Espac. Saúde. 2026v27.e1142en
Doi 10.22421/1517-7130/es.2026v27.e1142en

ESPAÇO PARA A SAÚDE

RESEARCH

SIMULATION TRAINING IN A PEDIATRIC HOSPITAL: ANALYSIS OF THE PARTICIPATION AND PERCEPTION OF NURSING PROFESSIONALS

Treinamentos em simulação em hospital pediátrico: análise da participação e percepção dos profissionais da enfermagem

Entrenamiento mediante simulación en un hospital pediátrico: análisis de la participación y la percepción de los profesionales de enfermería

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ABSTRACT

This study aimed to evaluate simulation training for nursing professionals, identifying the themes and individual perceptions of participants regarding the training. It was an exploratory, descriptive, documentary, and cross-sectional study conducted with nursing staff from a pediatric hospital, developed in two stages and analyzed using descriptive statistics. In the first stage, records from January to October 2024 were analyzed. In the second stage, questionnaires with a Likert scale were applied to 53 professionals between May and June 2025. Higher adherence was observed in training on hypodermoclysis and basic life support, and lower adherence in PICC line maintenance and medication administration in intensive care. Participants positively evaluated the methodology, duration, frequency, relevance of the topics, and contribution to patient safety. Limitations identified included low adherence and variations in performance among the topics covered. Simulation training was perceived as a strategy to promote safe care practices for pediatric patients.

Keywords: Pediatric nursing. Simulation training. Patient safety.

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RESUMO

Avaliar os treinamentos em simulação para profissionais de enfermagem, identificando as temáticas e percepção individual dos participantes sobre os treinamentos realizados. Estudo exploratório, descritivo, documental e transversal, realizado com profissionais da equipe de enfermagem de um hospital pediátrico, desenvolvido em duas etapas e analisado por meio de estatística descritiva. Na primeira etapa, analisaram-se os registros de janeiro a outubro de 2024. Na segunda, aplicaram-se questionários com escala Likert a 53 profissionais, entre maio e junho de 2025. Observou-se maior adesão aos treinamentos de hipodermóclise e suporte básico de vida e menor à manutenção de PICC e administração de medicamentos em terapia intensiva. Os participantes avaliaram positivamente metodologia, duração, frequência, relevância dos temas e contribuição para a segurança do paciente. Como limitações identificou-se a baixa adesão e variações no desempenho entre os temas abordados. Percebendo-se os treinamentos em simulação como estratégias para propiciar uma prática assistencial segura para o paciente pediátrico.

Palavras-chave: Enfermagem pediátrica. Treinamento por simulação. Segurança do paciente.

RESUMEN

Este estudio tuvo como objetivo evaluar la capacitación mediante simulación para profesionales de enfermería, identificando los temas y las percepciones individuales de los participantes respecto a la capacitación. Fue un estudio exploratorio, descriptivo, documental y transversal realizado con personal de enfermería de un hospital pediátrico, desarrollado en dos etapas y analizado mediante estadística descriptiva. En la primera etapa, se analizaron los registros de enero a octubre de 2024. En la segunda etapa, se aplicaron cuestionarios con escala Likert a 53 profesionales entre mayo y junio de 2025. Se observó una mayor adherencia en la capacitación sobre hipodermoclisis y soporte vital básico, y una menor adherencia en el mantenimiento de catéteres PICC y administración de medicamentos en cuidados intensivos. Los participantes evaluaron positivamente la metodología, la duración, la frecuencia, la relevancia de los temas y la contribución a la seguridad del paciente. Las limitaciones identificadas incluyeron la baja adherencia y las variaciones en el desempeño entre los temas cubiertos. La capacitación mediante simulación se percibió como una estrategia para promover prácticas de atención seguras para pacientes pediátricos.

Palabras clave: Enfermería pediátrica. Entrenamiento simulado. Seguridad del paciente.

INTRODUCTION

Professional training in the health field in Brazil has been the subject of debate since the 1990s, a topic that proved to be of national relevance as it was incorporated into the Organic Law of Health - 8080/1990, which states the need for human resource training to be oriented based on the Unified Health System, replacing technicist and hospital-centric training curricula with training aimed at professionals able to work in the Unified Health System[1-3].

In this context, the government instituted the National Policy for Continuing Education, which reinforced the importance of continuous professional development, as well as the relationship between training and the quality of care provided to the population[4-6].

Currently, in continuing education initiatives, the presence of active teaching methodologies (ATMs) wildly used. These are defined as dynamic activities in the teaching-learning process, where knowledge is actively constructed and transmitted, with the participants involved in this process taking the lead[6-8]. Examples include Problem-Based Learning (PBL), flipped classroom, gamification, case studies, virtual reality technologies, among others, which utilize different technological resources for education, and specifically in the health field, simulation has proven effective[6-10].

Furthermore, the relationship between professional training and patient safety is highlighted, given that patient safety is the subject of research and action globally. Patient safety became a prominent topic following publications in 1999 that addressed the impacts of adverse events in healthcare. Since then, the World Health Organization (WHO) has been publishing and encouraging discussion on the topic, seeking to disseminate measures to promote patient safety[11].

Given this, the interconnection between simulation scenarios and their impact on the quality of patient care and safety, as well as their effect on healthcare costs due to the reduction of care-related incidents such as infections, medication errors, among others[12-13]. This leads to the guiding question: “What are the main training programs conducted by the institution, what is each nursing professional's perception of the training, and how does it relate to clinical practice and pediatric patient safety?”

The object of the study is to analyze the training conducted in a simulation center and the nursing staff's perception of its contribution to clinical practice and the safety of pediatric patients.

METHOD

This is a descriptive, documentary, cross-sectional exploratory study with a quantitative and qualitative approach, designed in two complementary stages, developed in an exclusively pediatric hospital. The research participants were nursing professionals who met the following inclusion criteria: nursing technicians, nurses, trainee nurses, and resident nurses working at the institution for two months or more, who had completed at least two training sessions in the simulation center with records of the pre-test and post-test specific to each training session. Exclusion criteria included: professionals on vacation or leave during the research period. The data were structured, transcribed, and stored in Microsoft Excel, and analyzed using descriptive statistics (absolute and relative frequency, mean, graphs, and tables). The data from each stage were analyzed separately using statistical methods and subsequently critically.

The first stage of the research was developed through: document analysis of data collected from the database of the Simulation Center sector, which is responsible for conducting training with the institution's professionals, collecting the following available information: participant's work sector, number of registered participants and the number of attendances and absences, date of the training sessions which were held between January and October 2024, subject matter covered in the training sessions and the scores on the pre- and post-tests.

The second phase was carried out in May and June 2025, during day and night shifts, at the simulation center after training sessions for hospital professionals. Data collection was carried out using a questionnaire developed by the researchers, designed to cover sociodemographic questions of the participants and questions that verified the individual perception of the trained professionals at that institution regarding the training conducted by the simulation center. This questionnaire was designed to encompass these aspects, in order to construct an instrument that would answer the questions formulated by the researchers on the study topic, based on the analysis of articles available in the literature and on the practice and evaluation of the research field service, thus considering the specificities of the research location, in order to address the themes that would be evaluated in this research, to address the study themes directly and objectively, focusing on participants’ perceptions.

The questionnaire covered topics such as each participant's opinion on the preparation of the professional who conducted the training, the duration of the training, and the methodology used in the training. These questions were answered using Likert-type responses, as shown in Figure 1, and are fully described in Table 3 in the results section.

Figure 1 - Except from the questionnaire prepared and given to the participants.

5) Do you consider practical training sessions conducted after the theoretical approach to the subject to be important?
( ) I totally agree
( ) I agree
( ) I neither agree nor disagree
( ) I disagree
( ) I totally disagree

6) Are the professionals responsible for conducting the training qualified to perform this activity?
( ) I totally agree
( ) I agree
( ) I neither agree nor disagree
( ) I disagree
( ) I totally disagree

7) Are the topics covered in the training relevant to professional practice?
( ) I totally agree
( ) I agree
( ) I neither agree nor disagree
( ) I disagree
( ) I totally disagree

Source: the authors (2025)

The professionals were approached personally in a specific room, after a training session, with sufficient time to complete the questionnaire, and were then invited to participate in the research. The participants were given brown envelopes containing the Informed Consent Form (ICF) in duplicate, and the questionnaire, in order to ensure the confidentiality and anonymity of the participants, following the regulations for research with human subjects. The professionals were instructed to hand the sealed envelopes, upon leaving the room, to the researcher stationed outside the room. After collecting all the envelopes, the researcher separated the documents, coding the questionnaires (e.g., A1, A2, A3), and then transcribing the responses into Microsoft Excel.

This project was approved by the Research Ethics Committee of Faculdade Pequeno Príncipe, with registration CAAE: 86307325.2.0000.5580 and CEP opinion number: 7.468.997.

RESULTS

First stage

The training sessions covered various topics related to pediatric patient care, such as medication administration in pediatrics and the pediatric ICU, venous access, clinical deterioration, clinical management such as respiratory and seizure control, catheterization, hemotherapy care, tracheostomies and parenteral nutrition, life support, and infection prevention. Some were excluded because they did not meet the inclusion criterion of not having pre- and post-test scores, namely: "Medication administration in pediatrics" (n=307 records), "Urinary tract infection prevention" (n=260 registered participants), and "Advanced life support" (n=3 registered participants). The characteristics of these training sessions included different methodologies, with

the majority consisting of theoretical presentations followed by simulations, training with clinical simulations performed by participants followed by instructor debriefing, and pre- and post-tests to assess knowledge retention. Regarding duration, the average training session lasted between one and one and a half hours, structured according to the institution's protocols for its formulation, and designed to provide professionals with practical experience in real-world healthcare settings.

Those who met the inclusion criteria resulted in a total of 1,182 participants met the inclusion criteria, who could participate in more than one training session and could be re-enrolled due to absence from a previous training session. The total number of enrolled participants who did not attend the training sessions was: n=748, representing 63.28% of the enrolled professionals. Those who were enrolled and attended the training were n=434 (36.71%). Among these, the participants who did not meet the inclusion criterion of attending at least two training sessions were subtracted, resulting in a number of n=154 enrolled professionals who were excluded. After these filters, a total of 280 participants (100%) met all the inclusion criteria.

Based on this, Table 1 was created, which presents the name of each training analyzed, the number of participants who completed the training, those who passed and those who failed, and their average scores on the pre-test and post-test. The average improvement was also calculated, which analyzes the score obtained by the participants on the pre-test and averages it with the score obtained on the post-test, aiming to verify learning retention based on the increase in the participant's score when averaging these scores obtained before and after the training, respectively. It is noteworthy that those who failed did not obtain the minimum score of 70% for approval on the training test.

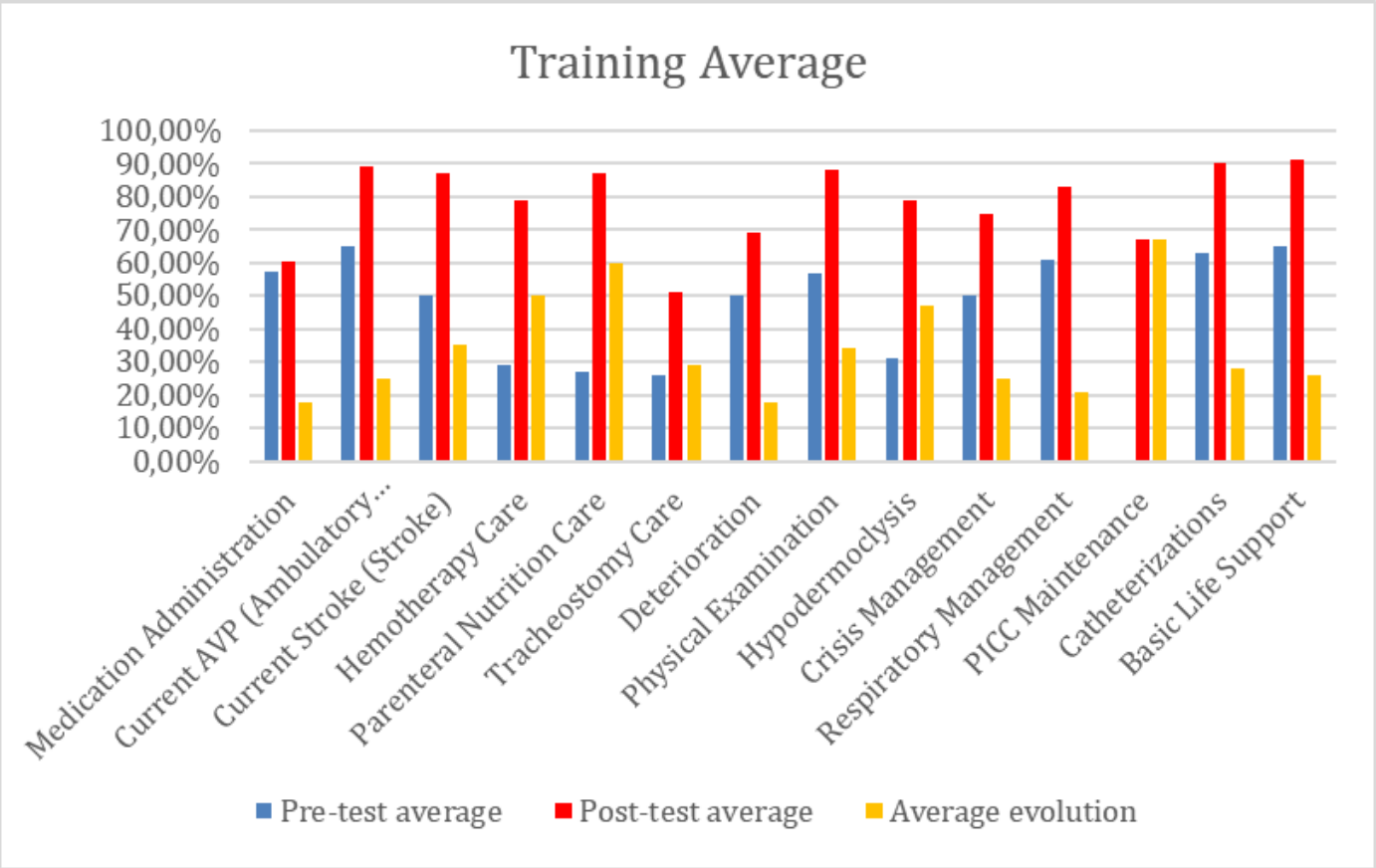
Table 1 - List of training courses and their respective approvals, rejections, pre- and post-test averages, and average progress.

Training identification number and name		Total number of participants	Approved	Failed	Pre-test average	Post-test average	Average evolution
1	Administering medications in pediatric intensive care.	4	3	1	57.50%	60.15%	18.00%
2	Update on peripheral venous access	33	33	0	65.00%	89.00%	25.00%
3	Update on central venous catheter	32	27	5	50.00%	87.00%	35.00%
4	Care with blood products	7	5	2	29.00%	79.00%	50.00%
5	Parenteral nutrition care	9	8	1	27.00%	87.00%	60.00%
6	Tracheostomy care in pediatrics	10	3	7	26.00%	51.00%	29.00%
7	Clinical deterioration in pediatrics	14	10	4	50.00%	69.00%	18.00%
8	Physical examination in pediatrics	36	35	1	57.00%	88.00%	34.00%
9	Hypodermoclysis in pediatrics	38	31	7	31.00%	79.00%	47.00%
10	Management of seizures in pediatrics	24	20	4	50.00%	75.00%	25.00%
11	Respiratory management in pediatrics	8	8	0	61.00%	83.00%	21.00%
12	PICC catheter maintenance	3	1	2	0.00%	67.00%	67.00%
13	Pediatric probes	24	24	0	63.00%	90.00%	28.00%
14	Basic life support for professionals in pediatrics.	38	37	1	65.00%	91.00%	26.00%
TOTAL		**280**	**245**	**35**	**45.11%**	**78.23%**	**34.50%**

Source: the authors (2025).

The training courses with the highest participation rates were hypodermoclysis and basic life support for healthcare professionals in pediatrics. Those with the lowest participation rates were training on Peripherally Inserted Central Catheter maintenance and medication administration in pediatric intensive care, both of which are critical topics. Regarding the highest average improvement in knowledge retention, training on parenteral nutrition care showed a 60% improvement and knowledge retention rate, followed by PICC maintenance training with 67%. The topics with the lowest improvement in scores were "medication administration in pediatric intensive care" and "clinical deterioration in pediatrics," both with an 18% improvement. All these data are presented in Graph 1, showing the pre-test and post-test averages and the improvement in scores.

Graph 1 - Average of pre-test, post-test and average of the progress score.



Source: the authors (2025).

Regarding the lowest average pre- and post-test scores in the training sessions, the topic of "tracheostomy care" had a participation rate of 10 participants, a high failure rate of 70% of the class, and a low average progress rate of only 29%, also registering low average scores in the pre- and post-tests.

The highest approval rate was for the topic of "physical examination in pediatrics," with 35 registered participants passing, representing 97.22%, and only 1 failure (2.78%). This was also reflected in the post-test average of 88%, showing a 34% improvement. These results were similar to those presented in the "basic life support for healthcare professionals" training, which also recorded only one failure and showed a 26% improvement between the pre- and post-test averages. Among the topics with no failures were "probing in pediatrics" and "respiratory management."

Based on these results, it is possible to identify which topics require greater attention for future approaches by the simulation center due to the relevance of the themes for the training of professionals and the evidence of weaknesses, in addition to indicating a wide range of issues that permeate daily hospital life and demonstrate a concern in training professionals for safe care of pediatric patients.

Second stage

Through the application of the questionnaire, 53 participants were included who met the inclusion criteria of the research, thus outlining the sociodemographic aspects of the participants. Of the total participants, 52 (98.11%) were women and only one participant (1.89%) was a man; with a predominance of 27 (50.94%) participants in the age range between 20 and 30 years, followed by 19 (35.85%) participants aged 30 to 50 years, with five collaborators over 50 years old (9.43%) and only two participants aged up to 20 years (3.77%).

Regarding the training of these professionals, it was identified that the majority, 26 (49.06%) were nursing technicians, followed by 21 (39.62%) nurses, 5 (9.43%) resident nurses, and 1 (1.89%) trainee nurse.

Regarding the length of service at the institution, Table 2 presents the verified data, which demonstrates that the majority of participating professionals, 15 (28.30%), have been at the institution for 2 to 5 years, followed by those who have been in service for 10 to 20 years (n=11, 20.75%). The minority consists of those with more than 20 years of service, with only 3 (5.66%) participants, and 4 (7.55%) new employees who have been in service for 6 months.

Table 2 - Period of work at the institution.

Work period at the institution	Total participants (N) (%)
Up to 6 months	4 (7.55%)
From 6 months to 1 year	7 (13.21%)
From 1 to 2 years old	7 (13.21%)
From 2 to 5 years old	15 (28.30%)
From 5 to 10 years old	11 (20.75%)
From 10 to 20 years old	6 (11.32%)
Over 20 years old	3 (5.66%)
TOTAL	**53 (100%)**

Source: the authors (2025).

Regarding the length of time service in the sector, it was found that professionals who have been in the same sector for 2 to 5 years accounted for 17 professionals (32.08%), followed by those who have been in the new sector for 6 months with 11 (20.75%) participants. Participants who have been in the same sector for 6 months to 1 year and 1 year to 2 years each accounted for 7 professionals (13.21%). It is noteworthy that only one (1.89%) professional has been in the same sector for more than 20 years.

Regarding the time since these professionals have been trained, the majority completed their studies, between 2 and 5 years ago, with 18 participants representing 33.96%. Following this, 12 professionals (22.64%) completed their studies between 5 and 10 years ago. It is noted that only one individual (1.89%) finished their studies more than 20 years ago. As for further training, 30 people (56.60%) stated that they had completed some type of specialization, while 23 (43.40%) did not pursue any specialization after completing their studies.

Regarding participation in training, it was found that 19 participants (25.85%) had completed their last training one week before the questionnaire was administered, followed by those who had completed it in the last 6 months, 17 (32.08%). Regarding participation frequency, it was found that 25 professionals (47.17%)

had completed 7 to 10 training sessions, followed by those who had completed 4 to 6 training sessions, 16 participants (30.19%), and those who had completed 1 to 3 training sessions, with 12 participants (22.64%).

The remaining questions were specifically focused on the training conducted by the simulation center, and were answered using a Likert scale: strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree, as shown in Table 3.

Table 3 - Questions and answers from the questionnaire regarding the training, according to the participants' perception.

Identification number and questionnaire question		I completely agree	I agree	I neither agree nor disagree	I disagree	I completely disagree
3	Is the duration of each training session appropriate?	23	25	5	0	0
4	Is the methodology used for each training session effective?	30	22	1	0	0
5	Do you consider practical training sessions conducted after the theoretical approach to the topic to be important?	43	9	1	0	0
6	Are the professionals responsible for conducting the training qualified to perform this activity?	35	16	2	0	0
7	Are the topics covered in the training relevant to professional practice?	41	12	0	0	0
8	Do you consider training important because it addresses specific aspects of pediatrics and aims to improve patient safety?	39	14	0	0	0
9	Are the training topics important for improving patient care?	40	13	0	0	0
10	Do the training sessions provide better professional practices and consequently have a positive impact on patient safety?	39	14	0	0	0
11	After completing the training, are you able to apply the knowledge gained during your clinical activities on your shift?	34	18	1	0	0

Source: the authors (2025).

Regarding the duration of the training, 25 (47.17%) of the participants responded that they agreed, followed by 23 (43.40%) of the participants who strongly agreed with the statement, and only 5 (9.43%) professionals neither agreed nor disagreed with the statement. Concerning the methodology used, only one (1.89%) professional chose to neither agree nor disagree, and 30 (56.60%) of the participants stated that they strongly agreed, while the remaining 22 (41.51%) stated that they agreed.

After the presentation of the theoretical content, participants are invited to carry out the practical part of the training through clinical simulation. Regarding this, participants were asked about the importance of this stage, with the majority of 43 (81.13%) reporting that they strongly agreed with the practical stage, 9 (16.98%) agreed, and only one participant (1.89%) neither agreed nor disagreed with the statement.

Regarding the instructors' preparedness to present, organize, and conduct each training session, participants were asked if the instructors were qualified for the activities. Of these, 35 (66.04%) strongly agreed with the statement, followed by 16 (30.19%) who agreed, and only 2 (3.77%) who neither agreed nor disagreed.

Of the topics covered, 41 (77.36%) of the participants strongly agreed that they are relevant to professional practice in the workplace, while 12 (22.64%) only agreed. When asked about the training's focus being specific to pediatrics and, consequently, to patient safety, 39 (73.58%) responded "strongly agree" and 14 (26.42%) "agree".

Regarding the relevance of the training topics for improving patient care, 40 participants (75.47%) responded "strongly agree" and 13 (24.53%) "agree," indicating that all considered the topics covered to be relevant. As for the positive impact of the training on clinical practice and, consequently, on patient safety, 39 (74.58%) strongly agreed and 14 (26.42%) responded agreed.

The final question sought to verify the application of the knowledge acquired in the training to patient care, with the majority of 34 participants (64.15%) strongly agreeing, 18 participants (33.96%) agreeing, and only one (1.89%) professional neither agreeing nor disagreeing.

Most participants agree that the training and methodologies are effective for pediatric patient safety, highlighting the importance of the simulation center in these actions.

DISCUSSION

The finding that most nursing technicians have recently completed their training aligns with national literature, which highlights weaknesses in technical training in Brazil, such as a curriculum focused on the technical aspects of the profession, little emphasis on critical thinking, and the incipient approach to topics such as patient safety[14]. The scarcity of studies focused on the nursing technical team is noteworthy, even though this team represents approximately 70% of nursing professionals[15].

The high turnover of professionals in the research setting was evident, as most work at the institution for a short period of time. This scenario impacts the institution's continuing education, given the need for constant training opportunities for updates and new employees. This is similar to what researchers have stated, affirming that professional turnover hinders continuing education, which requires frequent new training sessions without interrupting ongoing projects[16], especially considering the need to improve the quality of care provided in the service due to the population served.

The training sessions at the simulation center proved effective in providing updates to the team's professionals, in line with what is stated in the literature, that on-the-job training is beneficial for proposing updates, overcoming weaknesses in training, and encouraging the participation of other employees of the institution in future training, so that it goes beyond the trained professional and extends to the operational scenario[17].

Among the actions carried out by health services to increase the adherence of professionals to training, we present those developed in a Brazilian hospital developed strategies using games, guaranteeing an active learning methodology[18]. It is noted that in the context of the study, active participation is carried out through clinical simulation, where professionals become protagonists, through the use of their prior knowledge, to act in the scenarios set up that refer to daily life, ending with the debriefing that seeks reflection and discussion about the learning[19].

The topic of basic life support involved 38 professionals, of whom only one failed, corroborating the findings of a study that evaluated the positive results of conducting training and retraining on cardiopulmonary resuscitation (CPR), which verified a retention of the skills acquired by the professionals who received in-service education[20]. Another study developed the creation of a serious game about CPR in infants under one year old, reinforcing the relevance of educational technology for the safety of pediatric patients[21]. Brazilian researchers evaluated CPR simulation with nursing professionals, nursing technicians, physicians, and medical interns, highlighting the benefits of this methodology for obtaining knowledge, developing safer and higher-quality practice, reaffirming the importance of addressing this topic[22].

Regarding medication administration, an inherent action of the nursing team, a Brazilian study identified that training was positive in increasing learning in this area, positively impacting the safety of pediatric patients[23]. Due to its relevance, these issues are the subject of research that specifically evaluates the relationship between medication administration and the safety of pediatric patients[24]. This topic was specifically addressed in the context of administration in the pediatric intensive care unit; however, it showed the lowest rate of improvement in scores, demonstrating the need to reinforce the approach, avoiding potential weaknesses, in order to guarantee the safety of pediatric patients at the critical care unit level, and extending it to inpatient units.

It was found that the research participants stated that clinical simulation allows the development of knowledge that favors patient safety, an aspect that is similar to that expressed in the literature, which reinforces the importance of learning through simulation by allowing the improvement of theory and practice without jeopardizing patient safety[25], being applicable in hospital settings as well as in the pre-hospital setting[26], in addition to allowing the development and improvement of skills beyond techniques, such as aspects of anxiety management, personal skills and joint action in the learning process[25,26].

In summary, it is noted that clinical simulation is a reality in the field of nursing at the national and international levels, proving to be a strategy for teaching and continuing education of professionals with a view to providing quality and safe care to patients, through the improvement of technical and non-technical skills such as emotional skills. The relevance of these themes in the context of pediatrics is further highlighted, since this population benefits from teaching through clinical simulation in the development of nursing competencies[27].

The low participation rate in some of the training courses provided stands out, indicating a weakness and a point of attention for the institution. Therefore, there is a need to promote measures to reverse this situation, such as overcoming the nursing workload overload in order to increase the number of participants, considering that this scenario is a reality in our country and is the subject of discussions due to its relevance and impacts on care practice and, consequently, on patient safety[28], and on the service, since overworked workers perform their duties in a less productive way and with a greater chance of errors.

Limitations of the study include the small sample size of participants and the analysis conducted in a single research setting. The need for further research on this topic was also highlighted due to its relevance and impact on patient safety.

CONCLUSIONS

Based on the above, it was found that the training provided by the simulation center to nursing professionals allows them to develop skills, competencies, and professional attitudes, facilitated through the use of clinical simulation, which is considered an effective form of training by the trained professionals. It is noted that the weaknesses identified, such as low participation in training, low average progress in some topics, and work overload, were identified as aspects that should be evaluated by the institution in order to implement changes that facilitate the training sessions for the nursing team.

Also noteworthy is the relevance and validity of the training topics being focused on the pediatric audience, due to the specific nature of the institution where these trainings sessions are developed, demonstrating the service's objective of providing safe and high-quality care that guarantees safe care for children.

Therefore, this research demonstrates the relevance of the topic for pediatric patient safety, the benefits of clinical simulation for nursing staff training, and allows for discussions on topics that require future attention, such as staff overload, low scores on critical topics, and low adherence to training—aspects that involve the challenges of continuing education for nursing professionals and impact on patient safety.

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SUBMISSION DATE: 2/6/26 | ACCEPTANCE DATE: 4/10/26