorros para professores e estudantes do Ensino Fundamental. **Método:** revisão de escopo com artigos publicados em português, inglês ou espanhol. Incluíram-se artigos originais, artigos de revisão e relatos de experiência sobre metodologias de ensino-aprendizagem em primeiros socorros. A revisão abrangeu 21 estudos publicados entre os anos de 2015 e 2020. **Resultados:** abordagens educativas tradicionais do tipo treinamento teórico-prático predominaram; entretanto, como mais efetivas, foram apontadas as metodologias que oportunizam a participação ativa dos educandos na construção dos cenários e desafios de aprendizagem. As competências para educação em primeiros socorros demandam domínio de habilidades, conhecimentos e atitudes, podendo ser desenvolvidas por leigos (professores e estudantes), desde que eles recebam o devido treinamento. Aplicação pré e pós-teste foi o recurso utilizado para aferir os resultados da relação ensino-aprendizagem, com expressiva variabilidade quanto aos critérios amostrais e temporais. **Conclusão:** independente da metodologia educativa e do método avaliativo utilizados, a aprendizagem de primeiros socorros nas escolas produz impacto positivo na autoeficácia das respostas às situações de emergência, tanto para estudantes quanto para professores. O ensino deve ser estimulado no ambiente escolar, de acordo com as especificidades de faixa etária e com periodicidade anual.

**Palavras-chave:** Primeiros Socorros; Serviços de Saúde Escolar; Materiais de Ensino, Ensino Fundamental e Médio; Educação em Saúde.

#### RESUMEN

**Objetivo:** describir metodologías educativas y sus resultados en la enseñanza de primeros auxilios a profesores y alumnos de enseñanza primaria. **Método:** revisión exploratoria con artículos publicados en portugués, inglés o español. Se incluyeron artículos originales, artículos de revisión e informes de experiencias sobre metodologías de enseñanza-aprendizaje en primeros auxilios. **Resultados:** la revisión abarcó 21 estudios publicados entre 2015 y 2020. Predominaron los enfoques educativos tradicionales de tipo formativo teórico-práctico, sin embargo, las metodologías que brindan oportunidades para la participación activa de los estudiantes en la construcción de escenarios y desafíos de aprendizaje fueron señaladas como las más efectivas. Las competencias para la enseñanza de primeros auxilios exigen el dominio de habilidades, conocimientos y actitudes, y pueden ser desarrolladas por personas legas (profesores y alumnos), siempre que estén debidamente cualificadas. La aplicación de pre y postest fue el recurso utilizado para evaluar los resultados de la relación enseñanza-aprendizaje, con variabilidad significativa en cuanto a los criterios de muestra y tiempo. **Conclusión:** independientemente de la metodología educativa y del método de evaluación utilizados, el aprendizaje de primeros auxilios en la escuela tiene un impacto positivo en la autoeficacia para responder a situaciones de emergencia, tanto para los alumnos como para los profesores. La enseñanza debe estimularse en el medio escolar de acuerdo con las especificidades del grupo de edad, con periodicidad anual.

**Palabras clave:** Primeros Auxilios; Servicios de Salud Escolar; Materiales de Enseñanza; Educación Primaria y Secundaria; Educación en Salud.

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## INTRODUCTION

First aid is defined as immediate care to be provided to victims of accidents or sudden illness, with the aim of maintaining their vital functions until the arrival of qualified assistance<sup>(1)</sup>. Any unintentional, preventable event that occurs unexpectedly causing suffering, death or damage is conceptualized as an accident<sup>(2)</sup>.

Researches emphasize the relevance of preventive approaches in health, such as teaching and the inclusion of first aid in the school context for all subjects that are part of this environment<sup>(3-5)</sup>. In this sense, accidents in childhood are mostly preventable and, if not treated properly, can lead to serious sequelae, and even lead to death. Thus, it is relevant to address health education in first aid within the school space.

In recent decades, first aid has taken up space in the school environment, where actions have been carried out by healthcare professionals to reach educators and students<sup>(6,7)</sup>. Around the world, the American Heart Association (AHA) and the European Resuscitation Council (ERC) have developed training using schoolchildren as a target audience. In countries such as Norway, Denmark, France and the United Kingdom, teaching Cardiopulmonary Resuscitation (CPR) is mandatory<sup>(8)</sup>.

According to the AHA, in the United States, since 2018, 40 states have adopted laws making CPR training a prerequisite for completing high school. Students in this cycle represent the largest group of people receiving training in the country. However, CPR legislation varies from state to state, and there is no standard method for implementing this teaching<sup>(9,10)</sup>.

In the same year, law No. 13,722, also known as the Lucas Law, came into effect in Brazil, making it mandatory to train teachers and employees working in schools and children's recreation establishments<sup>(11)</sup>. This law aims to increase the number of people capable of reducing deaths or sequelae in accident victims, as well as forming future citizens aware of their role in the community in which they are inserted.

Among the main benefits of inserting first aid teaching in schools, we highlight the socialization of knowledge, the motivation to apply rescue techniques, the return of actions aimed at society and the increase in the trained lay public, which may change outcomes of morbidity and mortality in the assisted population<sup>(12)</sup>. In this context, this study aims to describe the educational methodologies and their results in teaching first aid to elementary school teachers and students.

## METHOD

This is a scoping review, guided by the assumptions of the Joanna Briggs Institute (JBI) – Methodology for JBI Scoping Review. The subsequent phases were followed: i) definition and alignment of objectives and research questions; ii) development of inclusion criteria according to objectives and questions; iii) elaboration and planning of the search strategy and selection of studies; iv) identification of relevant studies; v) selection of studies; vi) data extraction; vii) data mapping; and viii) summarization of results<sup>(13)</sup>.

The guiding question of this study was elaborated according to the mnemonic combination PCC (P: Population – Teachers and Students, 6-19 years old; C: Concept – teaching-learning methodologies in first aid; C: Context – Elementary School), being the following guiding question established: what are the educational methodologies and their results in teaching first aid to elementary school teachers and students?

Inclusion criteria were original articles and experience reports, as they addressed empirical knowledge, published in Portuguese, Spanish or English, from 2015 to 2020, and that dealt with teaching-learning methodologies in first aid. Studies carried out with teachers and/or elementary school students (understood as the period corresponding to the first nine school years)<sup>(14)</sup> were included. Duplicate studies, editorials, theses, dissertations, review studies, theoretical essays, reflection studies, non-original articles, articles that did not contemplate the age group or that did not meet the topic were excluded.

The following databases were verified: Latin American and Caribbean Health Sciences Literature (LILACS), Bibliographic Database on Health Care in Iberoamerica (CUIDEN), Cumulative Index to Nursing and Allied Health Literature (CINAHL), ScienceDirect and EBSCO. Searches of indexed publications in virtual libraries included: Scientific Electronic Library Online (SciELO) and National Library of Medicine (PubMed). The following controlled terminology descriptors recommended by Medical Subject Headings (MeSH) and/or Health Sciences Descriptors (DeCS) were selected: first aid; school; teaching materials. The search strategy used followed the definition of each corresponding database. The Boolean AND operator was used with the following combinations: “first aid” AND “schools”; “first aid” AND “teaching materials”. The search strategies were adopted in their equivalence in Spanish, English and Portuguese. The searches were carried out from January to June 2021. To systematize the process of inclusion of studies, the PRISMA Extension for Scoping Reviews (PRISMA ScR)

(15) methodology was chosen. The selection was carried out by reading the titles and abstracts, and the eligibility by full text reading (Figure 1).

For the data extraction step, a spreadsheet for data collection was prepared in Excel, allowing the identification and organization of the essential elements of the

studies: authorship, year of publication, journal, country where the study was carried out, population, type of study, educational methodologies, and main results. The results will be presented through a numerical and thematic description.

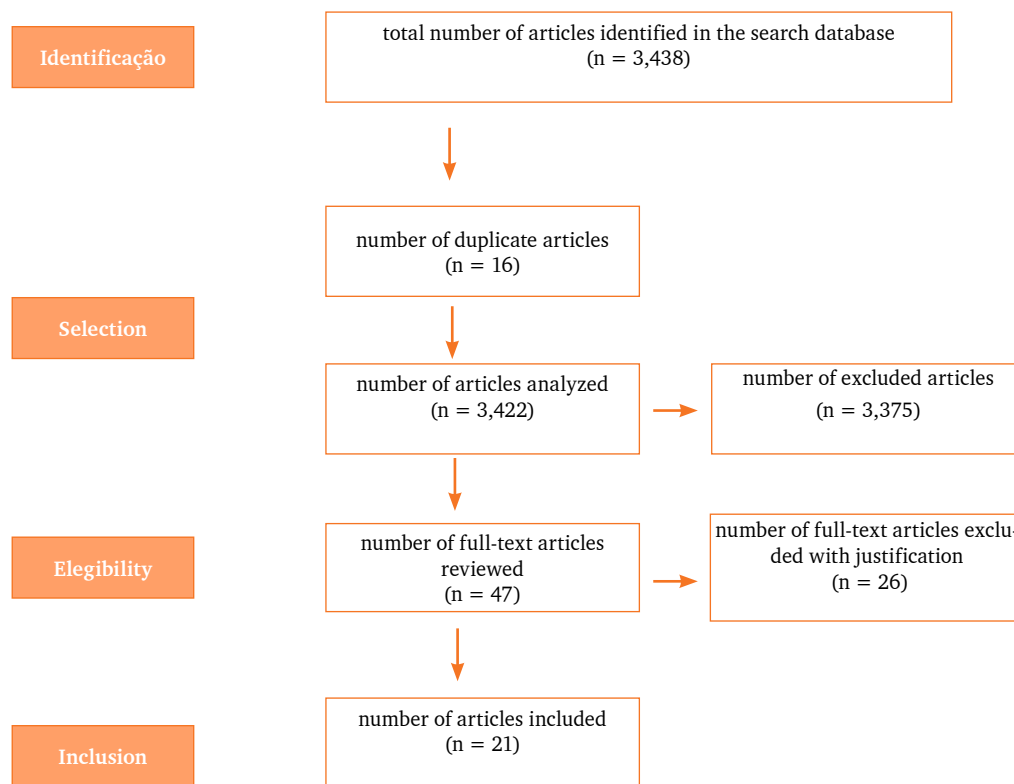


Figure 1 - Flowchart of the selection of studies that make up the research according to the PRISMA ScR(15).

## RESULTS

To compile and communicate the results, aiming to present an overview of all the material, the following categories were systematized: i) general profile of the works; ii) characterization of the studies and topics addressed; and iii) educational methodologies and their results.

### General profile of the works

In the scope review, 21 studies were included<sup>(16-36)</sup> (Table 1). The largest number of publications was concentrated in the years 2017<sup>(n=6)</sup>, 2020<sup>(n=5)</sup> and 2015<sup>(n=4)</sup>. As for the editorial origin, the studies were published in 19 scientific journals, most of them international. Regarding the country of origin of the studies, European and

Latin American countries prevailed, with Brazil standing out, with seven studies (Table 1).

### Characterization of the studies and topics addressed

Regarding the methodological design, most studies used a quantitative approach<sup>(19-21,23,25-27,29-31,33-34,36)</sup>, with quasi-experimental studies (n=8)<sup>(16, 19,22,23,29,30,34,35)</sup>, experimental studies with a control group (n=3)<sup>(17,25,33)</sup>, longitudinal studies (n=3)<sup>(21,27,31)</sup>, randomized studies (n=1)<sup>(28)</sup> and intervention study (n=2)<sup>(26,32)</sup>. The other studies were as experience reports (n=2)<sup>(20,24)</sup>, mixed method (n=1)<sup>(36)</sup> and exploratory study (n=1)<sup>(18)</sup>.

Of the 21 studies included, 14 involved students<sup>(17-22,23-25,28,30,31-33)</sup> and 7 involved teachers.<sup>(16,23-25,29,30,32)</sup> No study investigated the two subjects in a concomitant

way. In studies carried out with students, the prevalent age group was from 10 to 14 years<sup>(17-22,26-28,31,33,34-36)</sup>. The number of participants in the analyzed studies ranged from 15<sup>(16)</sup> to 764<sup>(36)</sup>, with students being the prevalent group. In terms of teaching, there was a predominance of nursing professionals and students (n=6), trained instructors (n=3), medicine (n=3), paramedics (n=2), researchers (n=2), lifeguards (n=1) medical doctors and trained teachers (n=1) and medic doctors and nurses (n=1). Three studies did not inform the lecturer.

Some studies, by supporting the implementation and mandatory teaching of first aid in schools, suggest that

duly trained teachers can act as instructors in basic first aid maneuvers<sup>(20,21,24,27)</sup>.

The topics most discussed with students and teachers were: cardiopulmonary resuscitation (CPR) maneuvers (n=15)<sup>(17-23,28-30,33-36)</sup>, bleeding control (n=6)<sup>(17,23,27,30,32,35)</sup>, burns (n=6)<sup>(16-18,22,25,26)</sup>, choking (n=6)<sup>(18,22-24,30,32)</sup>, use of automated external defibrillator (AED) (n=5)<sup>(16,20,23,27,33)</sup> and the ambulance call (n=4)<sup>(25,27,29,31)</sup>. Topics such as convulsions, heatstroke, electric shock, poisoning, accidents with venomous animals, drowning, fractures, fainting and allergic reactions were also covered in the studies, but on a smaller scale.

Table 1 - Characterization of articles according to authorship, year of publication, journal and country where the study was carried out. *Porto Alegre, Rio Grande do Sul, Brazil, 2021*

Study	Year	Authorship	Journal	Country of the Study
16	2015	Martín RA.	Enfermería Universitaria	Argentina
17	2015	Costa CWA, et al.	Pensar a Prática	Brazil
18	2015	Albuquerque AM, et al.	Rev enferm UFPE on line	Brazil
19	2015	Wilks J, et al.	Australian Health Review	Australia
20	2016	Calicchia S, et al.	BioMed Research International	Italy
21	2016	R.-P. Lukas, et al.	Resuscitation	Germany
22	2017	Mesquita MT, et al.	Revista Ciência Plural	Brazil
23	2017	Calandrim LF, et al.	Rev Rene	Brazil
24	2017	Silva LGS, et al.	Enferm. Foco	Brazil
25	2017	Arli SK; Yildirim Z.	International Journal of Caring Sciences	Turkey
26	2017	Bandyopadhyay L, et al.	Journal of Family Medicine and Primary Care	India
27	2017	Banfai B, et al.	Emerg Med J	Hungary
28	2018	Weidenauer D, et al.	PLoS ONE	Austria
29	2018	López MP, et al.	An Pediatr (Bare)	Spain
30	2019	Zonta JB, et al.	Rev. Latino-Am. Enfermagem	Brazil
31	2019	Bánfai B, et al.	Emerg Med J	Hungary
32	2020	Hosapatna M, et al.	Kurume Medical Journal	India
33	2020	Süss-Havemanm C, et al.	BMC Public Health	Germany
34	2020	Dhansura T, et al.	Indian Journal of Anesthesia	India
35	2020	Santana MMR, et al.	Rev. Enferm. UFMS	Brazil
36	2020	Pivac S; Gradisek P; Skela-Savic B.	BMC Public Health	Slovenia

### Educational Methodologies: Approaches and results

As for the educational approach used, the modality named training in first aid predominated, followed by educational intervention, didactic unit, workshops, classes in first aid and course in first aid (Table 2). In most studies (n=19), theoretical classes were associated with practical training, with simulation of cases as real situations and the use of dummies and first aid boxes. Adoption of other strategies was also identified, such as theater, group

exercises and booklet (Table 2). Regarding the workload and the number of meetings, there were studies lasting up to six hours, with meetings lasting an average of two hours (n=10), studies with a workload concentrated in a single event (n=7), followed by three meetings (n=3) and two meetings (n=2).

In measuring the results, a pre- and post-test questionnaire (n=16) was applied as a strategy to assess theoretical knowledge and quantify knowledge retention after

the intervention. On the other hand, skills and attitudes were rarely mentioned in the evaluation. The post-intervention evaluation methodology presented a range of modalities - ranging from one to three applications - and periodicity - starting soon after the intervention and extending up to six years.

There were significant differences in the results obtained in most studies, when comparing the pre-test

and post-test responses, varying according to the topic and evaluation period. It was observed that knowledge remained satisfactory for up to 45 days<sup>(17,19)</sup>, and could last between three<sup>(34)</sup> and four months after the intervention<sup>(27,31)</sup>. After 15 months, there was a significant decrease in knowledge<sup>(31)</sup>.

Table 2 - Characterization of articles according to approach and results. *Porto Alegre, Rio Grande do Sul, Brazil, 2021*

No.	Educational approach and instruments	Results
16	One-week theoretical/practical educational intervention (5 meetings lasting 4 hours each) with 15 teachers. Pre- and post-test questionnaire.	The average percentage of correct answers before the educational intervention was 38.6%, increasing to 76.2% after the intervention.
17	Applied didactic unit with a group of 20 students, consisting of: 2 meetings, with a total duration of 6 hours; dialoged expository class; practical activity (with gloves, glasses, mask, bandages, tape, and dummy); pre- and post-teaching evaluation after 5 days and 45 days.	After 5 days of intervention, there was 81.3% of use, decreasing to 63.3% after 45 days.
18	Ten workshops of 50 minutes, covering 63 students, carried out with: lectures, theater, and simulation practices; and pre- and post-test questionnaire after each workshop.	One-hundred percent of correct answers in seizure, trauma, and electric shock after intervention. In the topic nose bleeding, the performance was inferior.
19	One day training (8h) with 107 children (lecture, flags, rescue simulation). Application of the pre- and post-test questionnaire at 7 and 56 days.	The training provided significant improvements to knowledge in various emergency scenarios. Knowledge and understanding were retained at the 8-week follow-up. Students reported greater confidence in helping others after training.
20	Four BLS* workshops lasting 2 hours based on simulations and group exercises, with the application of a multiple-choice questionnaire after one year, with 130 students.	Significant difference between the scores obtained in the questionnaire between the case-control group. In the ability test, most students (69.35%) achieved positive results in difficult maneuvers, such as opening UA*, assessing breathing and using AED.
21	Annual events with 1 hour of theory and 2 hours of practice (small groups with a maximum of 5 students (n=261). Application of a questionnaire to assess knowledge at 1, 3 and 6 years.	Similar level of knowledge between those trained for 3 and 6 years. Students' performance was better when trained by teachers than by health technicians in terms of knowledge and ventilation.
22	An expository class (n=46 students) with slides + ludic FA box* (number of hours not informed). Pre- and post-test questionnaire.	Eighty-seven percent of correct answers with educational resources against 37% with only lectures.
23	Theoretical approach with demonstration on dummies with 35 teachers and 6 employees. A meeting lasting 2 hours. They repeated the maneuvers until they were executed correctly. Pre- and post-course theoretical knowledge and practical skills questionnaire.	The training was effective, with professionals performing above 90% in skill and knowledge assessments.
24	Theoretical and practical approach with 10 teachers and delivery of a first aid kit at the end of the meeting (number of hours not informed).	Educational measures, involved in dialogue, help to strengthen, and improve preventive and interventional practices at school.
25	Expository classes using computer, projector, video, and practices with mannequin with 44 teachers. Pre- and post-tests were applied (the number of meetings and hours/class was not informed).	There was a significant difference between the pre- and post-test scores, and the FA education given to the experimental group was effective.
26	A lecture for 230 students with slides and 30 minutes demonstration, including FA box. Pre- and post-test evaluation, after 15 days.	There was a significant difference between obtaining pre- and post-intervention knowledge: cut injuries (3.5% - 86.5%), burns (3.5% - 86%), sprains (9.2% - 79.1%), fracture (12.6% - 76.9%), dog bite (16.5% - 76.1%), snake bite (2.2% - 67.4%), nosebleed (24.3% - 60.9%) and foreign body in the eye (28.7% - 65.2%).
27	Training with 582 students with three theoretical/practical sessions (45 minutes each) in 3 consecutive weeks (1 meeting per week). Questionnaire pre-, immediately and post-test (4 months after training).	Children as young as 7 years old can learn the theoretical foundations of BLS and activate emergency services, use an AED, place a patient in a recovery position and stop bleeding. Knowledge and skills significantly improved in all categories (topics) and maintained satisfactory levels after 4 months.

Continue...



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Table 2 - Characterization of articles according to approach and results. *Porto Alegre, Rio Grande do Sul, Brazil, 2021*

No.	Educational approach and instruments	Results
28	Thirty-minute training and practical skills on a dummy with different compressive strengths (45 kg and 30 kg), with 322 children and adolescents. An evaluation questionnaire was applied after training.	Compression performance of CPR* was generally poorer in the higher resistance (45 kg) than the lower resistance (30 kg) dummies. The compressive strength of the manikins, although influencing CPR performance, did not affect the courage and motivation of children aged 8 to 13 years after CPR training. The findings refute the view that children are discouraged from receiving CPR training even if they are not physically capable of performing adequate CPR.
29	Theoretical training with two sessions: 40 minutes and 80 min of practice with simulation on dummies (81 teachers). Pre- and post-test questionnaire.	CPR performance increased from 1.2% to 46%. Quality improved significantly for correct hand position (97.6 x 72.3%; average depth (48.1 x 38.8); recommended depth (46.5 x 21.5%); adequate compressions (78.7 x 61.2%); and compressions performed (64.2% x 26.9%). Theoretical knowledge increased from 3.7 (correct answers, base questionnaire) to 8 correct answers in the post-training test. Teachers will be able to teach BLS to their students quite easily.
30	Booklet reading by e-mail, in situ simulation* with four scenarios, in two meetings (hour load not informed). Pre- and post-test questionnaire with 76 teachers.	Comparison of pre- and post-in situ simulation results identified promotion of self-confidence, especially for those teachers with less professional experience, without similar previous experience.
31	Three theoretical-practical classes of 45 minutes (1 per week) with 520 students. A pre- and post-intervention questionnaire was applied (immediately after, four months and 15 months).	In some cases, FA knowledge and skills were higher at 15 months than before training. However, knowledge and skills decreased compared to post-test performed immediately after training and 4 months after training. Children as young as 7 years old could remember some aspects of FA in the long term. However, knowledge and skills significantly declined after 15 months. Confidence in ability to perform FA improved after training and remained high after 15 months.
32	Lectures for 150 teachers, application of pre- and post-test. No number of hours informed.	Most teachers did not know the term FA and would like to learn. Significant improvement in post-test responses. Teachers have the time, ability and inclination for FA training.
33	CPR training event in schools, held in three classes, each lasting 45 minutes: 1) interactive lecture on BLS and AED; 2) hands-on training in BLS and AED skills, conducted in small groups (16-24 students with two trainers); and 3) evaluation.	Self-regulated learning (that developed by students) did not increase self-efficacy to help with cardiac arrest. Male students performed better than female students in long-term skill retention. High percentage of students had self-confidence to help cardiac arrest after training and nine months later, regardless of group. Pass rates for breath checking declined sharply by approximately 20% over time. The decline in approval rates for other items ranged by 10%.
34	One-hour training with slideshow and practice, with the participation of 132 students. A post-test was applied immediately and three months later.	The duration time proved to be sufficient to increase baseline knowledge, with an average post-training score of 82%.
35	Theoretical-practical approach with 15 meetings of 60 minutes. There was a realistic simulation with different materials (plastic bags, cloths, backpacks, books, magazines, broomsticks, and cardboard). Pre- and post-test with 67 students.	The knowledge of the participants on the subject CRA/CPR* in the pre-test was deficient. After the intervention, significant advances were made for almost all variables analyzed.
36	Sample of 764 students before CPR training and 566 after two months. Contents and methods of the National CPR Program based on the guidelines of the European Council on Resuscitation.	Significant progress was observed in knowledge of CPR with greater progress at an average age of 12.5 years, as well as in the variables "attitude towards helping others" and "self-confidence".

\*UA: Upper Airway; CRA: Cardiorespiratory Arrest; CPR: Cardiopulmonary Resuscitation; AED: Automated External Defibrillator; BLS: Basic Life Support; FA: First Aid; In Situ: Construction of simulated scenarios in the work environment based on simulation that occur in the real context.

## DISCUSSION

This scope review revealed a set of common and distinct attributes to first aid education aimed at students and teachers in Elementary School. Experiences from different countries, cultural and socioeconomic contexts highlighted the importance and efficacy of using educational approaches, regardless of the characteristics of the public, sample size, duration of interventions and methods of evaluation/measurement of results.

Brazil was the country with the highest number of publications on the subject<sup>(17,18,22-24,30,35)</sup>. In this direction, the enactment of the Lucas Law can represent a significant advance and incentive to the production of studies, as well as boosting public health and education managers to introduce the teaching of this topic in the school space for the prevention and reduction of preventable accidents that occur daily in the environment they are inserted. It should be noted that the responsibility for its regulation and application lies at the level of municipality.

The recurrent topics of the approaches, both for teachers and students, were CPR, bleeding, and choking/asphyxiation. These findings were also observed in a recent research, in which the teaching of FA in the school space had repercussions on increasing the knowledge of students and teachers<sup>(37)</sup>.

Studies carried out with students pointed to the importance of health education in schools, with the teaching of basic notions in first aid, which can be taught from the age of 7<sup>(23,27,38)</sup>. However, the age range of students who participated in most of the studies in this review was over 11 years old.

This finding is in line with the recommendation of the main cardiopulmonary resuscitation organizations in the world, which recommend starting CPR training at 12 years of age. This is based on the observation that the ability to deliver sufficient chest compressions is strongly influenced by children's weight. The need for a body weight of at least 50 kg was indicated for quality compressions to be performed during CPR, and this weight is usually reached at 13 years of age<sup>(28)</sup>.

The International Liaison Committee on Resuscitation (ILCOR), with the support of the World Health Organization (WHO), recommends two hours of training in CPR, annually, from the age of 12<sup>(12)</sup>.

The AHA's 2020 CPR Protocol Update emphasizes the importance of lay public training in high-quality CPR for elementary and high school students. The AHA suggests teaching CPR with in situ simulation, which consists of carrying out training based on real situations. It also recommends the combination or not of traditional

teaching, whose method produces positive results in learning<sup>(39)</sup>.

This review identified little theoretical knowledge and low practical skills of students and teachers on the topic of first aid. These results are like those of a study that evaluated the knowledge of 361 teachers about CPR, of which only 29 (8%) had adequate knowledge. This demonstrates the lack of knowledge about CPR, which suggests that they will hardly be able to instruct their students about the maneuvers or even help someone in CRA<sup>(40)</sup>.

Corroborating these findings, a study carried out in Saudi Arabia, covering 302 teachers from 24 public schools, applied a questionnaire to assess basic knowledge of life support, which revealed inadequate knowledge and skills<sup>(41)</sup>. This indicates the need to include the teaching FA also to teachers in schools<sup>(40)</sup>, which could result in more favorable conditions for the teaching-learning process.

In this direction, a study involving teachers suggested the importance of Nursing professionals being included in the school environment, being able to carry out continuing education actions with the faculty<sup>(16)</sup>. Other studies emphasized the importance of the topic being included in the curriculum, being worked on annually<sup>(23,24)</sup>. The connection between theory and practice provides teachers with the opportunity to expand their knowledge, giving them more confidence to provide assistance when faced with an urgent/emergency situation<sup>(25)</sup>.

As for the educational approaches, the results of the present study revealed the predominance of the traditional model of theoretical-practical training, with a focus on "knowledge retention" from short-term events. Such events have lectures and exercises to simulate attendance and measure the knowledge obtained during the meetings, with significant variation in terms of frequency and duration. Regarding student learning, the need for training courses to be suitable for each age group was pointed out, adapting the content and teaching methodology to the physical and cognitive capacity of the participants, using theoretical-practical methods lasting three hours<sup>(17,25,29)</sup>.

Other investigations have been suggested to study whether student performance is influenced by the characteristics of the instructor or by the interrelation between them, since studies have shown similar results between groups trained by professional instructors and groups trained by duly trained laypeople<sup>(20,22,25)</sup>.

It is important to highlight that there are specificities for each type of educational intervention, such as training, lecture, workshop, realistic simulation, or

theoretical-practical approach. They must be considered by professionals and researchers so that the chosen method successfully reaches the expected result<sup>(42)</sup>.

In this sense, better results were found in studies that used theoretical classes associated with practical-ludic exercises<sup>(21,22,28,35)</sup>. These are similar to those found in systematic reviews<sup>(43,44)</sup>, whose focus of analysis was the use of materials for training in first aid. Interventions that used mixed teaching methods were found to significantly improve knowledge and skills.

A review carried out to identify the technologies used by healthcare professionals to work with adolescents encourages the use of active methodologies as a health promotion tool, expanding the protagonism of subjects<sup>(45)</sup>.

Considering the peculiar characteristics of the children's segment, ludic technologies and digital tools are powerful devices for the motivation and participation of this group in the construction of their knowledge<sup>(45,46)</sup>.

However, in this scope review, there was a prevalence of the traditional teaching method (expositive/practical classes), a reduced number of playful approaches and no experience using digital tools. In schools, this approach can be better explored with the incorporation of resources such as virtual games and tele-simulation, whose proximity to the new generations can provide greater interactivity, engagement and participation<sup>(47)</sup>.

The active participation of students is understood as a premise of the educational act, overcoming the reductionist view of banking education, the one that places apprentices in the position of depositories, objects of action and, therefore, subject to pedagogical maneuvers for the "retention" of knowledge<sup>(48)</sup>. Thus, considering the teaching-learning relationship as a live process in action, it is necessary to incorporate, to the educational methodology, a set of competences consisting of knowledge, skills, and attitudes that attribute meaning to the learning of first aid and its use in the daily life of life of the population; in this case, students, and educators.

About knowledge, competence is associated with mastering the initiatives taken in response to emergencies (what to do? what to use in FA?). The field of skills corresponds to assertive responses for checking the scene and the victim, calling a specialized team, and providing care. The attitudes to be developed, in turn, refer to the readiness, willingness and initiative to provide care and confidence in providing the FA<sup>(44)</sup>.

In this sense, for knowledge in FA to be effective, it is important that people, in addition to feeling confident to perform the care, are willing to help. Although trust is associated with the willingness to help, both have

different concepts. Trust does not necessarily guarantee that help will be provided<sup>(37)</sup>. In addition, according to the study, among the main obstacles to acceptance and learning of first aid are the aversion or fear of making decisions or assuming responsibilities, which is linked to the fear of doing something wrong and blaming oneself for it<sup>(49)</sup>. At the core of these competences, there is also the perspective of preventing accidents and injuries, which must be incorporated into educational programs, as well as the notion of belonging to the collective and, therefore, taking care of oneself and the other<sup>(50)</sup>.

As for the evaluation of the results of educational approaches, this aspect proved to be a crucial aspect and, at the same time, with its methodological rigor in the production of evidence under construction. Although most of the studies used pre- and post-test instruments, the way and frequency of using them showed substantial differences, with only three studies being case-control studies. The structured questionnaire was used as a way of evaluating the "retention" of knowledge in two moments, pre-intervention and post-intervention, the latter being reproduced in different periods.

That said, despite the heterogeneity of evaluative metrics presented in this review, most studies indicated and validated the positive results of their educational programs. Another review study developed in Brazil showed similar results. According to the authors, despite not observing a pattern of intervention methods in the analyzed studies, the pre-intervention tests revealed inferior results in relation to the post-intervention tests, which, in turn, showed significant improvements in the average of correct answers<sup>(51)</sup>. In this direction, a study carried out with 111 students from the state of Pará, with a theoretical-practical educational strategy in CPR and with the purpose of assessing skills, obtained positive responses in the technical aspect, identifying improvement in the performance of students in chest compressions in terms of rhythm and depth<sup>(52)</sup>.

Therefore, evaluation as a permanent element of the educational process requires specific research to produce the best evidence, given the presence of intervening objective and subjective factors<sup>(34,44)</sup>.

It is also worth mentioning that a broader perspective and an important complement to a more rigorous evaluation of results is the identification of elements of the educational process itself, such as elements of reach, feasibility and acceptability<sup>(20,49)</sup>. Therefore, approaches qualitative and participatory approaches are indicated, and multicenter studies can expand the possibilities for comparison.



## CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

This study contributed to knowledge about the methodologies used and the results obtained in first aid education in the school environment, identifying similar and dissonant characteristics between different realities and countries. Learning centered on exposing content followed by practical exercises and pre- and post-intervention testing were the predominant approaches in the studies.

The study revealed that, regardless of the educational methodology and evaluation method used, learning about first aid in schools has a positive impact on the self-efficacy of responses to emergency situations, both for students and teachers. In addition, first aid education aimed at the school community enables teachers and students to feel confident in providing assistance when faced with urgent and emergency situations. Teaching should be encouraged in the school environment on an annual basis and according to age group specificities.

To expand its benefits, it is also pointed out the need to think about methodologies that favor interactivity, to enable the joint construction of knowledge, skills and attitudes between the facilitator and the public, which instigates critical thinking.

It is understood that the results of this review may encourage public health and education managers to introduce the teaching of this topic in schools, in addition to encouraging the production of new studies. These initiatives may contribute to the prevention and reduction of accidents that frequently occur in the school environment.

As limitations of the study - despite covering most of the existing literature -, the authors recognize that important publications may not have been explored, due to the strategies and search terms used in this research.

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