

# The teaching of leadership for healthcare professionals in the context of cardiorespiratory arrest: integrative review

## La enseñanza del liderazgo para profesionales de la salud en el contexto de la parada cardiorrespiratoria: revisión integrativa

Isabela de Souza Gonçalves<sup>1</sup>, Larissa de Oliveira Briganti Carvalho<sup>2</sup>, José César de Araújo<sup>3</sup>, Roberta Seron Sanches<sup>4</sup>, Rogério Silva Lima<sup>5</sup>.\*

1 Federal University of Alfenas, Faculty of Medicine, Alfenas-MG, Brasil.

[isabela.goncalves@sou.unifal-mg.edu.br](mailto:isabela.goncalves@sou.unifal-mg.edu.br)

2 Federal University of Alfenas, Faculty of Medicine, Alfenas-MG, Brasil.

[larissa.briganti@sou.unifal-mg.edu.br](mailto:larissa.briganti@sou.unifal-mg.edu.br)

3 Federal University of Alfenas, Postgraduate Program in Nursing, School of Nursing, Alfenas-MG, Brasil. [jose.araujo@sou.unifal-mg.edu.br](mailto:jose.araujo@sou.unifal-mg.edu.br) ORCID, 0000-0001-5672-9173

4 Federal University of Alfenas, Postgraduate Program in Nursing, School of Nursing, Alfenas-MG, Brasil. [roberta.sanches@unifal-mg.edu.br](mailto:roberta.sanches@unifal-mg.edu.br) ORCID, 0000-0001-7557-5530

5 Federal University of Alfenas, Postgraduate Program in Nursing, School of Nursing, Alfenas-MG, Brasil. [rogerio.lima@unifal-mg.edu.br](mailto:rogerio.lima@unifal-mg.edu.br) ORCID, 0000-0002-1751-2913

\* Correspondence: [rogerio.lima@unifal-mg.edu.br](mailto:rogerio.lima@unifal-mg.edu.br)

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**Abstract:** Cardiorespiratory arrest has a high prevalence among cardiovascular emergencies and the care provided by health professionals must be of excellence. Therefore, there is a need to prepare health professionals to deal with such situations with regard not only to the performance of technical skills, but also to the performance of non-technical skills, with leadership being exercised within the teams, crucial for a satisfactory outcome. The study aims to identify evidence in the literature regarding the strategies used in teaching leadership to health professionals in the context of cardiac arrest. This is an integrative literature review with searches in the CINAHL, MEDLINE, LILACS and WEB OF SCIENCE databases. The final sample included 4 studies, carried out in developed countries and with a relatively low level of evidence; among the strategies for teaching leadership, the practice of simulation in association with learning assessment methods predominated, showing good results in terms of leadership performance and the outcome of cardiac arrest. It is recommended that other studies evaluate leadership teaching strategies in the context of cardiorespiratory arrest in heterogeneous teams and in developing countries.

**Keywords:** Leadership teaching; Health professionals; cardiorespiratory arrest.

**Resumen:** La parada cardiorrespiratoria tiene una alta prevalencia entre las emergencias cardiovasculares y la atención que brindan los profesionales de la salud debe ser de excelencia. Por lo tanto, existe la necesidad de preparar a los profesionales de la salud para enfrentar tales situaciones en lo que respecta no solo al desempeño de habilidades técnicas, sino también al desempeño de habilidades no técnicas, ejerciendo el liderazgo dentro de los equipos, crucial para un resultado satisfactorio. El estudio tiene como objetivo identificar evidencias en la literatura sobre las estrategias utilizadas en la enseñanza del liderazgo a los profesionales de la salud en el contexto de la parada cardíaca. Esta es una revisión bibliográfica integradora con búsquedas en las bases de datos CINAHL, MEDLINE, LILACS y WEB OF SCIENCE. La muestra final incluyó 4 estudios, realizados en países desarrollados y con un nivel de evidencia relativamente bajo; entre las estrategias para la enseñanza del liderazgo, predominó la práctica de la simulación asociada a los métodos de evaluación del aprendizaje, mostrando buenos resultados en cuanto al desempeño del liderazgo y al resultado de la paro cardíaco. Se recomienda que otros estudios evalúen estrategias

de enseñanza del liderazgo en el contexto de paro cardiorrespiratorio en equipos heterogéneos y en países en vías de desarrollo.

**Palabras clave:** Enseñanza de liderazgo; profesionales de la salud; paro cardiorrespiratorio.

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## 1. Introduction

According to the American Heart Association (AHA), Cardiac Arrest (PCR) occurs when there is a sudden loss of cardiac function due to a malfunction of the heart's electrical system, resulting in the collapse of the systemic circulation, associated with the absence of breathing and, often, in death, if adequate care is not provided quickly. Among cardiovascular emergencies, PCR is highly prevalent, being associated with high rates of morbidity and mortality (1). Data collected in the United States point to the occurrence of out-of-hospital PCR, as responsible for 63% of deaths from Ischemic Heart Disease, with a survival rate of 9.5% when the initial care is performed on site (2).

Initial care, provided by one or more trained health professionals, requires quality cardiopulmonary resuscitation (RCP), standardized by algorithms and protocols. A sequence of behaviors is followed that aim to increase the probability of survival and/or reduce the chances of post-event sequelae, since survival is directly related to the quality of RCP performed, which requires a high level of technical skills and not -team techniques (2-3).

It is already well established in the literature that technical competences are crucial for the development of excellent RCP, however studies in recent years show the importance of implementing non-technical competences - such as teamwork, leadership, situational awareness, communication and decision-making - in the team's performance in providing emergency care to the victim of PCR. This is because the stressful environment in which the service usually takes place can contribute to inappropriate technical conduct, a situation that can be avoided if a well-trained leader leads the team efficiently (4).

Based on this analysis, studies show the importance of training professionals in the area also regarding non-technical skills, since, in general, their development and teaching are secondary. Therefore, it is necessary to include specific assessment tools to monitor the learning progress, making it possible to improve such competences, as is done with algorithms for the development of technical competences (5-6).

Bearing in mind that PCR normally develops in a stressful scenario, in which there are distractions and obstacles to the performance of health professionals, it is necessary that they have adequate preparation regarding non-technical skills for satisfactory care, since these can interfere with the performance of technical skills. Examples of satisfactory care related to this training are the ability to confirm and communicate cardiorespiratory arrest and the ability to ensure the timely start and maintenance of the quality of chest compressions (4).

It is known that leadership can be directive or shared, depending on the situation in which the team finds itself. When tasks are simple and/or the leader is the most experienced, directive leadership is employed, with the explicit distribution of tasks to subordinates, who are managed and supervised in their decision-making and conduct. On the other hand, shared leadership has been recommended when the tasks to be performed are more complex and, in this case, group members have freedom to discuss and make decisions while the leader focuses on mediating communication and organizing care (7). Since several leadership models can be used, it is considered necessary to explore the

literature on this competence in PCR, with a view to identifying the possibilities of its teaching in the training of health professionals.

Given the context of high prevalence and morbidity and mortality from PCR in the daily emergency care provided by health professionals, as well as the need for them to be fully prepared to lead the team in the execution of the techniques already established, it is assumed as an object for the study strategies for teaching leadership to health professionals in PCR care.

The study aims to identify the best evidence in the literature on the teaching of leadership to health professionals in the care of PCR.

## 2. Methods

It is an integrative review, a strategy for producing a synthesis of knowledge. Using standardized methods, the best evidence to answer a question is identified (8).

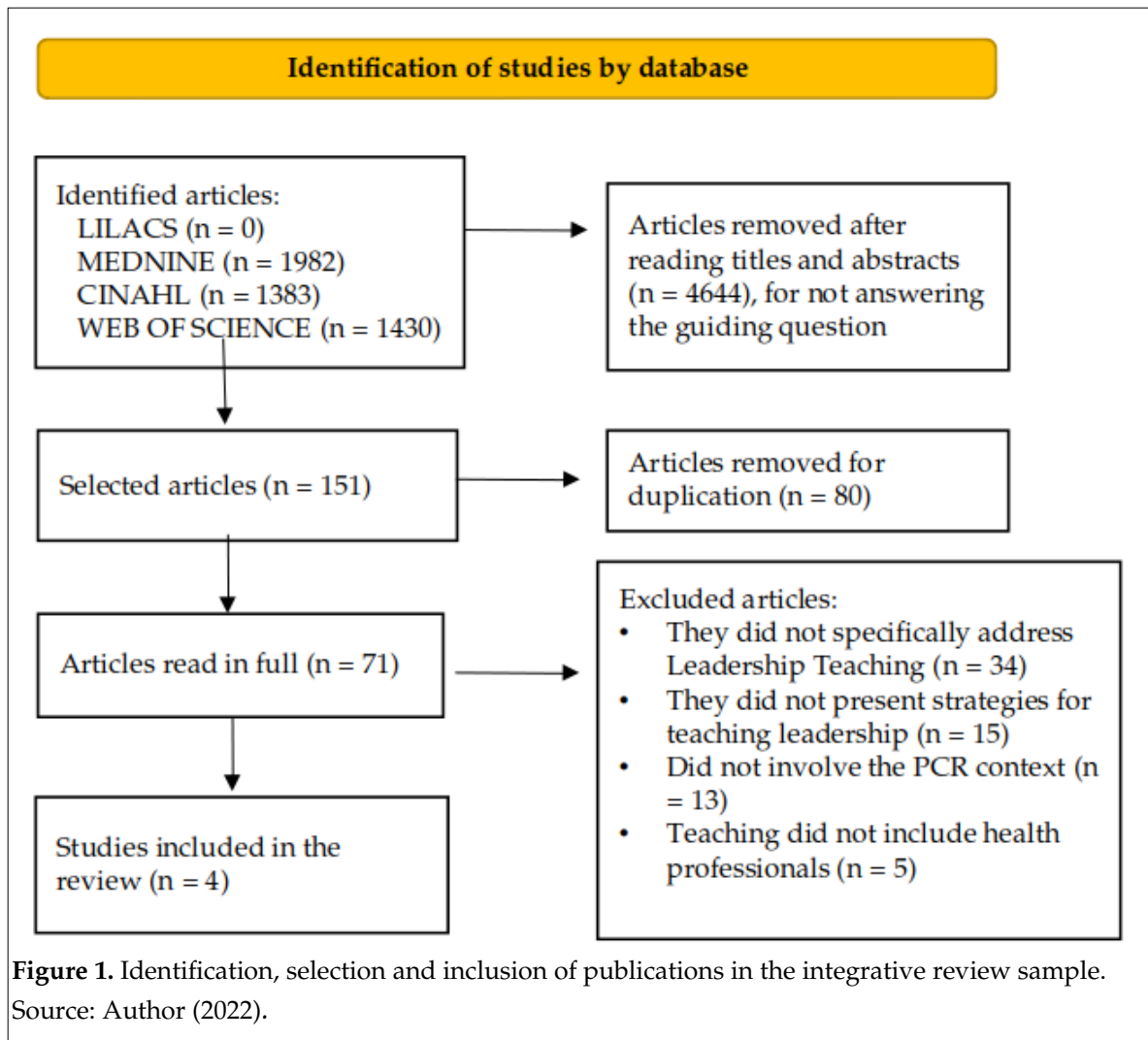
For this work, the following guiding question was elaborated: What is the evidence available in the literature related to strategies for teaching leadership to health professionals for PCR care? To elaborate the question, the PICO strategy (9) was used: Population: health professionals; Intervention: leadership teaching strategies for PCR care; Context: cardiac arrest.

The following inclusion criteria were established: studies published in English, Portuguese and Spanish, available electronically in full, that presented strategies for teaching leadership to health professionals for PCR care. Studies involving students from courses in the health area were excluded. Considering that the theme is a recent concern in the literature, a time frame was not adopted.

Data collection was performed in the following databases: Medical Literature Analysis and Retrieval System Online (MEDLINE), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Latin American and Caribbean Literature in Health Sciences (LILACS) and WEB OF SCIENCE, the following databases were selected, considering that they are broad bases in the linking of productions of the proposed topic. The following keywords and/or controlled descriptors were used in English, Portuguese and Spanish, according to the characteristics of each database: Physicians; nurses; Healthcare professionals; Leadership; teaching; Permanent Education; continuing education; cardiorespiratory arrest; cardiopulmonary resuscitation; Emergency. Considering that the descriptors are all controlled, only the Boolean operator AND was used, according to the orientation of the databases, with the truncation quotes (").

The articles included were read in full and the information organized in a table with a view to identifying the following aspects: year, journal, country, objective, method, pedagogical strategy used, tool used to assess leadership, main results and level of evidence (9).

Data analysis was descriptive and interpretative through the reading of selected articles in the light of the related literature.

**Table 1.** Search strategy in the database.

BASE	STRATEGY	AMOUNT
LILACS (DeCS)	<p>"Médicos" AND "Enfermeiros" AND "Profissionais de saúde" AND "Liderança" AND "Ensino" AND "Educação Permanente" AND "Educação continuada" AND "Parada cardiorrespiratória" AND "Reanimação cardiopulmonar" AND "Emergência"</p> <p>"Doctors" AND "Nurses" AND "Health professionals" AND "Leadership" AND "Teaching" AND "Continuing Education" AND "Continuing Education" AND "Cardiopulmonary arrest" AND "Cardiopulmonary resuscitation" AND "Emergency"</p> <p>"Médicos" AND "Enfermeras" AND "Profesionales de la salud" AND "Liderazgo" AND "Enseñanza" AND "Educación continua" AND "Educación continua" AND "Paro cardiopulmonar" AND "Reanimación cardiopulmonar" AND "Emergencia"</p>	0
MEDLINE (MeSH)	"Doctors" AND "Nurses" AND "Health professionals" AND "Leadership" AND "Teaching" AND "Continuing Education" AND "Continuing Education" AND "Cardiopulmonary arrest" AND "Cardiopulmonary resuscitation" AND "Emergency"	1982
CINAHL (CINAHL Subject)	"Doctors" AND "Nurses" AND "Health professionals" AND "Leadership" AND "Teaching" AND "Continuing Education"	1383

Headings)	Education" AND "Continuing Education" AND "Cardiopulmonary arrest" AND "Cardiopulmonary resuscitation" AND "Emergency"	
WEB OF SCIENCE (MesSH)	"Doctors" AND "Nurses" AND "Health professionals" AND "Leadership" AND "Teaching" AND "Continuing Education" AND "Continuing Education" AND "Cardiopulmonary arrest" AND "Cardiopulmonary resuscitation" AND "Emergency"	1430

Source: Author (2022).

### 3. Results

Data collection for the study took place between August and November 2021. Initially, 4795 articles were found and, after reading the titles and abstracts, 151 articles were selected, of which 80 were duplicates and were excluded, which resulted in a total of 71 articles to be read in full. Four articles made up the final sample (table 2).

### 4. Discussion

The publication date of the selected articles, between 2007 and 2021, allows us to infer that the concern with the theme is recent in the literature and indicates the need for more studies with different designs for a better understanding of the phenomenon. In this sense, attention is drawn to the small number of productions that made up the sample and were exclusively dedicated to leadership in PCR, which can be verified by the high number of articles excluded after reading in full because they did not specifically address the teaching of leadership or for not presenting strategies to do so. This may reflect the fact that leadership, although fundamental within the scope of non-technical competences, is a competence that is difficult to dissociate from the others, as an object of study, in the context of emergencies.

On the other hand, even though recent studies have shown an increase in the concern with teaching leadership, the scarcity of strategies for teaching leadership and tools for evaluating their learning by health professionals who undergo theoretical training processes is also evident. or practical. Possibly, this is related to the traditional prioritization of teaching technical skills related to PCR care, which already has well-established evaluation and teaching parameters. Training methods focused on practice in the leadership position by residents of a hospital, but only evaluated repercussions on their technical skills, not addressing in a quantitative and specific way if the leader communicates better or if he has improved other non-technical skills required by he (10).

Regarding the location of the published studies, one of them was developed in the United States, two in England and one in New Zealand. It is noted that all articles are in English and were carried out in developed countries, which can make it difficult to translate the results to other countries, with different attributions of roles of health professionals and different training of the team in the context of PCR, both for reasons related to training as well as the different economic scenario, which jeopardizes the planning, architecture and execution of projects focused on this type of education when it comes to developing countries.

For example, in the Brazilian reality, there is a subdivision of the nursing team, which has high school professionals (11). The heterogeneous conformation of teams may require professionals to have greater leadership skills in critical situations, although sometimes groups do not have the number and adequate qualifications of professionals, with inadequately trained professionals being allocated to compose the care teams, problem that is added to poor working conditions and limited resources (12). Therefore, studies are needed on leadership in PCR in teams with different compositions, as in Brazil, where the

team also includes nursing technicians, and that address broad and realistic conditions for the execution of patient care.

In this review, the only strategy used for teaching leadership to health professionals in the context of PCR was simulation, with different combinations of pedagogical strategies such as workshop and dramatization (13-16).

Simulation as an opportunity to train and practice new models of leadership and teamwork safely and without harm to the patient, moreover, they place education through simulation as superior to traditional clinical education (17). In a complementary way, the impact of simulation-based training during real resuscitation attempts in a teaching hospital. For this, they conducted a prospective, randomized trial in which a group of physicians underwent a simulation course for four hours before acting as leaders in real cardiac arrest situations in the hospital (10). The results were unexpected in relation to previous studies, as there was no incremental benefit of immersive simulation training over traditional training methods on the perception of leadership performance or technical knowledge in RCP, and the literature brings self-reported improvements in confidence and in decision-making capacity, as well as in the quality of RCP after simulation training (18-19).

Therefore, it is possible that this divergence is due to the very design of the course, which did not specifically address strategies for learning leadership and their repercussions on learning it, limiting itself to assessing the repercussions on the technical skills of the participating physicians. Thus, it can be understood that, although previous training in team leadership skills is associated with better leadership behavior, the same result may not occur if technical performance is evaluated, such as chest compression rate, depth and ventilation rate, reinforcing the importance of bringing leadership as a teaching strategy and not as a finding on the way (20).

A pre-post intervention study with 15 nurses showed a statistically significant increase in the T-NOTECHS scale for leadership measures. This result was achieved from the administration of a didactic course on team leadership and crisis resource management followed by simulation team training scenarios, an example in which two methodologies - one traditional and one based on simulation - were joined to best performances. In this case, the authors also used a post-intervention interrogation to stimulate self-reflection about the experience (15).

A mixed intervention, which featured a workshop divided into a plenary session followed by 2 simulated resuscitation scenarios. A checklist was adopted where the leader's tasks were verified and a debriefing took place after each scenario, as well as at the end of the workshop, in a large group environment. Residents (a total of 15) not only acquired team leadership skills in resuscitation but also demonstrated retention of skills beyond the initial intervention after 6 months (13).

In another study, it demonstrated an increase in the level of self-reported comfort in team leadership, as well as a decrease in the time of sharing and verbalizing commands. The strategy used for teaching leadership was also a simulation course, which was considered extremely useful and realistic by 71% of the participants and highly recommended by 85% (14). These high percentages reflect on how these courses could be offered to large numbers of health professionals, highlighting possible obstacles such as the cost or limited availability of trained teachers to provide high-quality simulation training (21).

The most recent evaluation found in this review of a strategy for teaching leadership to health professionals in the context of PCR. The study was observational and directed to

experienced physicians, which contributed to the reduced workload of just one hour. Leadership training in RCP was used during clinical simulations, and the evaluation took place through the analysis of videos that recorded the behavior of leaders in pre- and post-intervention simulations. After the comparison, there was a significant improvement in the responses to the previously selected criteria, thus reaffirming the simulation method as effective in teaching leaders in the management of CPR. However, it is emphasized again that in the current context of the Brazilian health system and other developing countries, it is uncommon to find a scenario conducive to success like this, as human and material resources are reduced (16).

When analyzing the tools for assessing leadership learning, the T-NOTECHS scale, applied pre and post tests for comparison. In this case, the scale was adapted to assess leadership skills and team performance in the selected cohort and the assessment was performed in real time, ensuring an inter-rater reliability of 0.44 using the intraclass correlation coefficient, considered low by the literature (15). A study that demonstrated that inter-rater reliability was higher (intraclass correlation coefficient = 0.71) for video review of resuscitations, in addition to also stating that better T-NOTECHS scores are correlated with better performance during simulations and situations real. That is, although the work of Armstrong and colleagues has been successful in teaching leadership and improving participant performance, it is likely that other courses that use a video-guided assessment mode will demonstrate even better and more reliable results (22).

In line with this perspective, a study with a simulation recording method. The videos (pre and post intervention) were retrospectively reviewed to compare and evaluate the team leader's response time, and the course participants were evaluated for their performance in each scenario, in addition, the participants were also able to watch the footage, which contributed to the development of self-critical analysis and reflection on the acquired learning (16).

Other authors reported evaluation strategies aimed at debriefing, leading the discussion of these tools to more particular methods of each study participant, however, also using a comparison between pre and post intervention. Bringing, in a way, positive results about the work developed, but of low reliability because they are not very rigorous methods regarding the subjectivity of the evaluators (13-14).

Most of the articles deal with PCR in pediatrics, considering that it is more dramatic for children, and simulation teaching remains the safest way (13-14).

Finally, it is valid to consider that this review has limitations, due to the small sample of selected articles, which may be due to the specificity of the theme regarding the teaching of leadership in the exclusive context of PCR; another limitation is due to the exclusion of studies that considered only students of health courses, it was considered that the learning objectives are different in the case of students, when compared to professionals; in addition, the general level of evidence is not high and it is necessary to design more rigorous and reliable works regarding teaching and assessment methods. However, studies that synthesize strategies for teaching during training may present relevant results with possible application to health professionals.

## 5. Conclusions

- It was possible to identify evidence in the literature regarding the strategies used to teach non-technical skills to health professionals in the context of cardiac arrest. The main strategy identified by the study was simulation, combined with different pedagogical resources, such as workshops and dramatizations. It was observed that all the articles are in English and were carried out in developed countries, which can make



it difficult to translate the results to other countries, with different attributions of roles of health professionals, and different training of the team in the context of PCR.

- Although the focus of the research was not pediatrics, professionals are concerned about PCR in children, so simulation remains a safe method, considering that professionals in the exercise of the profession, faced with such a situation, have much easier the simulation before to do all the paperwork.
- It was also identified that the main tools used to assess leadership learning were questionnaires and pre and post simulation checklists applied transversally or longitudinally.
- Further studies are recommended to assess leadership teaching strategies in the context of PCR in heterogeneous teams, also composed of high school professionals, in developing countries.

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**Table 2.** Results of the articles selected to compose the integrative review.

REF.	OBJECTIVE	METHOD	STRATEGY FOR TEACHING LEADERSHIP IN PCR	TOOL FOR ASSESSING LEADERSHIP LEARNING	RESULTS	LEVEL OF EVIDENCE
13	Assess immediate and long-term learning outcomes from a workshop to determine whether medical residents could acquire and retain team leadership skills in advanced pediatric resuscitation.	Fifteen pediatric residents participated in a pre- and post-intervention study based on theoretical teaching associated with simulation practice.	Brief theoretical teaching with workshop designed to meet learning needs and meet Pediatrics Training Objectives.	Checklist where the leader's tasks were checked. A debriefing took place after each scenario, as well as at the end of the workshop, in a large group setting. Learning was also assessed by retrospective pre/post questionnaire self-report.	Residents acquired resuscitation team leadership skills after an educational intervention, as demonstrated by both observational checklist scores and self-reported research. The six-month follow-up assessment demonstrated skill retention beyond the initial intervention.	3
14	Evaluate the effectiveness of a pilot program to improve nursing staff resuscitation team leadership skills using simulation-based training.	Pre and post intervention study with seven nurses. A 4-hour simulation course was carried out in pediatric cardiac emergencies.	High-fidelity simulation course in pediatric emergencies, lasting four hours.	In the initial part, participants reflected on individual and team performance. During the second part, the course facilitators promoted discussions on the gaps identified in the performance of the leader and the team in relation to the principles of CRM (crisis resource management).	Prior to the course, self-reported comfort levels in the team leadership role and the sharing mental model were rated low to moderate. The team leadership self-reported comfort level score increased.	3
15	To determine whether a simulation program can improve team performance and nurse leadership skills in the management of simulated cardiac arrest.	A pre-post intervention study in which 15 senior nurses participated. It consisted of a didactic course on team leadership and crisis resource management followed by simulation team training scenarios (divided into start-up phase, training phase and reassessment phase).	Simulation training.	Study participants were assessed using a modified teamwork scale for non-technical skills (T-NOTECHS) in the initial phase and, after the training phase, in the reassessment phase. Thus, the primary result was measured from the comparison between the scores in the two simulation moments.	A statistically significant increase on the T-NOTECHS scale was detected for measures of leadership, crisis resource management, adherence to the New Zealand Resuscitation Council ALS algorithm, and situational awareness. The study shows that a short-term simulation training program improved nurse leadership and teamwork performance in establishing a shared leadership model for CPR in the ER.	3
16	To assess whether a simulation-based educational intervention for	Observational pilot study that evaluated some specific parameters during	One hour simulation-based team leader training session.	Pre- and post-intervention quality review through analysis of videos recorded during pre- and post-intervention simulations; 6 criteria	Through the determined parameters analyzed in the videos and comparing the pre-implementation data and the post-	3

	experienced doctors, focused on specific processes and with goals in improving communication, would result in improvements in the performance during actual resuscitations.	clinical resuscitations before and after training applied to pediatric emergency supervisors.		were used to determine the quality of practice. The videos were reviewed retrospectively to compare and evaluate team leader response time.	implementation data, there was a significant improvement in the answers in front of the selected criteria.	
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Source: Author (2022).