ARTICLES

Continuing education for healthcare professionals: in situ simulation of cardiac arrest in primary care*[1]

Mariana Ferreira Dutra Brasileiro[2]
Orcid: 0000-0001-9158-8505
Vanessa de Almeida Ferreira Corrêa[2]
Orcid: 0000-0001-7121-4493
Renata Flávia Abreu Da Silva[3]
Orcid: 0000-0003-1776-021X

Abstract

The article aims to explore the experiences of primary care health professionals in participating *in situ* simulation as a strategy for continuing education in the care of individuals in cardiopulmonary arrest situations. This is a retrospective and documentary study with a qualitative approach, conducted with primary care health professionals from two Municipal Health Centers located in the city of Rio de Janeiro (RJ), Brazil. A questionnaire comprising four open-ended questions was administered at the conclusion of six university extension courses, which were developed between July and September 2023. Thematic-categorical content analysis was utilised to structure the data. The results of the research project are presented in the following section. The study involved the administration of questionnaires to 74 health professionals, which enabled the construction of two categories: "Cardiopulmonary resuscitation course using *in situ* simulation" and "*In situ* simulation as a continuing education strategy." Satisfaction with participating in the *in situ* simulation was identified, as was the motivation to learn more about the subject and the importance of using an active methodology in continuing education, as well as the potential for team education in the workplace. We observed the power of *in situ* simulation as a strategy for continuing health education for professionals working in primary care, specifically focusing on cardiopulmonary resuscitation in adults. The participants' experience demonstrated the efficacy of a teaching method based on active methodology in fostering their participation and motivating them to learn from the experience of *in situ* simulation.

Keywords

In situ simulation - Continuing education - Health professionals - Primary Health Care - Cardiopulmonary resuscitation.

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1- Data availability: The entire data set supporting the results of this study has been published in the article itself.

2- Universidade Federal do Estado do Rio de Janeiro. Rio de Janeiro, RJ, Brazil. Contact: mariana.brasileiro@edu.unirio.br; vanessa.correa@unirio.br

3- Université Laval. Quebec, Canadá, Contact: renata.f.silva@unirio.br

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Introduction

Continuing Health Education (CHE) is understood as a tool for changing practices in the day-to-day operation of health services, considering the knowledge, expertise, and experiences of professionals at work (Brasil, 2018). CHE is aimed at updating professionals daily according to the theoretical, methodological, scientific and technological contributions available, in addition to the joint construction of organizational, inter-institutional and/or intersectoral practices, focused on the policies in which health actions are inscribed (Ceccim, 2005), presenting itself as a public policy in Brazil (Brasil, 2004).

According to Ferreira *et al*. (2019), CHE has the work process as the object of transformation, based on the critical reflection of the professionals who work there on what is happening in the daily routine of the services and seeking solutions together with the team to the problems encountered. However, despite indications of a teaching-learning process that begins with the issues identified in daily work to improve healthcare, the difficulty of developing CHE is noted, bringing it closer to the use of traditional teaching methodologies (Bomfim *et al*., 2017).

An integrative review study, in the context of Primary Health Care (PHC), showed that the understanding of CHE by health professionals and managers is close to the concept of Continuing Education, due to the use of traditional teaching methodologies. The devaluation of EPS initiatives was a contributing factor to their failure to take effect. This necessitated the legitimisation of these initiatives as an educational movement and policy with the aim of improving the quality of management and healthcare (Ferreira *et al*., 2019).

PHC is one of the gateways to the Unified Health System (SUS), offering timely and continuous care, while also welcoming users. With the expansion of services developed in PHC, the health team professionals who work there have been increasingly required to care for users in critical situations, such as cardiac arrest, for example. The primary therapeutic maneuver in a case of cardiac arrest is cardiopulmonary resuscitation (CPR), which facilitates a more rapid return of circulation and spontaneous ventilation (Gonzalez *et al*., 2013).

In this sense, two dimensions are essential for encouraging teaching and learning practices aimed at improving the quality of healthcare. The first is related to the importance of CHE, based on everyday professional work experiences and the involvement of adults in the teaching and learning process. The second is based on the choice of active methodology strategies, which can motivate professionals to improve their daily work, intervene, and (re)interpret it, leading to a constant improvement in health practices.

These dimensions stand out in the proposal of this research concerning the experience of health professionals when participating in an *in situ* simulation as an active methodology strategy and are related to the difficulties encountered in the provision of CHE (Ferreira *et al*., 2019), to think about a new way of providing continuing education in PHC.

The aim of this article is therefore to identify the experience of primary care health professionals in participating *in situ* simulation as a strategy for continuing education in the care of individuals in cardiopulmonary arrest.

In situ simulation is an active methodology strategy carried out within the work process and environment. It is characterized as a powerful strategy for CHE purposes, as it is

developed directly in the places where the health teams work. Instead of conducting training in a simulation center with groups that may not always work together, the health team itself carries out a simulated scenario in its work environment (Patterson *et al*., 2012).

Primary health care

Primary Health Care (PHC) is identified as the main component in the organization of health systems in countries that have adopted it as the basis for their health systems.

health systems, due to their impact on the health of the population, showing better health indicators; greater efficiency in the flow of users within the system; more effective treatment of chronic conditions; greater efficiency of care and user satisfaction; use of preventive practices; and improvement in the general state of health of the population (Oliveira; Pereira, 2013).

PHC are responsible for receiving the population and are often the first point of contact for urgent and emergency situations, such as cardiac arrest. In this way, the purpose of PHC is to provide first aid, until transfer or referral to other points of care, expanding access, consolidating links, and distributing responsibility for the care of SUS users. One of the objectives of the National Emergency Care Policy in the SUS is to promote the lifelong education of health workers, enabling them to provide adequate urgent and emergency care at all levels of the system (Brasil, 2011).

In the PHC setting, health professionals are also faced with users in severe situations, which can quickly evolve into death in the absence of correct and agile interventions, as is the case with care for individuals in a situation of cardiac arrest. There is therefore a need for health professionals to be regularly qualified and trained to achieve the best outcomes in these cases. The immediate performance of CPR on an individual in cardiac arrest is essential for their survival, to minimize sequelae, relieve suffering, and preserve life, when possible, according to the American Heart Association (AHA, 2020).

That said, it is essential to emphasize that health training can equip professionals to deliver high-quality care to individuals in cardiac arrest (Nava; Magro, 2020).

Permanent Health Education in PHC and *in situ* simulation

As for the development of PHC in the field of primary care, Fortuna *et al*. (2013) and Soratto *et al*. (2015) highlight its importance in strengthening health practices and the model of care in force in Brazil, considering the articulated work between management, educational institutions, the service, and the community (Fortuna *et al*., 2013). PHC is a powerful space for the development of CHE, as it involves shared practices in teams using different technologies to care for users (Soratto *et al*., 2015).

About the possibility of CHE regarding the care of individuals *in* CPR through the *in situ* simulation strategy, the American Heart Association (AHA, 2020) guidelines on CPR and Emergency Cardiovascular Care (ACE) show that effective education is a key variable in improving survival outcomes after CPR. Without effective education, lay rescuers and

healthcare professionals would struggle to consistently apply the science that supports evidence-based treatment of CPR.

Research in the south-east of England with PHC health professionals identified that *in situ* simulation can be an acceptable approach to interdisciplinary team CHE and is a teaching-learning strategy that is well accepted by staff. This research has contributed to the understanding of how *in situ* simulation can benefit both the workforce and users of health services. In addition, the authors suggest that future research is needed to refine in-service training using *in situ* simulation (Halls *et al*., 2019).

In situ simulation

The simulation strategy began with the use of aviation simulators for pilot training. At the time, in 1929, the scenario of a real flight was reproduced (Yamane *et al*., 2019). Thirty years later, Asmund Laerdal developed a healthcare mannequin for CPR training (Souza; Iglesias; Pazin-Filho, 2014). With this, recreating the real world in practical situations, particularly in the health sector, has become a challenge for institutions, as they strive to increase learning related to health training and continuing education.

In education, simulation began in universities with medical students and subsequently spread to hospitals, eventually reaching high-fidelity simulation centers. The use of simulation in healthcare is a long-standing tradition, with reports of anatomical models dating back to antiquity, as well as the use of animals to train surgical skills (Gaba, 2004).

However, in recent decades, the format of teaching in the healthcare sector has changed worldwide. In addition to being challenging, teaching requires a certain level of versatility; simulation has the potential to place professionals in an environment closely resembling reality, thereby generating reflection and problematization of the content in a controlled context. This is because the professional will be exposed to the problem and encouraged to solve it, as well as integrating the complexities of practical and theoretical learning, with the opportunity for repetition, feedback, evaluation, and reflection (Costa *et al*., 2017).

One of the ways in which simulation is developed is through its use *in situ.* This is any simulation-based activity that takes place in the real context, i.e. the simulated scenarios are built in the work environment itself (Zonta *et al*., 2019). This facilitates health professionals' access to CHE actions and promotes fidelity of the scenarios, as the learning context resembles the practice context.

It should be noted that, to guarantee the quality, safety and efficiency of *in situ* simulation, it is recommended to design, develop and analyze evidence of the validity of the simulated scenario, according to the criteria contained in the guidelines of the International Nursing Association for Clinical Simulation and Learning (INACSL) (INACSL standards committee, 2016). This ensures that simulation participants meet the following criteria: a controlled environment, adaptability for multiple learning strategies, clinical variations, clarity of objectives and expected results, validity of the simulator's realism, and *feedback* during the learning experience.

There are numerous advantages to using this teaching strategy, including the opportunity for repetition, experiencing authentic clinical situations, practicing in a safe environment, learning from mistakes, standardized experiences, and receiving *feedback* on practice (Carvalho *et al*., 2021).

However, the purpose of simulation as an active methodology strategy is not simple. It requires planning its activities, development by professionals with experience in simulation, and constant monitoring of learning to offer a teaching strategy aimed at increasing knowledge, as well as improving professional skills and competencies (Turkot *et al*., 2019).

Methodology

In order to achieve the objectives of analyzing *in situ* simulation as a permanent education strategy for PHC professionals, we decided to carry out a qualitative, retrospective and documentary study of the participants' experience with this active methodology strategy, offered during six extension courses entitled "Cardiopulmonary resuscitation course using realistic simulation", developed by the extension project: "Realistic simulation for training lay rescuers and health professionals in cardiac arrest care", registered, since 2016, with the Pro-Rectory of Extension of the Federal University of the State of Rio de Janeiro (Unirio), Brazil.

The courses were held at two Municipal Health Centers (CMS) in the field of Primary Health Care (PHC) in a Programmatic Area (PA) in the municipality of Rio de Janeiro (RJ), with health professionals, during the months of June and September 2023. Each course lasted 2 hours.

The courses were based on the updated CPR guidelines published by the American Heart Association (AHA, 2020) in 2020. It began by showing a previously recorded 20-minute video lesson, which was structured on the online platform for designers Canva® and prepared by the main researcher of this article. This was followed by the development of the *in situ* simulation, which included the necessary stages: a 10-minute briefing, the implementation of the simulated scenario in 10 minutes, and a subsequent 30-minute debriefing. The simulated scenario used in the course was previously validated in a study by Carreiro, Romão, and Costa (2021). Ultimately, the data collection instrument was administered in the form of a questionnaire, comprising four open-ended questions about the *in situ* simulation experience. The data collection instrument had the following questions: "How did you feel about taking part in a course using simulation? What was your satisfaction with taking part in a course using simulation?"; "Did the course using simulation motivate you to want to learn more about the subject than a traditional course?"; and "in addition, please provide a commentary on the aspects of the simulation course that most contributed to or impeded your learning."

The sample consisted of: questionnaires answered by health professionals characterized as doctors, nurses, nursing technicians, community health agents, dentists, nutritionists and physical education professionals working in the two CMSs of a PA in the municipality of Rio de Janeiro (RJ), who participated in the entire

course and who answered the questions about their experiences. Questionnaires whose professionals had not answered the questions about their experiences in developing the simulation were excluded.

Thematic-categorical content analysis (Oliveira, 2008) was employed, following the steps of reading the content of all the answers, which highlighted the content within the text. Next, provisional hypotheses about the object studied were defined, and the beginning and end of each sentence were marked in the text, forming the Registration Units (RUs), which were related to the specific objective of the research. These RUs were highlighted in different colors. The URs were then combined with the Meaning Units (US), i.e. each US was made up of a set of URs. This was followed by the thematic analysis of the URs, where the themes were quantified in terms of the number of URs for each answer analyzed. Finally, for the development of the categorical analysis, the themes and their final quantification were organized and grouped into categories to address the article's objective. It should be noted that the construction of the categories followed the qualitative and quantitative criteria that express the meaning contained in the text, and the importance of the US in understanding the object of study.

This research was approved by the Research Ethics Committee of the institutions proponent and co-participant, respectively, by opinions n. 5.947.529/2023 and n. 5.947.529. Respecting human dignity, data was collected from the course response database only from those participants who had agreed to the Free and Informed Consent Form (FICF). It should be noted that the survey was only invited at the end of the course, when all the questionnaires had been completed, to avoid conflicts of interest and minimize selection bias. To maintain the anonymity of the participants, the answers were identified by the capital letter "Q" and in ascending sequence of the cardinal number, for example Q1, Q2, Q3, up to Q74.

Results

All 74 course participants agreed to have their questionnaires used for this research. The professionals were on average 36 years old (SD=10) and 81.1% (n=60) were female. As for the professional category, the majority, 35.1% (n=26), were community health agents. Regarding the length of professional training, 55.4% (n=41) of the participants reported having less than 5 years of professional training, with one participant not answering this question; the remaining 44.6% (n=32) reported having more than 5 years of professional training.

About having taken part in a course using *in situ* simulation, 71.6% (n=53) reported not having taken part in a course using this methodology.

The content analysis identified a total of 318 URs, made up of phrases, which converged in nine USs, and two thematic categories were constructed, entitled: Category 1: Cardiopulmonary resuscitation course using *in situ* simulation, and Category 2: *In situ* simulation as a permanent in-service education strategy, as shown in Table 1. The results, presented in the form of descriptions, were guided by the theoretical frameworks of the research and accompanied by examples of significant URs for each thematic category.

Table 1 - Construction of categories: Category 1 - Cardiopulmonary resuscitation course using *in situ* simulation and Category 2 - *In situ* simulation as a continuing education strategy

CATEGORY 1 - CARDIOPULMONARY RESUSCITATION COURSE USING *IN SITU* SIMULATION				
THEMES / UNITS OF MEANING	UR-NUMBER / THEME	% RH / THEME	CATEGORY	% UR OF CATEGORY
There is a need for more teaching courses with *in situ* simulation aimed at the EPS of the Primary Health Care team, on the subject of Cardiopulmonary Resuscitation.	20	39%	Course of Cardiopulmonary resuscitation by through *in situ* simulation	16%
The course has clear and objective information	16	31%		
I need more time and to include skills training after the end of the *in situ* simulation to make the most of the course	15	29%		
TOTAL UR =	51	100%		
CATEGORY 2 - *IN SITU* SIMULATION AS A CONTINUING EDUCATION STRATEGY				
THEMES / UNITS OF MEANING	NUMBER UR/THEME	% RH / THEME	CATEGORY	% UR OF CATEGORY
The *in situ* simulation led to the need to deepen the knowledge of the subject	73	27%	*In situ* simulation as a training strategy	84%
The *in situ* simulation led to the need to deepen the knowledge of the subject	73	27%		
Personal satisfaction with participating in the simulation *in situ*	64	24%		
In situ simulation strategy enhanced knowledge and recalled the process of cardiac arrest care with realism	44	16%		
Practical practical: feelings/emotions related to *in situ* simulation	42	15%		
Participation in the simulated scenario and debriefing promote learning	29	11%		
Importance of providing prior knowledge and participation in the briefing for learning	15	7%		
TOTAL UR =	267	100%		

Source: Data collected. Rio de Janeiro (RJ), 2023.

Category 1: Cardiopulmonary resuscitation course using *in situ* simulation

This category covers a total of 51 URs (16%), referring to three of the nine USs. The themes discussed highlight the need for more courses with *in situ* simulation aimed at the CHE of PHC staff on CPR, as well as more time to include skills training after the *in situ* simulation has been completed. Additionally, records about the course should present clear and objective information.

Regarding the US entitled: Need for more courses with *in situ* simulation aimed at team CHE in PHC, about CPR, it was identified that the professionals presented the importance of the course, when they requested more courses with the inclusion of *in situ* simulation in PHC, as can be seen in the URs:

> I think it's essential for the course to be offered periodically (Q25).

> I think it's essential to introduce this kind of training to primary healthcare (Q32).

The need for more courses about CPR in PHC can also be seen in the participants' responses regarding the length of the course. The professionals expressed the need for more time to develop the course. In addition to the inclusion of skills training after the end of the *in situ* simulation, to make better use of the course, according to the UR below:

> More course time so that everyone can do the simulation (Q3).

> The downside is the lack of more time for training (Q5).

In the US, the entitled course provides transparent and objective information, and participants appear to have positive impressions of their experience in an in-situ simulation course. The clarity and objectivity expressed in the following URs demonstrate that the professionals recognized the importance of the subject and understood how to proceed *in situ*ations involving CPR.

Clarity of the team's up-to-date information on the subject (Q21). Very direct and objective presentation (Q50).

Category 2: *In situ* simulation as a continuing education strategy

This category covers a total of 267 URs (84%), referring to six of the nine USs. The themes refer to the *in situ* simulation strategy, the professionals' recognition of the need to deepen their knowledge on the subject, and their satisfaction in participating in the *in situ* simulation. In addition, the participants stated that the *in situ* simulation strategy helped them gain knowledge and recall the process of CPR care realistically, allowing them to express feelings and emotions related to the simulated scenario.

Regarding *in situ* simulation as a continuing education strategy, participants reported that participating in the simulated scenario and the subsequent debriefing were

effective learning experiences. They also pointed to the previously recorded video lesson, in terms of providing participants with prior knowledge, and taking part in the briefing, as important points for learning.

About the US entitled: The *in situ* simulation provoked the need to deepen knowledge on the subject, 73 of the 74 participants reported in their answers that the *in situ* simulation aroused the desire to learn more, given the need to deepen knowledge about CPR, as can be seen in the URs:

> Improve your knowledge (Q1).
>
> It motivated me to learn more about the subject (Q9).

In the US entitled: Personal satisfaction in participating in the *in situ* simulation, the word "satisfaction" was mentioned several times in the participants' responses, making it the second US with the highest number of URs, 24% of the total number of units in this category. The following URs exemplify this US:

> Very satisfied, thank you very much! (Q21).
>
> Unique satisfaction (Q63).

Concerning the US entitled: The *in situ* simulation strategy enhanced the acquisition of knowledge and recalled the process of CPR care with realism, it was identified that 44 of the 74 participants in the survey reported that the *in situ* simulation presented a link between theory and practice, as it brought the experience of a CPR situation in a simulated way, as can be seen in the URs:

> It brings the reality of our daily lives, in which we are vulnerable to such situations (Q18).
> Having the opportunity to train in a simulation is much more beneficial than just a visual lesson (Q26).

It can be inferred that the URs presented in this US, related to the possibility of putting theory into practice, as well as sensitizing participants to the possibility of a clinical situation occurring in PHC, are presented as positive perceptions of professionals regarding the *in situ* simulation experience.

In the URs that make up the US entitled: practical scenario: feelings/emotions related to the simulation *in situ*, the following URs highlight nervousness, the need for total attention and the responsibility of professionals in the face of a CPR situation. In addition to the feeling of gratitude at being able to experience the simulated scenario.

> I felt nervous because I can't imagine going through this situation, even though it's common and could happen (Q15).
>
> I felt a great responsibility (Q30).

Regarding the US study, 'Participation in the simulated scenario and debriefing favored learning,' the URs related to the stages of the *in situ* simulation strategy stood out, specifically referring to the development of the simulated scenario and participation in the debriefing. This involves the identification of phrases referring to the possibility of simulation experience, by doing it with your own hands, made possible by practicing in the simulated scenario, or to the exchange, based on the development of the debriefing.

The selected URs, which make up this US, are presented below:

> The exchange of experiences in the conversation circle (Q7).
>
> The role-play was very effective in raising awareness of possible errors that can occur during CPR (Q44).

Another stage of the *in situ* simulation, also identified in the analysis of the participants' responses, was the need for prior knowledge and participation in the briefing. Such.

The responses, after selecting the URs, formed the following US: Importance of providing prior knowledge and participation in the briefing. These were phrases that highlighted the previously recorded video lesson and the explanation before the simulation as positive points related to the extension course with *in situ* simulation.

> The detailed explanation provided during the simulation was very helpful (Q33).
>
> The video lesson is excellent, well explained and the simulation training is great for training; showing it in practice makes a difference (Q42).

Data discussion

The participants in the research were professionals from the PHC health team: community health agents, dentists, nursing technicians, nurses, doctors, physical education professionals and nutritionists. The coverage of seven professional categories is an essential point of this research, as one of the challenges of the National Policy for Continuing Health Education (NPCHE) is the qualification of health professionals, as a team, based on the problems identified in each daily practice in health units (Brasil, 2004). In addition, the American Heart Association (AHA, 2020) emphasizes the importance of training multi-professional teams to ensure the quality of care provided to individuals in cardiac arrest, as it enhances the retention of knowledge, skills, and behaviors. It also has the advantage of offering a more realistic training environment, which can have a positive impact on learning outcomes.

The implementation of active methodologies in the professional qualification process is included in the NPCHE (Brasil, 2004) and encouraged by authors in the field. Cunha *et al.* (2022) conceptualize active methodology as a set of pedagogical alternatives that aim to facilitate professional learning by providing a critical and problematizing education of reality, from redirecting the participant to the center of the knowledge construction process.

According to Santos *et al.* (2023), the use of *in situ* simulation as an active methodology strategy enables the approach of a range of topics that are relevant to various areas of knowledge, disciplines, and cultures. Reproduced in multiple places around the world, *in situ* simulation considers the characteristics of local services and adapts to them, without requiring significant additional investments to implement. Bortolato (2017) notes that one of the primary characteristics of *in situ* simulation is that it enables the team to operate in their work environment, within a simulated scenario, thereby facilitating team learning.

It is understood that there is an essential link between the active methodology strategy of *in situ* simulation and the objectives to be achieved by the NPCHE, concerning identifying the need for continuing education, based on everyday problems and encouraging the planning, execution and evaluation of the practices developed in the educational process (Brasil, 2004), based on the use of active methodologies for the construction of knowledge (Schweickardt *et al.*, 2015).

It is interesting to note that the lack of experience of the participants *in* this research with the *in situ* simulation methodology is in line with studies that indicate the importance of this strategy in PHC and research that can analyze its application in this field of care (Gaspar *et al.*, 2023; Silva *et al.*, 2023). This highlights the importance of reflecting on the possibilities of implementing this strategy in PHC, as a way of offering CHE, based on real situations, which can be actively experienced by health professionals, in a critical and reflective way. It's a question of considering the process of lifelong education to encourage the experience of real-life situations for health professionals as a team.

By constructing the first thematic category, we identified that participants felt there was a need for more courses with *in situ* simulation about CPR in PHC, as seen in the research carried out by Siqueira *et al.* (2019). Whether it's the request for this course format to be more frequent or the extent to which it sensitizes participants to life-sustaining CPR maneuvers.

The participants' responses showed that they were satisfied with taking the course using the *in situ* simulation strategy, as identified in other studies that analyzed the simulation strategy. In one study in the Federal District, simulation had a positive effect on gaining knowledge and self-confidence among health professionals (Nava; Magro, 2020). In another, in the east of England, the authors showed how *in situ* simulation can benefit both the workforce and users (Halls *et al.*, 2019).

The satisfaction expressed by participants in this research with the on-site simulation experience was also identified in a study conducted in Minas Gerais, where positive results were observed, and it was concluded that participants gained knowledge, along with increased satisfaction and self-confidence (Ferreira *et al.*, 2018). According to Mesquita, Santana, and Magro (2019), the application of *in situ* simulation training for health professionals yields satisfactory results, both in terms of the content covered and personal satisfaction, as it fosters greater confidence in their work with health service users.

In this sense, the results of this research are in line with scientific articles about *in situ* simulation in CPR training in PHC (Nava; Magro, 2020; Siqueira *et al.*, 2019). These authors demonstrate that *in situ* simulation promotes experiential learning, fostering interprofessional self-confidence in dealing with emergencies in primary health care (Siqueira *et al.*, 2019). One positive effect of *in situ* simulation is that it generates

knowledge and self-confidence for health professionals, including those who are not directly involved in care, such as community health workers, but who may be exposed to this situation in their daily work practice (Halls *et al*., 2019; Nava; Magro, 2020).

The importance of continuing education processes in PHC with the implementation of *in situ* simulation is reinforced in studies which attribute quality to multiprofessional training activities (AHA, 2020; Gobato; Gonçalves; Baptista, 2009). However, scientific evidence is needed, with the development of research that links the active methodology to the subject of CPR (Halls *et al*., 2019).

It is worth noting that the scientific literature supports the need for continuing education among health professionals in CPR care. According to Moura *et al*. (2019), training for health professionals in CPR care for individuals should be conducted regularly, over periods of no more than six months. In this way, it is possible to intensify the possibility of greater fixation of knowledge, directly linked to experience and practical application.

A literature review conducted by Santos *et al*. (2023) concluded that, worldwide, *in situ* simulation has been utilized by health professionals as an educational strategy, yielding positive results for learning and training at various stages of professional development, and indicating an improvement in patient care. He points out that there is still much to be expanded regarding the use of *in situ* simulation, especially in Brazil, particularly in terms of the publication of studies on this active methodology strategy.

This study demonstrated that professionals were satisfied with their learning experience and motivated to learn more about CPR, utilizing the active learning methodology strategy of *in situ* simulation. The results are presented in Table 1, which highlights the themes associated with the dimensions of satisfaction and motivation.

As for the stages highlighted by the participants in this research and identified in the data analysis, briefing and debriefing stand out as essential stages presented by the professionals related to information before the simulated scenario, and the exchange of experiences in the round table discussion.

According to Fabri *et al*. (2017), the briefing is a time to contextualize the clinical situation that will be experienced. According to Schuelter *et al*. (2021), this stage of the simulation is configured as an informative meeting to score the aspects needed to contextualize and develop the case. It must be well-structured and in line with the objectives and competencies to be addressed.

As for debriefing, the authors Oliveira *et al*. (2018) present it as a moment of reflection on the experience, which allows exploration, analysis and synthesis of the actions taken, the thought processes formulated and the emotions triggered, to improve performance in real situations. According to Carvalho *et al*. (2021), debriefing in simulation facilitates learning by allowing individuals to reflect on mistakes and receive feedback on their practice.

In a study conducted with a multi-professional group during simulated emergency exercises, it was concluded that simulation and debriefing increased the preparedness of team members for physical and mental health emergencies (Sweeney and Papp, 2024). The research by Oliveira *et al*. (2018) and Carvalho *et al*. (2021) demonstrates the importance of debriefing as a crucial stage in the learning process of simulation participants for professionals from various categories.

The participants also emphasized the realism of the scenario and the opportunity for practical experience as being important aspects of the *in situ* simulation experience. A fundamental principle in the use of simulation in health teaching is that the more the participant believes that the situation they are experiencing is real, the more useful it will be (Murphy et al., 2007). In this sense, there is the challenge of offering *in situ* simulation, based on the day-to-day reality of health services, which can motivate professionals to learn by interpreting their daily work.

Final considerations

The experience of the participants involved, health professionals characterized as doctors, nurses, nursing technicians, community health workers, dentists, nutritionists and physical education professionals, revealed *in situ* simulation as a satisfactory active methodology strategy that motivates learning, as a possibility for CHE and as a proposal to experience real situations, contributing to learning and improving the subject of CPR in the context of PHC. In addition to the satisfaction expressed by the participants, there was also dissatisfaction related to the simulation's short duration, which aligns with the scientific literature on the subject.

Through qualitative analysis, it was possible to identify the research participants' motivation to learn through *in situ* simulation. They expressed a desire to participate in the simulated scenario as a team, to engage in other courses using simulation due to its realism, and to seek updates on the subject. Regarding the inclusion of *in situ* simulation in the context of primary health care (PHC), the participants responded that there should be more courses utilizing this active learning strategy. The participants reported that their experiences with *in situ* simulation were satisfactory and motivating.

The course, developed to offer *in situ* simulation through an extension course, highlighted the importance of using the principles of good practice in simulation as a basis for its construction, particularly in briefing, the realism of the simulated scenario, and debriefing. The participants stated that the information provided during the briefing was clear and objective, as was the experience of the simulated scenario and the debriefing, which were positive experiences. Participants were concerned about the need to deepen their knowledge of CPR, which was the US with the highest number of URs identified in the participants' responses.

This research aims to stimulate CHE in the field of PHC with the implementation of *in situ* simulation; to reflect on the potential and challenges encountered in the development of *in situ* simulation; and to analyze the implementation of this active methodology strategy in other contexts in the field of primary care as a possibility for CHE. It is hoped to provide contributions that will allow the use of *in situ* simulation to be expanded, with a discussion on its importance in the development of a permanent health education strategy.

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Mariana Ferreira Dutra Brasileiro has a degree in nursing. She specializes in nursing, emergency and nursing management. She holds a master's degree in nursing from the Federal University of the State of Rio de Janeiro.

Vanessa de Almeida Ferreira Corrêa has a bachelor's and master's degree from the State University of Rio de Janeiro (UERJ). She has a PhD in nursing from UERJ and is an adjunct professor in the Department of Nursing and Public Health at the Federal University of the State of Rio de Janeiro (Unirio).

Renata Flávia Abreu da Silva is a post-doctoral student at UERJ/Université Laval. She holds a doctorate in science from Unirio and a master's degree in nursing from Unirio. She is an associate professor at Unirio.