

ORIGINAL ARTICLE

USE OF THE DESIGN AND SELF-CONFIDENCE SCALES IN CLINICAL SIMULATION OF CARDIAC ARREST*

HIGHLIGHTS

1. Clinical simulation as a pedagogical practice enhances learning.
2. Realism in clinical simulation is important for learning.
3. A sense of satisfaction is evident from the clinical simulation.

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ABSTRACT

Objective: To evaluate participants' perception of design satisfaction and self-confidence in learning through clinical simulation in cardiac arrest. **Method:** This is a descriptive and exploratory study with a quantitative approach, a quasi-experiment of a single group, before and after type, carried out in 2022 in the greater São Paulo area, Brazil. The study was carried out with 24 participants who were nursing professionals and undergraduate trainees at two basic health units. **Results:** There was a significant increase ($p < 0.05$) in the level of knowledge after the simulation. When evaluating the design scale, an average of 4.55 was found for agreement and 4.55 for importance with the clinical simulation. There was an average score of 4.56 on the scale of satisfaction and self-confidence perceived by the participants in the clinical simulation. **Conclusion:** Clinical simulation enhances participants' learning, promotes satisfaction and self-confidence, and using instruments to evaluate and apply the scenario are guidelines for effective clinical simulation.

KEYWORDS: Simulation training; Cardiorespiratory arrest; Nursing; Satisfaction; Health education.

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INTRODUCTION

Clinical simulation (CS) is an innovative pedagogical practice that allows students and health professionals to learn and train safely, contributing to their professional training¹. This pedagogical practice stimulates learning, facilitates the relationship between theory and practice, provides elements for objective decisions, and develops group work and leadership². It is defined as an active learning method, not a technology³, characterized by an experiential, interactive, collaborative environment centered on the participant⁴.

Thus, CS is a method replicating direct patient care scenarios, constituting a powerful teaching tool that allows safe analysis of the attitudes taken, proving appropriate for training professionals for safer professional practice⁵.

Thus, CS is seen as a methodology for developing manual skills, clinical reasoning, assertive communication, and safety when providing care, capable of mitigating errors and preventing failures that could cause irreversible damage⁶.

As an innovative pedagogical practice, CS contributes to robust training, consolidating theory with practice simultaneously, allowing safe and harm-free care to be provided⁷. It can be an option for professional updating *in loco*, not just academic environments⁸.

CS can be used in the context of high-fidelity laboratories, such as training for surgical procedures with robots, and low-fidelity laboratories, such as venipuncture and mannequins for cardiopulmonary resuscitation (CPR) training, both of which provide a safe environment for critical and reflective development⁹. It is widely used to teach complex emergency healthcare situations, including cardiopulmonary arrest (CPR)¹⁰.

In health care, CPR remains a major challenge due to its complexity and variable dynamics, with a poor prognosis when poorly conducted. The use of CS in CPR care training has been aimed at improving and acquiring knowledge skills and, consequently, better performance in care and increased patient survival rates since students and health professionals feel insecure about this scenario¹¹.

Evaluating the satisfaction of professionals and students and the strategies used in CS indicates the quality of the process carried out; the higher the level of satisfaction, the better the self-confidence developed during simulated practice. The realism of clinical simulation is important in building the critical reflective thinking of participants⁸. It allows participants to experience countless possibilities during CS in a safe environment, facilitating development and bringing security and self-confidence¹².

From this perspective, studies point to the need to evaluate simulation design, satisfaction, and self-confidence in the perceived learning of CS participants¹³.

Clinical simulation design involves creating training or scenarios that accurately replicate real-life situations, evaluate objectives, fidelity, problem-solving, student support, and debriefing to provide an authentic and engaging learning experience¹⁴. However, studies are still scarce.

This study aimed to assess the participants' perception of the simulation design, satisfaction, and self-confidence in learning through the clinical simulation of cardiopulmonary arrest.

METHODS

This is a descriptive and exploratory study with a quantitative approach, a quasi-experiment with a single group of the before and after type to compare the variables of a participant in a study, before and after intervention¹⁵.

The study was conducted in two Basic Health Units in a city in the greater São Paulo area, with a population of approximately 180,000 people. These units absorb local demand for first aid and are responsible for stabilizing and maintaining patients until they are transferred to a referral hospital. The study population comprised 24 participants, including nurses, nursing technicians, assistants, and trainees taking their compulsory undergraduate nursing internships at health units.

The inclusion criteria were nurses, nursing assistants, and nursing trainees working in basic health units during the data collection or study period. The exclusion criteria were vacation, maternity leave, sick leave, and time off at the time of the study.

Initially, all the participants were given a presentation of the study with information about the research, the concepts of CS, and guidance on the stages of a CS (preparation, participation, and debriefing). Next, all the participants were given a 10-question questionnaire to assess their knowledge of CPR care. Afterward, an educational session was held on the proposed topic, with updates from the *American Heart Association* (AHA) on the presentation of two clinical cases and the performance of CS. The researcher accompanied the CS stage with a *checklist* of the clinical case scenarios previously prepared for assessing the proposed skills. The same exit questionnaire was applied to identify the knowledge inferred through the CS and the instrument to evaluate the Simulation Design Scale and the Student Satisfaction and Self-Confidence in Learning Scale.

Data collection was carried out in September 2022; after the CS for adult CPR care, two scales were applied: 1) Simulation Design Scale (SDS); 2) Student Satisfaction and Self-Confidence in Learning Scale (ESEAA). The National League for Nursing¹⁶ developed the SDS and translated and validated it in Brazil¹⁷.

The SDS is made up of 20 items, which assess five domains of the simulation developed: a) Objectives and Information (5 items); b) Support (4 items); c) Problem Solving (5 items); d) Feedback / Reflection (4 items); e) Realism (2 items). For each item, the participant must mark two columns: the first evaluates the educational practices on how much they agree with each item on a five-point *Likert* scale: strongly disagree, disagree, neither agree nor disagree, agree or strongly agree and the other on the importance of each item on a five-point *Likert* scale: not important, not very important, neutral, important or very important.

The ESEAA consists of 13 items, which assess two domains: (5 items) to assess satisfaction with the simulation activity and (8 items) to assess self-confidence with learning. For each item, the participant must mark on a five-point *Likert* scale what corresponds to their perception: strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree. The National League also developed this scale for Nursing¹⁶, which has been translated and validated for use in Brazil¹⁸.

The analysis of the results of this study, therefore, focused on the data obtained on the evolution of knowledge after CS by comparing the frequency of correct answers on pre- and post-intervention CPR knowledge and the SDS and ESEAA.

Based on the assumption that clinical simulation as a teaching practice can enhance learning, this study assessed the number of correct answers to questions on knowledge of CPR before and after CS. To assess whether there was a significant difference between the number of correct answers between the groups before (pre) and after (post) the CS intervention, among the participants, who were Nurses, Nursing Technicians and Assistants and Nursing Trainees, the non-parametric Wilcoxon test was carried out, with $p < 0.05$

considered significant.

The study was approved by the Human Research Ethics Committee (CEP) of the Universidade Anhanguera of São Paulo through the Brazil Platform under opinion number 5.589.544.

RESULTS

The sociodemographic characteristics of the participants in this study are shown in Table 1. Of the 24 participants, 91.7% were female and 8.3% male; the predominant age range, 58.3%, was between 30 and 50 years. Regarding professional training, 58.3% were nursing assistants, and 20.8% were nurses and trainees (Table 1).

Table 1 - Sociodemographic characteristics of health professionals. São Paulo, SP, Brazil, 2022.

Sociodemographic characteristics		n	(%)
Gender	Female	22	(91.7)
	Male	2	(8.3)
Training	Assistant/Technician	14	(58.3)
	Nurses	5	(20.8)
	Trainee	5	(20.8)
Age group	25 to 30 years old	3	(12.5)
	From 30 to 50 years old	14	(58.3)
	From 50 to 62 years old	7	(29.2)

Source: The authors (2022).

Table 2 shows the results relating to the number of correct answers (N), the average number of correct answers, standard deviation, minimum and maximum correct answers, and the percentage improvement in pre- and post-intervention CPR knowledge. Values of $p < 0.05$ were considered significant.

Table 2 - Descriptive statistics and comparison test between functional categories (Wilcoxon test; $p < 0.05$ significant). São Paulo, SP, Brazil, 2022.

Functional category		N	Average	Standard Deviation	Right Minimum	Right Maximum	% improvement	p-value
General	PRE	24	5.71	1.46	3	9	40.11	< 0.001
	POST	24	8	1.32	5	10		
Auxiliary	PRE	14	5.43	1.4	3	9	46.04	< 0.002
	POST	14	7.93	1.38	6	10		
Nurse	PRE	5	5.4	1.52	3	7	55.56	= 0.039
	POST	5	8.4	0.55	8	9		
Trainee	PRE	5	6.8	1.3	6	9	14.71	= 0.197
	POST	5	7.8	1.79	5	9		

Source: The authors (2022).

In general, there was an increase in the number of correct answers before (5.71 ± 1.46) and after (8 ± 1.32) the intervention. This difference was significant ($p < 0.001$) (Table 2), demonstrating that the clinical simulation intervention favored an increase in the number of correct answers to questions on the content of CPR by the nursing professionals working at the UBS studied.

When analyzing the number of correct answers by nursing professionals from different categories, it was observed that in the nursing assistant category, there was a significant increase in the number of correct answers ($p < 0.05$) before (5.43 ± 1.4) and after (7.93 ± 1.38) the intervention (Table 2). Similarly, in the nurse's category, there was a significant increase ($p < 0.05$) before (5.4 ± 1.52) and after (8.4 ± 0.55) the intervention. In the trainee category, there was no significant increase ($p > 0.05$) before (6.8 ± 1.3) and after (7.8 ± 1.79) the intervention, despite their absolute differences (Table 2). These results show that the clinical simulation intervention favored an increase in the number of correct answers to questions on the content of PCR answered by the research participants who work at UBS.

The ESD was evaluated in the agreement option, and in the importance option, the mean and standard deviation (SD) were calculated, as shown in (Table 3).

Table 3 - Presentation of the scores for the Simulation Design Scale. São Paulo, SP, Brazil, 2022.

	Concordance		Importance	
Objectives and Information				
1. Sufficient information was provided at the start of the simulation to provide guidance and encouragement.	4.6667	0.48154	4.5417	0.50898
2. I clearly understood the purpose and objectives of the simulation.	4.5417	0.65801	4.5417	0.58823
3. The simulation provided enough clear information to solve the problem.	4.6667	0.56466	4.4583	0.65801
4. I was given enough information during the simulation.	4.4583	0.50898	4.2500	0.60792

5. The clues were appropriate and targeted to promote my understanding.	4.5417	0.65801	4.5417	0.50898
Total per domain	4.5750	0.57424	4.4667	0.57442
Support				
6. The support was offered in good time.	4.3750	0.49454	4.375	0.49454
7. My need for help was recognized.	4.6667	0.48154	4.5833	0.50361
8. I felt supported by the teacher during the simulation.	4.5833	0.50361	4.6250	0.49454
9. I was supported in the learning process.	4.7083	0.46431	4.7083	0.46431
Total per domain	4.5833	0.48600	4.5729	0.48925
Troubleshooting				
10. Solving problems independently was made easier.	4.4167	0.71728	4.4583	0.50898
11. I was encouraged to explore all the possibilities of the simulation.	4.5417	0.58823	4.625	0.49454
12. The simulation was designed for my specific level of Knowledge and skills.	4.5417	0.50898	4.4583	0.58823
13. The simulation allowed me to prioritize the Assessments and nursing care.	4.5833	0.50361	4.5417	0.50898
14. The simulation allowed me to set goals for my patient.	4.6250	0.49454	4.7083	0.46431
Total per domain	4.5417	0.562528	4.5583	0.51301
Feedback / Reflection				
15. The feedback provided was constructive.	4.7500	0.44233	4.7083	0.46431
16. Feedback was provided in good time.	4.7917	0.41485	4.6667	0.48154
17. The simulation allowed me to analyze my behavior and actions.	4.5833	0.50361	4.4167	0.50361
18. After the simulation, there was an opportunity to get guidance/feedback from the teacher to build knowledge to another level.	4.5833	0.58359	4.5833	0.50361
Total per domain	4.6771	0.48609	4.5937	0.48827
Realism				
19. The scenario resembled a real-life situation.	4.4167	0.58359	4.625	0.49454
20. Real-life factors, situations, and variables were incorporated into the simulation scenario.	4.4167	0.50361	4.5833	0.50361
Total per domain	4.4167	0.5436	4.6042	0.49907

Source: The authors (2022).

The analysis of the participant's perception of their agreement with the CS shows

that the average for the realism domain was lower (4.41) compared to the average for the other domains. The highest average was for the feedback/reflection domain (4.67). The objective, information, support, and problem-solving domains averaged around (4.56) agreement. When the scale was analyzed concerning the importance of CS, the domain with the highest score was realism (4.60).

When comparing the perception of the importance of CS for the participants, it can be seen that the average for the information objective factor was slightly lower (4.46) when compared to the average for the other factors. The highest average (4.99) was for the realism and feedback/reflection factors.

Twenty-four participants completed the ESEAA, and the mean and SD were calculated for each item on the satisfaction and self-confidence scale in the agreement option (Table 4).

Table 4 - Presentation of the Student Satisfaction and Self-Confidence in Learning Scale scores. São Paulo, SP, Brazil, 2022

Items n=24	Average	SD
Satisfaction with current learning		
1. The teaching methods used in this simulation were useful and effective.	4.54	0.509
2. The simulation provided various teaching materials and activities to promote my learning of the medical-surgical curriculum.	4.71	0.464
3. I liked the way my teacher taught through simulation.	4.63	0.495
4. The teaching materials used in this simulation were motivating and helped me learn.	4.63	0.495
5. The way my teacher taught through simulation suited the way I learned.	4.75	0.442
Total per domain	4.652	0.481
Self-confidence in learning		
6. I'm confident that I've mastered the content of the simulation activity that my teacher has given me.	4.42	0.504
7. I am confident that this simulation included the necessary content for mastering the medical-surgical curriculum.	4.54	0.509
8. I am confident that I am developing the skills and gaining the knowledge required from this simulation to perform the necessary procedures in a clinical environment.	4.54	0.509
9. My teacher used useful resources to teach the simulation.	4.54	0.509
10. My responsibility as a student is to learn what I need to know through the simulation activity.	4.38	0.647
11. I know how to get help when I don't understand the concepts covered in the simulation.	4.33	0.658
12. I know how to use simulation activities to learn skills.	4.42	0.504

13. the teacher is responsible for telling me what I need to learn about the topic developed in the simulation during the lesson.	4.58	0.654
Total per domain	4.468	0.5617

Source: The authors (2022).

About the domain (satisfaction with current learning), the average was (4.652), showing that the participants were satisfied with teaching through CS in CPR care. About the domain (self-confidence in learning), the average was (4.468) showing that the participants feel confident in their learning using the CS methodology.

DISCUSSION

The study evaluated the perception of nursing professionals from two basic health units regarding clinical simulation in adult cardiac arrest care; using the simulation design scale and student satisfaction and self-confidence in learning, the results show that clinical simulation is a pedagogical practice capable of providing sufficient elements for the development of technical and attitudinal skills, bringing satisfaction and self-confidence and that the scenario close to reality favors understanding of the proposed activity.

Knowledge of CPR care was higher after the simulated activity for all categories. Comparing the groups, those with prior knowledge had a higher percentage of correct answers than the trainees. This result differs from the study carried out in 2021 with 150 nursing students from different semesters, in which there was no significant difference in the increase in knowledge measured after the CS¹².

In the study's SDS domain (objective and information), item three (the simulation provides enough information for me to solve the problem situation) was the one with the highest score, demonstrating that the objectives were clear so that the situation presented in the CS could be solved; a similar result was presented in another study¹⁹, in which the clarity of the objectives was a determining factor for the CS to be understood by the participants.

The (support) domain reflects the facilitator's responsibility during the implementation of the CS, guiding the participants so that the objectives are achieved. The support provided by the facilitator and the conduct of the CS are fundamental to this process²⁰.

The (feedback/reflection) domain scored the highest on the scale, which is in line with another study that considers this domain to be the key moment in CS²¹, being essential for learning, as it is an opportunity for the participant to reflect and provides a reflection on the scenario, which may reveal additional insights into the CS presented.

The reflection process should be carried out immediately after the CS⁸, as it allows the participant to highlight feelings, discuss important points that were presented during the CS, as well as the possibility of taking knowledge to another level through discussion with the participants, and it is a dynamic process.

Studies have shown the importance of constructing and validating scenarios for CS, and their objective must be measurable²²⁻²³.

The results of this study are similar to another²⁰ carried out with 35 participants. In terms of the construction and evaluation of the CS scenario, this favors the interaction between practice and reality.

The scenario used in this study was of low fidelity, and the realism domain obtained the lowest score in the agreement factor, so it is clear that low-fidelity scenarios can directly

impact the CS carried out and the achievement of its established objectives. Other studies state that the greater the realism, the better the interaction between knowledge and practice^{9,24}.

Participants expressed satisfaction with using CS for teaching CPR to adults, showing that this methodology reinforces technical skills, leadership, and decision-making. In a similar study with 94 participants, they expressed satisfaction with using CS in the teaching and learning process compared to the control group in traditional teaching²⁵. A study with 273 participants reported that simulated practice favored a relationship between satisfaction and self-confidence in the educational context and also stated that the environment and debriefing are important during simulation²⁶.

Satisfaction with the learning process used to teach CRP through CS favors learning, minimizes feelings of fear, and stimulates development. In a study with 35 nursing students, they expressed satisfaction with CS teaching emergencies at various levels of complexity²⁰. In this way, it is understood that CS provides learning results for participants who can articulate the theory and practice of the subject²⁰. It promotes an increase in satisfaction with the activity, reducing the level of anxiety and nervousness.

Participants feel self-confident in their learning through the use of the CS methodology; the greater the satisfaction, the greater the self-confidence in developing professional activities; this result aligns with other studies^{18,22}. This study showed that the participants consider CS a tool capable of helping them control their emotions improving their self-confidence in caring for real patients. Thus, CS enables training for emergencies such as CPR²⁷.

Even though CS is considered an active methodology, this study did not observe the protagonism of the participant; a similar result was found in another study when they stated that it is the teacher's responsibility to say what the student should learn²². So, satisfaction is a positive reaction to the student's expectations or experiences. This helps to improve their performance and professional development. In addition, self-confidence is achieved when there is a positive view of oneself, recognizing one's ability to achieve something. These elements also directly influence the quality of the experience²⁸.

The study was limited by the number of participants in the research, and the low fidelity in constructing the scenario for the CS may have interfered with the results obtained.

FINAL CONSIDERATIONS

Clinical simulation in emergency teaching is an excellent option due to its possibilities and applications, especially in cardiac arrest simulations. The simulated activity in a structured way encouraged the development of skills and knowledge by the participants and increased self-confidence in learning for safe care practice and decision-making.

Using simulation design scales and student satisfaction and self-confidence in learning are guidelines for constructing and evaluating clinical simulations. This study showed good results with the scenario presented, clarity, objective satisfaction, and self-confidence in learning in an adult cardiac arrest situation.

Clinical simulation is recommended in teaching emergencies and should be incorporated into academic curricula in formal and non-formal teaching environments.

The study strengthens the benefits of clinical simulation as a strategy for teaching cardiac arrest care and contributes to more robust training, improved self-confidence, and participant satisfaction.

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