



IN SITU SIMULATION IN CARDIOPULMONARY RESSUSCITATION: IMPLICATIONS FOR PERMANENT NURSING EDUCATION

SIMULAÇÃO *IN SITU* EM RESSUSCITAÇÃO CARDIOPULMONAR: IMPLICAÇÕES PARA A EDUCAÇÃO PERMANENTE EM ENFERMAGEM

SIMULACIÓN *IN SITU* EN RESUCITACIÓN CARDIOPULMONAR: IMPLICACIONES PARA LA EDUCACIÓN PERMANENTE EN ENFERMERÍA

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RESUMO

Objetivo: comparar o desenvolvimento de competências para ressuscitação cardiopulmonar (RCP) entre grupos com periodicidades de intervenção diferentes, utilizando a simulação *in situ* como método de ensino-aprendizagem. **Método:** estudo experimental com abordagem quantitativa. Os participantes serão os membros da equipe de enfermagem da Unidade de Hemodiálise de um hospital universitário, que serão alocados em grupos com periodicidades de intervenção diferentes. Os instrumentos de coleta avaliarão o conhecimento e as habilidades para RCP, além da percepção dos participantes em relação às suas competências no atendimento à parada cardiorrespiratória (PCR). A análise dos dados e as comparações entre os grupos serão realizadas por meio dos testes t-Student e Qui-Quadrado. O projeto de pesquisa foi aprovado nos Comitês de Ética e Pesquisa da Universidade Federal de Ciências da Saúde de Porto Alegre, CAAE nº 56516216.9.0000.5345, e da Pontifícia Universidade Católica do Rio Grande do Sul/PUCRS, CAAE nº 56516216.9.3001.5336. **Resultados esperados:** determinar o intervalo de formação periódica com o uso da simulação *in situ*, para o desenvolvimento das competências em RCP. **Descritores:** Simulação; Ressuscitação Cardiopulmonar; Educação Continuada em Enfermagem.

ABSTRACT

Objective: to compare the development of skills for cardiopulmonary resuscitation (CPR) between groups with different periods of intervention, using in situ simulation as teaching-learning method. **Method:** experimental study with quantitative approach. Participants will be the members of the nursing team of the Hemodialysis Unit of a university hospital, which will be allocated in groups with different intervention periods. The collection instruments will assess the knowledge and skills for CPR, as well as the participants' perception regarding their skills in cardiorespiratory arrest (CPR) care. Data analysis and comparisons between groups will be performed using Student's t-test and Chi-Square test. The research project was approved by the Ethics and Research Committees of the Federal University of Health Sciences of Porto Alegre, CAAE 56516216.9.0000.5345, and the Pontifical Catholic University of Rio Grande do Sul/PUCRS, CAAE nº 56516216.9.3001.5336. **Expected results:** to determine the interval of periodic training with the use of in situ simulation, to develop the skills in CPR. **Descriptors:** Simulation; Cardiopulmonary Resuscitation; Education, Nursing, Continuing.

RESUMEN

Objetivo: comparar el desarrollo de competencias para resucitación cardiopulmonar (RCP) entre grupos con periodicidades de intervención diferentes, utilizando la simulación *in situ* como método de enseñanza y aprendizaje. **Método:** estudio experimental con enfoque cuantitativo. Los participantes serán los miembros del equipo de enfermería de la Unidad de Hemodiálisis de un hospital universitario, que serán agrupados con periodicidades de intervención diferentes. Los instrumentos de recolección evaluarán el conocimiento y las habilidades para RCP, además de la percepción de los participantes en relación a sus competencias en la atención a la parada cardiorrespiratoria (PCR). El análisis de los datos y las comparaciones entre los grupos serán realizadas por medio de los testes t-Student y Chi-Cuadrado. El proyecto de investigación fue aprobado en los Comitês de Ética e Investigación de la Universidad Federal de Ciencias de la Salud de Porto Alegre, CAAE nº 56516216.9.0000.5345, y de la Pontifícia Universidad Católica de Rio Grande do Sul/PUCRS, CAAE nº 56516216.9.3001.5336. **Resultados esperados:** determinar el intervalo de formación periódica con el uso de la simulación *in situ*, para el desarrollo de las competencias en RCP. **Descriptores:** Simulación; Resucitación Cardiopulmonar; Educación Continua en Enfermería.

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INTRODUCTION

Continuing education is a tool of education for work. Thus, continuing education is understood as the process that brings education closer to everyday life, allowing reflection and analysis of practical problems, enhancing the work context. For the nursing team, continuing education means an opportunity to improve the quality of patient care, and it is important to develop training programs based on the needs of the team, although the constant lack of professionals and the number of tasks to be performed hinder the participation in these programs.¹⁻²

Cardiopulmonary arrest (CPR) is a topic requiring continuing education in nursing, since it is a highly stressful situation for the care team, relevant even to be aware of the periodicity of the training, since smaller intervals between one formation and another showed a better development in the knowledge, skills and even confidence of the professionals on the subject.³⁻⁴

Being a subject in which the teaching-learning process has a high degree of complexity, essentially involving cognitive-motor skills for its execution, the educational action to be developed must consider aspects of adult learning, such as the relevance of learning in the practice to the domain of skills, and in an environment closer to the real world.⁴⁻⁵

In situ simulation is a new approach to clinical simulation. It is a method that allows simulation within real clinical environments, and in this context, this type of simulation can contribute to individual or team learning, consolidating as an opportunity to develop professional skills.⁶

Faced with this, the following question arises: how to implement a continuing education that meets the complexity of this theme?

Some studies demonstrate the contribution of in-situ simulation to continuing education in CPR care. When compared to traditional training, its application in training may increase confidence levels and imply a significant improvement in cardiopulmonary resuscitation (CPR) skills. Results with impact on patient care were demonstrated, such as reduction in the time of clinical deterioration recognition (from 4 hours to 1.5 hours) and in the time of transfer to the intensive care unit (from 10.5 hours to 5hours).⁷⁻⁹

Also, as a benefit of its use, it is observed the decrease of the necessary structure for the simulation compared to the simulation in

the laboratory, which, consequently, entails a lower cost, with increase of realism and accessibility to the team as it occurs in the workplace, and may even be an initiative for patient safety in care units that have less exposure to events such as CPR.¹⁰⁻¹¹

It is worth noting that there is still no evidence to demonstrate the ideal time interval for the application of CPR formations, but it was observed in one study that short-term in situ simulations performed every three months are effective to improve some points of the CPR service. In another study, the need for reevaluation of knowledge was observed after six months, due to the fact that this interval already shows a decline in competencies.¹²⁻¹³

Thus, this study intends to explore the question: at what frequency can in situ simulation be used in the continuing education of nursing professionals for the topic CPR?

OBJECTIVES

- To compare the development of skills for CPR between groups with different intervention periods, using in situ simulation as teaching-learning method;
- To compare participants' knowledge of CPR before and after the intervention;
- To contrast the development of CPR skills in the period of the intervention;
- To verify the participants' perception of the response to CPR in the intervention, as well as the period of this intervention.

METHOD

- **Type of study and design**
Experimental study of prospective temporal direction with quantitative approach. The intervention will be the application of in situ simulation, implemented after an initial theoretical training on the subject, with different periods between the groups.
The intervention groups will be divided as follows:
 - **Group A** - participants will not be exposed to periodic intervention. In this segment, participants will receive an initial intervention and one in the outcome, after eight months;
 - **Group B** - participants will be exposed to periodic intervention every four months, in addition to the initial intervention and the outcome;
 - **Group C** - participants will be exposed to periodic intervention every two months, in addition to the initial intervention and the outcome.

The outcome will occur eight months after initial training. In each group, participants will be allocated into two subgroups, according to the periodicity of the intervention. The figure below shows the division of the groups:

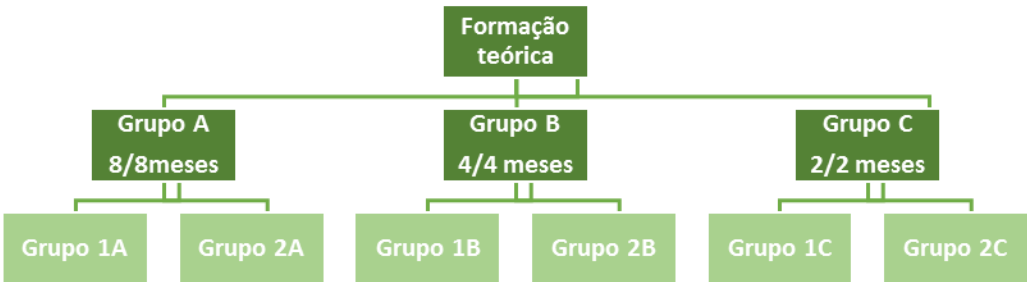


Figure 1. Division of the groups

The construction of clinical scenarios with maximum realism and clear and concise scope assists participants' satisfaction and contributes to learning effectiveness.¹⁵ In this area, the study's simulation scenarios will be fictitious but developed according to the context of the unit for PCR service, with clear and simple objectives, where the participants are expected to perform the same tasks, as it would be in a real emergency.

The service team will be composed of five members, four of whom will be part of the research and one guest will play the role of the doctor. Therefore, it is expected that the four participants of the research divide into the following positions during the simulation: a participant in the ventilation; a participant in chest compression, with a need for relay every two minutes; a participant in the stop car, to prepare the defibrillator and the drugs and to carry out the time control; and a participant in drug administration and, in the specific case of the research unit, in the manipulation of the hemodialysis machine.

The simulation scenario will be built using the service environment, with real equipment and materials, as well as a low fidelity mannequin. For each phase of the research, a different clinical case will be created, which will be uniformly applied to the groups.

The simulations will take place during the working hours of the participants, with a maximum duration of 15 minutes. After that, another 20 minutes will be reserved for debriefing. The planning of each simulation will be carried out together with the unit manager, considering factors such as: number of patients to be attended and scale of nursing professionals in the shift. In case of unforeseen events, the simulation will be postponed to another date.

● Scenario of the study

The study will be conducted in a large university hospital located in the capital of the state of Rio Grande do Sul, with 651 beds. The site selected for the research is the

Hemodialysis Unit, belonging to the Nephrology Service of that hospital.

This unit was selected because it has the characteristic of performing specialized care with risk of CPR events, but these events do not occur frequently in this unit, which may contribute to the lack of preparation of the professionals for CPR.

● Population and sample

The study population consists of the nursing team of the Hemodialysis Unit, where each group will be composed of three nursing technicians and one nurse.

Participants will be selected by the random simple sampling method through a lottery, where each professional will be identified by a number. They will be allocated to groups after initial training by the same draw method.

● Inclusion and exclusion criteria

The inclusion criteria will be professionals in the Consolidation of Labor Laws (CLT) who work in said unit and who are willing to participate in the research.

The exclusion criteria will be holiday and/or extended licenses professionals at the time of sampling.

● Instruments of data collection

A questionnaire for the analysis of the sociodemographic profile will be applied to the participants drawn, including age, gender, education level, training time, unit working time and previous emergency courses that the participant has performed.

The expected skills will be evaluated through tools developed for the research. The technical questions of knowledge and ability to perform were elaborated according to the guidelines of the American Heart Association (AHA).¹⁴

Knowledge will be verified with the application of an elaborate pre-test and post-test instrument. The test will consist of four multiple choice questions, which will have their sequence modified at both times of application (pre and post). The instructional

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objectives that will be addressed in the test are recognition of cardiorespiratory arrest (CPR) and first actions; emphasis on chest compression; main heart rhythms and their treatments; and drug therapy in CPR. Assertiveness will be compared in the pre-test and post-test, in the two application moments during the study (Table 1).

Skills will be assessed with a checklist, which will be completed in the each on-site simulation by volunteer observers. Each simulation should involve at least two observers. Observers will receive training regarding the skills to be measured. This calibration is intended to promote a uniform assessment by these observers.

The check items will be composed by skills necessary for nursing professionals to act on the basic and advanced supports of life, according to the conduct of the clinical cases, and involving:

- ✓ **Thoracic compression:** the number of chest compression will be evaluated, where the evaluation parameter is the one proposed by the AHA. There are 30 compression in a maximum of 18 seconds. The thoracic compression technique will also be evaluated;
- ✓ **CPR recognition and first actions:** besides the CPR procedure, it will be evaluated if the massage table was placed under the patient as one of the first actions;

Table 1. Frequency of application of the collection instruments in each phase of the study. Porto Alegre (RS), Brazil

Instruments	Initial training	Simulation <i>in situ</i>	Simulation <i>in situ</i> outcome
Pre-test and post-test	Yes	No	Yes
Unit Checklist	No	Yes	Yes
Perception of preparedness for care	No	Yes	Yes

• **Data analysis**

Continuous variables will be described as mean and standard deviation, when with normal distribution, and categorical variables as frequency and percentage.

In the comparison of continuous variables, the t-Student test will be applied. In the case of categorical variables, the chi-square test.

• **Ethics considerations**

The project was submitted to the ethical evaluation of the Research Ethics Committees (CEP) of the Federal University of Health Sciences of Porto Alegre, CAAE nº 56516216.9.0000.5345, and the Pontifical Catholic University of Rio Grande do Sul/PUCRS, CAAE nº 56516216.9.3001.5336. Participants will sign a Free and Informed Consent Term (TCLE), after being duly guided by the researcher of the study.

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- ✓ **Ventilation with manual resuscitator:** in this item, the ventilation technique will be observed, as well as the aid in the insertion of advanced airway if the clinical case requires the procedure;
- ✓ **Monitoring and aiding defibrillation:** assesses familiarity with the defibrillator equipment;
- ✓ **Control of the times:** it refers to the times of check of the heart rhythm, exchange of the professionals who are in the chest compression and intervals between the administrations of the drugs.

Participants will be evaluated in relation to the achievement of each skill, according to their position assumed during the service in the simulation.

A questionnaire based on a Likert-type scale will also be applied to match the participants' perceptions regarding their competencies in CPR care. The questionnaire will be applied before and after the simulation in situ, with a maximum of 30 days apart.

Table 1 shows the instruments and their periodicity of application in the research.

EXPECTED RESULTS

With the use of the instruments and subsequent analysis of the results, it is expected to determine the interval of periodic training with the use of in situ simulation, to develop the skills in CPR, contributing to the operationalization of continuing education in nursing.

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Submission: 2017/01/27
Accepted: 2017/05/28
Publishing: 2017/07/01

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