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Original Article

In situ simulation: the gain of self-confidence by nursing professionals during cardiopulmonary arrests

Simulação *in situ*: ganho da autoconfiança de profissionais de enfermagem na parada cardiopulmonar

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Objective: to compare *in situ* simulation to the traditional didactic methodology, regarding the gain of self-confidence of nursing team professionals regarding cardiopulmonary arrest. **Methods**: quasi-experimental non-equivalent study, developed in an intensive care unit and emergency room of a general hospital. The intervention was an *in situ* simulation. For data collection, a professional characterization questionnaire was used, and the self-confidence aspect was assessed by the Self-Confidence Scale. Results with p≤0.050 were considered significant. **Results**: 37 nursing professionals participated. The pre-simulation experimental group was less self-confident (3.4±0.6) when compared to the control group (3.9±0.7). However, 30 days after the intervention, the experimental group showed a significant gain in confidence (p=0.040). **Conclusion**: the self-confidence of nursing professionals with regards to assisting patients in cardiopulmonary arrest improved significantly with the use of an *in situ* simulation, when compared to the traditional didactic methodology, through dialogue.
Descriptors: Simulation; Simulation Training; Trust; Critical Care; Nursing, Team.

Objetivo: comparar a simulação *in situ* em relação à aula didática tradicional, no ganho da autoconfiança de profissionais da equipe de enfermagem, em situação de parada cardiopulmonar. **Métodos**: estudo quasi-experimental, não equivalente, desenvolvido em unidade de terapia intensiva e pronto socorro de hospital geral. A intervenção foi a simulação *in situ*. Para coleta de dados, adotou-se questionário de caracterização profissional, a autoconfiança avaliada pela escala *Self-Confidence Scale*. Considerou-se significativo resultados com p≤0,050. **Resultados**: participaram 37 profissionais de enfermagem. O grupo experimental pré-simulação se mostrou menos autoconfiante (3,4±0,6) quando comparado ao grupo controle (3,9±0,7). Entretanto, 30 dias após a intervenção, o grupo experimental mostrou a manutenção de ganho significativo da confiança (p=0,040). **Conclusão**: a autoconfiança dos profissionais de enfermagem, direcionada à assistência ao paciente em parada cardiopulmonar, melhorou significativamente com emprego da simulação *in situ,* quando comparada à aula didática tradicional, dialogada.
Descritores: Simulação; Treinamento por Simulação; Confiança; Cuidados Críticos; Equipe de Enfermagem.

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Introduction

Self-confidence is a non-technical skill, capable of influencing the actions performed by the nursing staff, especially in complex situations, thus gaining relevance in the urgency setting[1].

Success, failure, and difficulties are conditions that require from professionals the ability to adapt and cope, in order to overcome problems and reach a positive outcome[2]. In this setting, self-confidence, when aligned with resilience, enables better adaptation to face challenges[3].

Simulation-based training programs can use specific clinical experiences to standardize interventions and fill gaps identified in the self-confidence and practical performance of professionals in critical situations[4].

Clinical simulation, however, is a strategy that triggers the contact with real scenes through guided experiences[5]. Interactive simulation programs are tools capable of providing realistic resources in the figure of dummies that are anatomically similar to humans and that, by expressing physiological responses to real interventions, allow interaction, mediated by verbal or nonverbal communication, both by the instructor and participant[6].

Simulation as a training tool contributes to the development of clinical reasoning and is therefore applicable during the undergraduate course, also being relevant for improving professional performance during the continuing education program[5]. Nowadays, given the need to develop professional self-confidence, simulation works as an excellent resource to provide safe and individualized care[7].

Simulation, when available in the workplace, through resources and equipment that provide the health team with an experience close to reality, is called *in situ* simulation[8]. From this perspective, it is considered as a vehicle for the development and improvement of self-confidence, contributing to the capacitation of the team, especially in the context of critical and risky care[9].

The need for professional training becomes essential in the health care sectors, since innovative training methods that improve professional knowledge and confidence can compensate for deficiencies in clinical experience[10]. There is a recognition of the role of *in situ* simulation in the training and evaluation of technical and non-technical skills, since they boost self-confidence, and improve communication and teamwork[11], making it easier to observe how care happens in real time, instead of just speculating on what might happen or how it should happen from traditional teaching tools.

Simulations in the actual work environment have been identified as particularly valuable because they bring together the elements of the team and the environment[12]. Researchers have recognized that the role of *in situ* simulation goes beyond training and assessment of technical and non-technical skills, and above all they emphasized the unique ways in which this strategy could be used to assess system competence and identify latent conditions that predispose errors[11].

Based on the above, the objective of this study was to compare the *in situ* simulation to the traditional didactic methodology, concerning the self-confidence gain of nursing team professionals with regards to cardiopulmonary arrest situations.

Methods

This is a quasi-experimental non-equivalent study, with pre and post-tests. The study was conducted in an adult intensive care unit and yellow and red emergency room in a public general hospital in the Federal District, Brazil.

The study population, at the time of data collection, consisted of 37 nursing professionals from the intensive care unit and 43 from the emergency room. The sample was non-probabilistic, by convenience, and consisted of 5 nurses and 13 nursing technicians from the intensive care unit (experimental group) and 5 nurses and 14 emergency room nursing technicians

(control group). When the groups needed to be compared, the instruments with no response were excluded, this happened in two situations, which resulted in a final sample size of 37 professionals. The other sample losses were due to vacation, work leave, or refusal to participate in the study.

The intervention was the implementation of the *in situ* simulation strategy and the control was the didactic methodology using dialogue (traditional), both directed to nursing care of patients in cardiopulmonary arrest.

Nursing professionals with at least six months of professional experience were included and those who did not provide direct patient care or worked in both sectors were excluded; substitute and/or on leave nurses, residents and nursing interns.

Data collection took place from December 2017 to March 2018, through visits to professionals in the work environment, according to the distribution of the monthly work schedule.

In the *in situ* pre-simulation phase, the setting "patient care in cardiopulmonary arrest" was validated by three judges (teachers with expertise in the area, according to *Lattes* curriculum data) who analyzed and evaluated the coherence, appearance, realism, availability of resources, and the debriefing[13] (discussion of the scene experienced between researcher and participants), in a simulation laboratory of a public higher education institution. The suggested adjustments were made, and in a second moment, the validation was repeated in the hospital ward where the study was developed, to adjust the simulation proposal to the environment itself.

Then, the identification questionnaire, consisting of demographic and professional data, was applied, as well as the Portuguese version of the Self-Confidence Scale[14], developed by Frank Hicks and later published[15]. Its development aimed to evaluate the self-confidence variable, subdivided into four dimensions. The scale consists of a list of twelve items, with Likert-type answers, with five possibilities: not confident, a little confident, confident, very confident, and extremely confident. The different items identify the student's ability to: (1) recognize signs and symptoms of changes in these areas, (2) accurately assess the patient, (3) appropriately intervene, and (4) evaluate the effectiveness of the interventions implemented in respiratory, cardiac, and neurological fields. The Cronbach's alpha found in the Portuguese version (pv) was 0.918[14]. It is important to mention that the 12 items of the scale were adapted for nursing professionals acting in critical patient care settings.

To the intensive care unit professionals (experimental group) the *in situ* simulation was implemented using a Laerdal® medium fidelity patient simulator, capable of reproducing the conditions of a patient in cardiopulmonary arrest. Realistic reproduction was possible through the participation of two research assistants (students/trained monitors) who assisted in the projection of vital hemodynamic parameters and reproduced the voice of the simulator.

At the end, there was a debriefing, discussion and reflection session between the professionals and the facilitator of the scene experienced. The simulations were filmed and took place in a room of the intensive care unit itself, in order to surprise the nursing professionals and ensure the confidentiality of the sessions in the setting. Thus, the fact that the setting of the simulation sessions was not announced made it possible to reduce the adherence effect, the repetition of the same response by professionals, when exposed to the same situation[16].

For comparison purposes, the control group of nursing professionals was dismissed at the beginning of the shift, according to the release schedule previously agreed upon with the immediate nursing supervisor, to participate in a didactic exposition (class through dialogue) using a traditional pedagogical approach related to the theme "cardiopulmonary arrest". The researcher put the proposal in a specific space, but in a space which was within the emergency room itself, to minimize prolonged interruptions of the care process. Multimedia and educational material adapted from the American Cardiology Association were used[17].

Thus, the result of the intervention (experimental group), when compared to the control group (traditional teaching pedagogical strategy), would make it possible to verify if the *in situ* simulation would contribute to greater self-confidence gain by nursing professionals, in situations of cardiopulmonary arrest.

For both the experimental and control groups, the Self-Confidence Scale was reapplied one month (30 days) after the interventions to assess the professionals' level of confidence in assisting cardiopulmonary arrest, even after an extended period from the implementation of both strategies (*in situ* simulation and dialogue methodology).

Descriptive analysis was performed using summary (mean and median) and dispersion (standard deviation and 25th and 75th percentiles) measurements. To test the distribution of the sample, the Kolmogorov Smirnov test was applied, but the hypothesis of normality was not confirmed, thus, the nonparametric Mann-Whitney and Wilcoxon Rank tests were applied. For data analysis, the statistical program Statistical Package for the Social Sciences, version 23, was used and the results with p≤0.050 were considered significant.

The research was approved by the Research Ethics Committees of the School of Health Sciences of the University of Brasilia and of the Foundation for Teaching and Research in Health Sciences, according to protocol 2,357,399/17 and Certificate of Presentation for Ethical Appraisal nº 47071915,0,0000,0030. Participants signed the Informed Consent and the Image and Sound Authorization Forms.

Results

From the 37 nursing professionals distributed between the control and experimental groups, most (n=26) were female (70.3%), with an age median of 37 (32 - 40) years. Of these, almost half were graduated, 15 (40.5%), and 10 (27.0%) had a high school degree; 11 (29.7%) had a specialization (*lato sensu* postgraduation) and only one (2.7%) a master's degree (*stricto sensu* postgraduation). The experience of the professionals of the intensive care unit was slightly higher than those of the emergency room (4 vs. 3 years). From the total of professionals, 18 (48.6%) stated that, when hired, they participated in trainings for the exercise of their functions. Most of them, 19 (51.4%), reported experience with the simulation strategy as a teaching model during the process of professional training.

Considering that the Self-Confidence Scale ranges from 1 to 5 points, being 1 not confident and 5 extremely confident, the professionals of the experimental group, initially (pre-intervention), were less self-confident, 3.4 (3.0 - 3.8), when compared to the control group, 4.1 (3.2 - 4.3) (p=0.040). However, 30 days after the intervention, the experimental group was shown to maintain a significant confidence gain, from 3.4 (3.0 - 3.8) to 3.7 (3.2 - 4.1), p=0.040 – a result not found in the control group, since the self-confidence of the professionals did not change from the initial to the final phase [3.9±0.7 vs 4.0±0.9].

Self-confidence, 30 days after intervention (knowledge retention), in the experimental group for patient care in cardiopulmonary arrest was significantly higher in the group of younger nursing professionals (age <35 years) compared to those aged ≥35 years, (p=0.040 vs p=0.400), but in the control group, no significant difference was identified (Table 1).

Table 1 – Comparison of self-confidence between the different age groups of nursing professionals for each phase of study of the experimental and control groups.

	Phases			
Age (years)	**Experimental Group Median (25-75)**		**Control Group Median (25-75)**	
	Pre-intervention	Retention	Pre-intervention	Retention
< 35	3.6 (3.5-3.8)	3.9 (3.8 – 4.3)	4.1 (3.5 – 4.3)	4.3 (3.0 – 4.8)
≥ 35	3.2 (3.0 – 3.5)	3.5 (3.1 – 3.8)	4.0 (3.3 – 4.7)	4.2 (3.0 – 4.7)
p*	0.400	0.040	0.700	0.800

*Mann-Whitney test

Discussion

The results of this study confirmed that the *in situ* simulation strategy provided nursing professionals with greater self-confidence in attending a cardiopulmonary arrest when compared to training using traditional teaching methods.

In situ simulations represent a relatively innovative strategy that provides real clinical experience in a controlled environment within the workplace itself, in order to minimize future challenges, renew previously acquired knowledge, increase professional self-confidence, improve skills and, especially, identify risk factors for patient safety[8-9]. Improving patient safety has been shown to be essential for all healthcare organizations and teams, especially those that work with critical patient care[18].

Accurate and fast diagnoses, and the management of patients who are seriously ill or in emergency situations is of the utmost importance. Although many protocols are assumed to assist this process, there has not been much emphasis on nonclinical health care skills, such as self-confidence, in nurses and nursing technicians during emergencies. Among these skills, self-confidence, as identified in the present study, remains an essential factor in decision making and occupies a crucial role in professional performance[19].

Given the complexity of patients in cardiopulmonary arrest, it is important that nurses and nursing technicians have confidence, knowledge and skills to check when the situation is getting worse and act appropriately to prevent and treat the disease, reducing hospital readmissions. Therefore, it is clear that confident nursing professionals, have improved performances, even in highly complex situations[19].

A study conducted in an Australian University showed that confidence in the care process was inversely associated with age, indicating that the highest confidence levels were identified in younger nursing students[20]. In the present study, although it was developed with nursing team professionals, this relationship was also true.

Collective training was declared as a method capable of improving safety and quality of health care. In an intensive care unit, a high-tech environment, nurses work in disciplinary and interdisciplinary teams, facing rapidly changing conditions, such as cardiopulmonary arrest. Failures in team performance regarding non-technical skills, such as self-confidence, are factors that often contribute to the occurrence of incidents[13].

From this perspective, it is emphasized that simulations represent a teaching and learning tool adopted in emergency training situations, capable of increasing self-confidence and the development of clinical reasoning[5].

The research showed as limitations the unavailability of some professionals to participate in the study, although the *in situ* simulation was available at different times. Nevertheless, the use of *in situ* simulations proved to be a good and significant strategy for nursing professionals to gain self-confidence, considering their repercussion on the development of this non-technical skill, which makes a difference when it comes to successful attention involving direct care and patient safety.

Conclusion

The self-confidence of nursing professionals, with regards to assisting patients in cardiopulmonary arrest, improved significantly with the use of an *in situ* simulation, when compared to the traditional didactic class carried out through dialogue.

The findings of this study suggest that investment in simulation-based education clearly tends to improve care management, patient quality and safety on one hand, and the self-confidence of nursing professionals on the other, both important aspects found in emergency situations.

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Collaborations

Almeida MN and Magro MCS contributed to the conception and design, analysis and interpretation of data. Duarte TTP contributed to the writing of the article, relevant critical review of the intellectual content, and with the final approval of the version to be published.

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