Rev Rene. 2023;24:e91858.
DOI: 10.15253/2175-6783.20232491858
www.periodicos.ufc.br/rene

Original Article

Satisfaction, self-confidence and self-efficacy in the use of clinical simulations: comparisons between health undergraduates and professionals

Satisfação, autoconfiança e autoeficácia no uso da simulação clínica: comparação entre acadêmicos e profissionais da saúde

How to cite this article:
Almeida VCRA, Lima JC, Ferreira GE, Oliveira JLC, Miraveti JC, Ribeiro MRR. Satisfaction, self-confidence and self-efficacy in the use of clinical simulations: comparisons between health undergraduates and professionals. Rev Rene. 2023;24:e91858. DOI: https://doi.org/10.15253/2175-6783.20232491858

Viviane Christine dos Reis Alves Almeida[1]
Jaqueline Costa Lima[2]
Gímerson Erick Ferreira[2]
João Lucas Campos de Oliveira[3]
Jocilene de Carvalho Miraveti[2]
Mara Regina Rosa Ribeiro[2]

[1]Hospital Universitário Júlio Muller.
Cuiabá, MT, Brazil.
[2]Universidade Federal de Mato Grosso.
Cuiabá, MT, Brazil.
[3]Universidade Federal do Rio Grande do Sul.
Porto Alegre, RS, Brazil.

Corresponding author:
Viviane Christine dos Reis Alves Almeida
Rua São Joaquim, 1050. CEP: 78020-150.
Cuiabá, MT, Brazil.
E-mail: viviane_reisa@hotmail.com

Conflict of interest: the authors have declared that there isno conflict of interest.

EDITOR IN CHIEF: Ana Fatima Carvalho Fernandes
ASSOCIATE EDITOR: Ana Luisa Brandão de Carvalho Lira

ABSTRACT
Objective: to analyze the levels of satisfaction, self-confidence, and self-efficacy in clinical simulations among health undergraduates and professionals. **Methods:** cross-sectional study based on Design Science Research Methodology, with 156 health professionals and 149 health undergraduates who participated in an educational session about personal protective equipment use during the COVID-19 pandemic, mediated by Rapid-Cycle Deliberate Practice. Participants responded to a social and work-related questionnaire and to validated scales. For descriptive analysis of independent samples, Chi-squared test and Student's t were used considering p<0.05 as significant. **Results:** we found generally high satisfaction levels (mean ± standard deviation: 4.72±0.58), self-confidence (4.44±0.78), and self-efficacy (4.03±1.17) for favorable items. There were significant statistical differences in seven items in the scale of satisfaction and self-confidence with learning in students, and in six items of the general self-efficacy scale, with p<0.05. **Conclusion:** undergraduates showed higher means of satisfaction and self-confidence with learning, while professionals had higher means of self-efficacy. These results can collaborate for the continuity of clinical simulation practices, increasing procedural safety and quality. **Contributions to practice: t**he results show that the activities had a positive contribution, increasing learning opportunities and practical experiences that reflect on the excellence of the routine.
Descriptors: Personal Protective Equipment; COVID-19; Simulation Training.

RESUMO
Objetivo: analisar os níveis de satisfação, autoconfiança e autoeficácia no uso da simulação clínica entre acadêmicos e profissionais da saúde. **Métodos:** estudo transversal, baseado no *Design Science Research Methodology*, com 156 profissionais e 149 acadêmicos da área de saúde, que participaram da capacitação para uso de equipamentos de proteção individual na pandemia da COVID-19, mediada por Prática Deliberada em Ciclos Rápidos. Os participantes responderam ao questionário sociolaboral e escalas validadas. Utilizou-se análise descritiva, testes Qui-quadrado e *t Student* em amostras independentes para análise de dados, considerando-se significativo p<0,05. **Resultados:** verificou-se altos níveis gerais de satisfação (média ± desvio-padrão: 4,72±0,58), autoconfiança (4,44±0,78) e autoeficácia (4,03±1,17) para itens favoráveis). Na comparação, identificou-se diferenças estatísticas significativas em sete itens da escala de satisfação dos estudantes e autoconfiança com aprendizagem, e seis da escala de autoeficácia geral com p<0,05. **Conclusão:** os acadêmicos apresentaram maiores médias relacionadas à satisfação e autoconfiança com aprendizagem, enquanto profissionais apresentaram maiores médias relacionadas à autoeficácia, resultados que corroboram para continuidade de práticas envolvendo simulação clínica, propiciando segurança e qualidade aos procedimentos. **Contribuições para a prática:** os resultados apontam que as atividades contribuíram positivamente, potencializando oportunidades de aprendizagem e vivências práticas, que refletem na excelência das rotinas.
Descritores: Equipamento de Proteção Individual; COVID-19; Treinamento por Simulação.

Received: July 26th 2023; Accepted: Sep. 19th 2023.

Introduction

The coronavirus pandemic (COVID-19), a grave, highly transmissible, and globally impactful disease, required adjustments to protective measures, especially for health workers. This led sanitary surveillance agencies and health institutions to implement new protocols, especially regarding the use of personal protective equipment (PPE), once again showing the importance of an adequate use of such materials[1].

Despite their undeniable relevance, the use of PPE in the context of the pandemic was considered a problem to be confronted by leadership, not only because it was scarce, but also due to its potential misuse, to workers who did not use them, and even to lesions that could be caused by prolonged use[2]. Thus, when the pandemic revealed these shortcomings, managerial approaches became necessary that could implement actions to articulate care, management, and education, prioritizing educational actions as a strong support to professional action, while promoting fast, effective, and long-lasting transformations[3].

Clinical simulations are teaching methodologies that allow for experienced-based learning in a safe environment, in which the student is the center of the process, and the professor is a facilitator. It creates conditions that are similar to reality through the use of practical scenarios, with different complexity levels, in order to broaden and/or replace reality with experience in controlled and interactive environments[4], thus showing itself as an excellent option to educate health professionals and undergraduates during crises.

The concept of clinical simulation — due to its broad potential as a learning strategy that involves the creation of a hypothetical situation — is dynamic, incorporating an authentic representation of reality, and contributes for active and safe participation[5]. Furthermore, it seeks to integrate the complexities of practical and theoretical learning with opportunities for repetition, feedback, evaluation, and reflection, while not submitting any patient to the risks inherent to these procedures[4]. As a result, it is highly effective for the education of health workers[6].

The several modalities of clinical simulation include Rapid-Cycle Deliberate Practice (RCDP), an innovative simulation strategy in which a case or ability is repeated until the desired competence is acquired. This modality seeks to help develop mastery and muscle memory through deliberate practice[4,7]. Its debriefing — a stage considered to be the most valuable moment in a simulation — is also unique, as it takes place in a more informal manner, being provided immediately after an action is interrupted, to consolidate the correct way to carry out an ability[4].

The RCDP is an innovative strategy that allows repeating the procedure, provides immediate feedback directed by the instructor, and enables "overlearning", meaning that the participant can continue to practice the procedure even after they already managed to do it correctly[4]. The use of these practices has been associated with participant satisfaction and with the possibility of practicing for longer. This, coupled with structured plans and environments, contributes for the method to be an excellent opportunity to practice[7].

From this perspective, studies were created involving the use of RCDP to train health teams in the skills needed to deal with the pandemic[8-9], collaborating for the development of this research, which brings advancements regarding the perspective of the individuals who participated in this practical experience methodology, analyzing satisfaction and self-efficacy feelings and enhancing the use of simulations in scenarios with new routines, and providing necessary skill training sessions.

This study addresses the demand for the education of health professionals and undergraduates to use PPE in the COVID-19 pandemic, allowing its subjects to get in touch with the clinical simulation methodologies using the RCDP strategy. It also evaluates their self-confidence regarding the teaching methodology, and their self-efficacy regarding the use of PPE during the pandemic. The study is justified by the need to evaluate whether the teaching strategy, used

in a pandemic situation, can reach its goals regarding education and practice.

Based on the above, our goal was to analyze the levels of satisfaction, self-confidence, and self-efficacy in clinical simulations among health undergraduates and professionals.

Methods

Cross-sectional study based on the principles of Design Science as epistemological paradigms, starting with the knowledge generated by the proposal of solutions for real problems, with an impact on the routine of organizations, starting with the projection of a new artifact and the formalization and evaluation of a pre-existing artifact[10].

An artifact can be defined as something constructed by men or as an artificial object, that can be characterized according with its objectives, functions, and adaptations[10]. In this study, the artifact was a previously existing methodology, which was applied to the reality installed beforehand, observing its behavior, and analyzing its viability and efficacy. This artifact was of the instantiation type[11]. We used the method detailed by the Design Science Research Methodology (DSRM) in six stages[12].

1) Identification of the problem: The researcher identifies the problem and its relevance for the study scenario, showing the importance of the research and highlighting its motivation[12]. The problem was identified considering the experience in the pandemic and the activities carried out in its frontlines, which showed potential shortcomings in the use of PPE in this context.

2) Definition of expected results: stage where awareness and knowledge about the problem are developed to identify what can be done considering reality, thus defining expected results[12]. We aimed to project an educational artifact that valued the education process, bringing together content and practical experience by valuing practices related with the wearing and removing of PPE in the context of the pandemic.

3) Design and development: aims to elaborate the artifact proposed as a solution to the problem. At this point, it is important to define its operationalization, functionality, architecture, and development, using the theoretical framework constructed up to this point[12]. We carried out a search in literature for modalities of simulation that would attend to our practical needs and repeat until the participant felt safe, and which provided immediate feedback as the ability is carried out. Finally, we projected an artifact in the form of a simulation script[13], using the clinical simulation with the RCDP strategy.

4) Demonstration: uses the artifact proposed, presents solutions for one or more instances of the problem through experimentation, simulation, case studies, formal proof, or another appropriate activity. Factors related to this step consider all knowledge that involves the artifact[12]. We set up training stations that lasted for two hours, including a theoretical lecture. 50% of time was separated for the practical activity of putting on and removing PPE, an action which was repeated until the ability was achieved.

5) Evaluation: results found after the artifact was implemented are compared with the expected results described in the second stage of the process, and it is possible to go back to previous stages for adaptation if the goals traced are not achieved[12]. We used validated scales to measure satisfaction, self-confidence, and self-efficacy considering the proposal of education to prove the usefulness of the artifact proposed.

6) Communication: presents the problem and its importance. We have the opportunity to expose the rigor of the research, as well as the efficacy of the proposed solution, in the form of an article presented to the academic community[12]. Communication can be carried out through the publication of manuscripts in academic means of communication and teaching environments.

The study included 305 health professionals and undergraduates from a university hospital, who would work in direct or indirect assistance to patients with suspected or confirmed COVID-19 cases.

We included professionals and undergraduates from the health field who had direct contact with patients with suspected or confirmed COVID-19 cases or with their hospitalization environments (physicians, nurses, nursing technicians and auxiliaries, nutritionists, physical therapists, dentists, resident physicians, multiprofessional residents, hospital maintenance and infrastructure teams, and health undergraduates - interns from the last year of the medicine course and nursing undergraduates). We excluded professionals and undergraduates who were on vacations or on medical leave during data collection. It is worth noting that there was no control over the persons excluded due to being on vacation or on leave, and nobody was excluded by any other criteria. There were also no losses. The final sample was non-probabilistic, by convenience.

The data collection stage took place from March to November 2020. During this period, the participants were invited to integrate the educational activity "Clinical simulation about the use of PPE in the care to COVID-19 patients", through the electronic communication channels used by the hospitals. They enrolled in the course using a Google Form. The activity was available in the morning, afternoon, and evening shifts, lasting for a mean of two hours.

Participation was voluntary and participants were informed about the research and invited to participate, signing two identical copies of an informed consent, which guaranteed their anonymity, confidentiality, and the freedom to abandon the study at any time.

We applied sociodemographic and academic-professional questionnaires, in addition to two previously validated instruments. The Scale of Student Satisfaction and Self-Confidence in Learning (SSSSCL) and the General Self-Efficacy Scale are both translated and validated[14-15] and contain 13 items organized on a 5-point Likert, with values going from 1, meaning *strongly disagree*, up to 5, meaning *strongly agree*. Cronbach's alpha was calculated to show the internal consistency of each.

Data collected was stored in Microsoft Excel spreadsheets and analyzed in SPSS, version 24. In the descriptive analyses, categorical variables were compared using the Chi-squared test, while continuous variables were compared using Student's *t* test for independent samples and their respective standard deviations (SD). The normality of data was verified using the Kolmogorov–Smirnov. We considered values of $p<0.05$ as significant.

The research was allowed by the institution and approved by the Ethics Committee for Research with Human Beings of the Júlio Muller Teaching Hospital, under Certificate of Submission for Ethical Appreciation 09495919.9.0000.5541, and opinion: 3.285.978/2019.

Results

The study included 305 individuals, with 156 (51.2%) health workers and 149 students (48.8%). Professionals and undergraduates had statistically significant differences in all sociodemographic variables analyzed ($p<0.05$), except in the question about having participated in PPE use courses in the past ($p=0.37$) (Table 1).

Table 1 – Characteristics of the individuals and participation in education sessions in the Júlio Muller Teaching Hospital. Cuiabá, MT, Brazil, 2020

Individual characteristics	Total n=305	Professionals n=156	Undergraduates n=149	p-value*
	n (%)	n (%)	n (%)	
Age group (years)				<0.001
20-29	159(52.1)	28 (17.9)	131 (87.9)	
30-39	74 (24.3)	61 (39.1)	13 (8.7)	
> 40	72 (23.6)	67 (42.9)	5 (3.4)	<0.001
Sex				
Male	98 (32.1)	41 (26.3)	57 (38.3)	
Female	207(67.9)	115(73.7)	92 (61.7)	
Marital Status				<0.001
Single	197 (72.4)	68 (50.7)	129 (93.5)	
Married/Stable Union	75 (27.6)	66 (49.3)	9 (6.5)	
Educational level				<0.001
Basic and elementary education	26 (8.5)	26 (16.7)	0 (0.0)	
Incomplete higher education	135(44.3)	9 (5.8)	126 (84.6)	
Complete higher education	72 (23.6)	57 (36.5)	15 (10.1)	
Specialization/Master/PhD	72 (23.6)	64 (41.0)	8 (5.4)	
Course on the use of Personal Protective Equipment				<0.001
Yes	165(54.1)	96 (61.5)	69 (46.3)	
No	140(45.9)	60 (38.5)	80 (53.7)	
Course on PPE use				0.370
Yes	141(46.2)	76 (48.7)	65 (43.6)	
No	164(53.8)	80 (51.3)	84 (56.4)	
Simulation course				<0.001
Yes	155(50.8)	97 (62.2)	58 (38.9)	
No	150(49.2)	59 (37.8)	91 (61.1)	

*Association test X^2

We used Cronbach's Alpha to verify the internal consistency of the scales used in the study. The SSSS-CL presented high levels of internal consistency, while the self-efficacy scale presented results that varied from moderate to high (Table 2).

Table 2 – Cronbach's alpha values. Cuiabá, MT, Brazil, 2020

Verified items	No. of items	Cronbach α
SSSSCL*		
Satisfaction with learning	5	0.92
Self-confidence in learning	8	0.81
General Self-Efficacy Scale		
Favorable items	9	0.79
Unfavorable items	4	0.73

*SSSSCL: Scale of Student Satisfaction and Self-Confidence in Learning

The subscale that refers to satisfaction with learning presented high means (4.72±0.58). The highest means were found among students, showing statistically significant differences in satisfaction in four items (1, 2, 3, and 5). Regarding the subscale "self-confidence", there were also high means (4.44±0.78). The items (7, 8, and 12) were statistically different in the comparison between the groups (Table 3).

Both professionals and undergraduates presented a high level of general self-efficacy in the practice of simulation in RCDP, with an mean of 4.03 points (SD=1.17). However, undergraduates presented lower means. There were statistically significant differences in this comparison for four favorable items (2, 4, 6, and 9) and two unfavorable ones (12 and 13) (Table 4).

Table 3 – Mean of the Scale of Student Satisfaction and Self-Confidence in Learning of health professionals and undergraduates (n=305). Cuiabá, MT, Brazil, 2020

Domains and items	Total n=305	Professionals n=156	Undergraduates n=149	p-value‡
	Mean±SD*	Mean±SD	Mean±SD	
Satisfaction with learning				
1. Teaching methods used in the simulation were useful and effective	4.74±0.56	4.66±0.55	4.81±0.56	<0.001
2. The simulation provided me with a variety of materials to learn and activities to promote my learning	4.65±0.60	4.58±0.60	4.72±0.60	<0.001
3. I liked how my instructor taught me the simulation	4.78±0.54	4.71±0.53	4.85±0.53	<0.001
4. Academic materials used in this simulation were motivating and helped me learn	4.67±0.61	4.62±0.59	4.72±0.63	0.143
5. The way my instructor taught me the simulation was adequate to the way I learned	4.75±0.59	4.66±0.61	4.84±0.54	<0.001
Self-confidence in learning				
6. I am confident I mastered the contents of the simulation activity as presented to me by my instructors	4.4±0.70	4.37±0.69	4.42±0.71	0.570
7. I'm confident this simulation covered the critical contents needed for me to domain its surgical-medical contents	4.38±0.84	4.27±0.90	4.50±0.76	<0.001
8. I am confident that I am developing the abilities and obtaining from this simulation the knowledge needed to carry out tasks in a clinical environment	4.59±0.67	4.51±0.69	4.66±0.64	<0.001
9. My instructors used useful resources to teach me the simulation	4.75±0.55	4.72±0.55	4.77±0.56	0.390
10. It is my responsibility as a professor/preceptor to learn what I must know from this simulation activity	4.58±0.76	4.58±0.69	4.58±0.82	0.980
11. I know how to find help when I don't understand the topics addressed in the simulation	4.50±0.68	4.50±0.64	4.50±0.72	0.960
12. I know how to use simulation activities to learn critical aspects of these skills	4.38±0.72	4.30±0.73	4.47±0.70	<0.001
13. The instructor is responsible for telling me what I need to learn about the content of the simulation activity	3.97±0.99	3.92±1.05	4.02±0.93	0.362

*SD: standard deviation; †Student's t

Table 4 – Mean of the General Self-Efficacy Scale of health professionals and workers (n=305). Cuiabá, MT, Brazil, 2020

Domains and items	Total n=305	Professionals n=156	Undergraduates n=149	p-value*
	Mean±SD*	Mean±SD	Mean±SD	
Favorable items				
1. I can successfully carry out my life plans	4.26±0.69	4.30±0.70	4.22±0.68	0.350
2. I trust my abilities	4.30±0.69	4.48±0.64	4.12±0.69	<0.001
3. When I decide to do something, I act as soon as possible	3.90±0.89	3.96±0.87	3.83±0.90	0.180
4. I deal well with unexpected problems	3.76±0.89	3.88±0.90	3.63±0.87	<0.001
5. I feel capable of dealing well with most problems that appear in my life	3.97±0.82	4.05±0.82	3.88±0.83	0.080
6. I see difficulties as challenges	4.02±0.90	4.19±0.81	3.84±0.96	<0.001
7. Even if an activity starts badly, I can finish it successfully	4.01±0.92	4.04±0.94	3.97±0.89	0.530
8. I can say I've had more success than failure in my life	4.20±0.99	4.23±1.06	4.16±0.94	0.500
9. I recover fast from failures	3.84±0.89	3.98±0.81	3.69±0.95	<0.001
Unfavorable items				
10. I give up fast on things I try to do	1.78±0.92	1.71±0.96	1.85±0.87	0.180
11. If something seems too complicated, I don't even try doing it	1.76±0.97	1.75±1.07	1.77±0.87	0.790
12. I feel unsafe when dealing with new situations	2.69±1.22	2.39±1.25	3.01±1.11	<0.001
13. I get disheartened by failure	1.94±1.00	1.76±0.95	2.12±1.03	<0.001

*SD: standard deviation; †Student's t

Discussion

This study found that the use of clinical simulation with the RCDP strategy to teach PPE use in the context of the COVID-19 pandemic presented high levels of satisfaction, self-confidence, and self-efficacy, for both professionals and undergraduates of the health field.

The clinical simulation methodology has been included in most course curriculums in the field of health, due to factors such as increased self-confidence, autonomy, and satisfaction with the initiative. Satisfaction levels are an important parameter to evaluate education, professors, and institutions, in addition to enabling proposals to improve and provide the parameters to choose the best method to use in the classes[16].

The results of our analysis of the SSSSCL in relation with the methodology used in the education sessions show that there has been a statistically significant difference in the comparison between professionals and undergraduates, which made it possible to identify that the undergraduates had higher means than the professionals. Simulations have been associated with a significant growth in learning and the facilitation of the development of abilities to carry out procedures[17].

As educational activities are carried out, it is extremely important to evaluate factors related to satisfaction and self-confidence[18]. Thus, the results found corroborate studies that compare traditional methodologies with active ones, regarding satisfaction and self-confidence in learning[18-19], which was also indicated by a research with professionals in permanent education activities[20].

In the context of teaching evaluations, high levels of satisfaction are related with several aspects that consolidate the practice of simulation, seeing it as a useful and efficient mechanic. Among these aspects, some stand out: the variety of materials and activities developed with the goal of teaching, and the way in which content is taught. The feelings of satisfaction described consider the motivating potential of the activity, increasing the involvement of participants with the practice[21].

Educational activities based on simulation op-

timize the progress of the student. Therefore, the use of this methodology should be adequately developed in search of better practices, contributing to teaching-learning processes. Factors such as relevant settings, competent instructors, and adequate steering of the activity proposed allow understanding the topic in a practical way, very similar to reality[22].

The use of RCDP is still limited, but research indicates increased satisfaction as one of the benefits of the method, in addition to factors including the developing of mastery to carry out certain abilities, the opportunity for all participants to carry out the task, safety connected to the development of practical activities, and the consequent reduction of risks and mistakes, in addition to a longer time carrying out the practice itself[8,23].

On the other hand, health workers had higher levels of general self-efficacy regarding PPE use in the care for COVID-19 patients. A high self-efficacy perception contributes to the adherence and shows more motivation to carry out certain activities adequately.

Concepts suggest that self-efficacy is related with behavioral factors and the individual's belief in their ability to successfully carry out a specific activity[24]. Thus, the results found here show that health professionals had higher self-efficacy averages when compared to health undergraduates, which allows stating that these individuals feel efficient to carry out activities and obtain success.

Self-efficacy is associated with the idea that individuals improve when considering their own abilities to successfully carry out tasks or demands from an environment and are motivated by challenges[24]. Although this is a dynamic construct, this scale uses a general concept, in which individuals see themselves as capable of engaging the necessary resources to improve their abilities considering the challenges of several situations[25].

Negative feelings associated with giving up, lack of interest, and the idea of abandoning tasks at hand are factors associated with low self-efficacy levels. The results found here, in turn, show high levels of self-efficacy, which suggests a judgment of one's own ability, leading to better performance in actions, and, therefore, triggering feelings intrinsic to each individual, which lead them to self-regulate and seek to learn and complete gaps in their knowledge to perform their activities[24].

Self-efficacy is an individual characteristics that interferes in the results of educational situations, a factor that interferes in educational results and performance, associated with self-regulating and commitment mechanisms[26]. That said, the high mean scores of item 2 of the General Self-Efficacy Scale, "I trust my abilities", can be related to positive results, associated with the belief that there will be future learning and performance.

Students attribute feelings of self-efficacy to the educational methodologies used and perceive their self-efficacy better when they use a simulation methodology for learning. It also became clear that compromised professors favor this setting, and, associated with the use of more realistic technologies, can collaborate for better results in learning, showing that activities carried out in a short period of time — with specific topics adequate to the level of knowledge of participants — favor the construction of knowledge[27-28].

Although few studies compare health undergraduates with professionals, the scenario evaluated allows attributing a great import to simulations that use the RCDP methodology, be it in educational or health institutions. It becomes clear, thus, that health workers should use this tool to develop and/or improve abilities related to work demands.

This is an opportunity for nurse work, since this professional has the necessary knowledge and practical experience, and, also, is usually the one responsible for educational actions in hospitals, which would certainly contribute to train the abilities of the teams, mediated by simulations.

Our results encourage reflection about related topics by showing that health undergraduates have better satisfaction and self-confidence levels with the

methodology, potentially due to the fact that students are more familiarized with the learning environment and new teaching methodologies. Also, this study shows that health professionals have higher levels of self-efficacy, which could be related to professional experience, leading to more confidence to carry out activities and procedures.

Study limitations

Study limitations included the lack of more robust statistical analyses and the consideration of outcomes related to the adherence to the use of PPE. There may also be an influence of "gratitude bias", related to the fear and anxiety that affected the pandemic period. This may have had an impact on the level of satisfaction with the educational sections.

Contributions to practice

Our findings show that activities mediated by the artifact of rapid-cycle deliberate practice had a positive impact on the participants, since they provided them with satisfaction, self-confidence, and self-efficacy to carry out tasks.

These findings corroborate the usefulness of clinical simulations for the education of health professionals and undergraduates, especially in the context of new situations that cannot be addressed with previous standard routines, as was the case of the COVID-19 pandemic. Thus, they help consolidate teaching actions, increasing the opportunity for learning and for practical experience that reflects on the safety and excellence of these routines.

Conclusion

The use of rapid-cycle deliberate practice to educate health professionals and undergraduates in the use of PPE during the COVID-19 pandemic generated satisfaction, self-confidence, and self-efficacy. When the results of health workers were compared to those of health undergraduates, the students showed better means in regard to satisfaction and self-confidence, while the professionals showed better self-efficacy scores.

Author contributions

Concept and project or analysis and interpretation of data; writing of the manuscript or relevant critical revision of the intellectual content; final approval of the version to be published; and agreement to be responsible for all aspects of the manuscript and guarantee the precision and integrity of any of its parts: Almeida VCRA, Ribeiro MRR.

Relevant critical review of the intellectual content: Ferreira GE, Oliveira JLC, Miraveti JC.

Data analysis and interpretation, relevant critical review, approval of the final version to be published: Lima JC.

References

1. Ministério da Saúde (BR). Recomendação de proteção aos trabalhadores dos serviços de saúde no atendimento de COVID-19 e outras síndromes gripais [Internet]. 2020 [cited Jun 13, 2023]. Available from: https://www.saude.go.gov.br/files/banner_coronavirus/GuiaMS-RecomendacoesdeprotecaotrabalhadoresCOVID-19.pdf
2. Cardoso FS, Sória DAC, Vernaglia TVC. The use of personal protection equipment in COVID-19 times: a literature review. Res Soc Dev. 2021;10(2):e55510212772. doi: https://dx.doi.org/10.33448/rsd-v10i2.12772
3. Gleriano JS, Fabro GCR, Chaves LDP, Tomaz WB, Goulart BF. Reflections on the management of Brazilian Unified Health System for the coordination in facing COVID19. Esc Anna Nery. 2020;24(spe):e20200188. doi: https://dx.doi.org/10.1590/2177-9465-EAN-2020-0188
4. Conselho Regional de Enfermagem (COREN). Manual de simulação clínica para profissionais de enfermagem [Internet]. 2020 [cited Jun 13, 2023]. Available from: https://biblioteca.cofen.gov.br/wp-content/uploads/2022/01/manual-simulacao-clinica-profissionais-enfermagem.pdf

5. Kaneko RMU, Lopes, MHBM. Realistic health care simulation scenario: what is relevant for its design? Rev Esc Enferm USP. 2019;53:e03453. doi: https://doi.org/10.1590/S1980-220X2018015703453

6. Pimentão AR, Ueno TMRL, Silva AC, Nogueira TO, Oliveira MLC. Clinical simulation to comfort COVID-19: complementary training of nurses. Rev Enferm UFPE on line. 2021;15:e246653. doi:https://dx.doi.org/10.5205/1981-8963.2021.246653

7. Coelho LP, Castro LT, Couto BT. Prática deliberada em ciclos rápidos no treinamento de ressuscitação cardiopulmonar pediátrica: uma revisão de escopo. Rev Latino-am Simul Clin. 2022;4(3):85-93. doi: https://doi.org//10.35366/109708

8. Oliveira HC, Souza LC, Leite TC Campos JF. Personal Protective Equipment in the coronavírus pandemic: training with Rapid Cycle Deliberate Practice. Rev Bras Enferm. 2020;73(suppl2):e20200303. doi: 10.1590/0034-7167-2020-0303

9. André RPD, Oliveira HC, Gouvêa G, Fernandes FC, Jerônimo IRL, Campos JF. Orotraqueal intubation training in the coronavírus pandemic: application of the rapid cycle deliberate practice. Rev Bras Educ Med. 2021:45(3):e136. doi: https://dx.doi.org/10.1590/1981-5271v45.3-20210019

10. Dresch A, Lacerda DP, Antunes Junior JAV. Design Science Research: método de pesquisa para avanço da ciência e tecnologia. Porto Alegre: Bookman; 2015.

11. March ST, Smith GF. Design and natural science research in Information Technology. J Intel Dec Sup Systm. 1995;15(4):251-66. doi: https://doi.org/10.1016/0167-9236(94)00041-2

12. Peffers K, Tuunanen T, Chatterjee MARS. A design science research methodology for information systems research. J Manag Inf Sys. 2007;24(3):45-77. doi: https://dx.doi.org/10.2753/MIS0742-1222240302

13. Schubert D. Sugestão de simulação in-situ COVID-19. ABRAMED [Internet]. 2020 [cited Jun 12, 2023]. Available from: http://abramede.com.br/wp-content/uploads/2020/03/simulacao_covid_19.pdf

14. Almeida RGS, Mazzo A, Martins JCA, Baptista RCN, Girão FB, Mendes IAC. Validation to Portuguese of the Scale of Student Satisfaction and Self-Confidence in Learning. Rev Latino-am Enfermagem. 2015;23(6):1007-13. doi: https://doi.org/10.1590/0104-1169.0472.2643

15. Meneses PPM, Abbad GS. Construção e validação instrumento para avaliar autoeficácia em situações de treinamento, desenvolvimento e educação de pessoas. Psicol Reflex Crit. 2010;23(1):121-30. doi: http://doi.org/10.1590/S0102-79722010000100 015

16. Olímpo CG, Fulguini FL, Garbuiu DC, Carvalho EC. Learning style and level of satisfaction in nurse clinical simulation. Acta Paul Enferm. 2021;34eAPE001675. doi: https://dx.doi.org/10.37689/acta-ape/2021AO0001675

17. Santos ECA, Fontes CJF, D'Artibale EF, Miravete JC, Ferreira GE, Ribeiro MRR. Simulation for teaching cardiorespiratory resuscitation by teams: setting and performance assessment. Rev Latino-Am Enfermagem. 2021;29:e3406. doi: https://dx.doi.org/10.1590/1518-8345.3932.3406

18. Teixeira CFS, Pinto ICM, Souza EA, Lisboa ES, Espiridião MA, Andrade LR. The health of healthcare professionals coping with the Covid-19 pandemic. Ciênc Saúde Coletiva. 2020;25(9):3465-74. doi: https://dx.doi.org/10.1590/1413-81232020259.19562020

19. Campanati FLS, Ribeiro L, Silva ICR, Hermann PRS, Brasil GC, Carneiro KKG, et al. Clinical simulation as a Nursing Fundamentals teaching method: a quasi-experimental study. Rev Bras Enferm. 2022;75(02):e20201155. doi: https://doi.org/10.1590/0034-7167-2020-1155

20. Reis SN, Neves CC, Alves DA, Lopes RRS, Souza KV, Ribeiro LCC, et al. Knowledge, satisfaction, and self-confidence in health professionals: simulation with manikin versus simulated patient. Rev Enferm Ref. 2020;5(3):e20034. doi: https://doi.org/10.12707/RV20034

21. Coutinho VRD. Simulação realística em contexto de Enfermagem. Rev Enferm Contemp [Internet]. 2022 [cited Jun 12, 2023];11:e4217. Available from: https://www5.bahiana.edu.br/index.php/enfermagem/article/view/4217

22. Butafava EPA, Oliveira RA, Quilici AP. Student satisfaction and self-confidence inrealistic simulation and the experience of knowledge perpetuation. Rev Bras Educ Med. 2022;46(4):e166. doi: http://doi.org/10.1590/1981-5271v46.4-20210479.ing

23. Bizario JCS, Vaccarezza GF, Brandão CFS. Desenvolvimento de habilidades em ambientes controlados e simulação para segurança dos usuários SUS na graduação. Rev Inter Educ Saúde. 2020;4(1):45-51. doi: https://dx.doi.org/10.17267/2594-7907ijhe.v4i1.2885

24. Matos CAC, Correa JFB, Moraes LCLS. Autoeficácia e motivação para aprender: uma investigação entre estudantes bacharelados em administração. Rev Gestão Sust. 2020;2(1):57-70. doi: https://doi.org/10.36661/2596-142X.2020v2i2.10811

25. Balsan LAG, Carneiro LL, Bastos AVB, Costa VMF. Adaptation and validation of the New General Self-Efficacy Scale. Aval Psicol. 2020; 19(4):409-19. doi: 10.15689/ap.2020.1904.16654.07

26. Menezes AN, Alves BM, Barbosa RPC, Campos PC. A influência da crença de autoeficácia no desempenho doas alunos do IFMG - BAMBUÍ. Psicol Esc Educ. 2020;24:e202380. doi: https://doi.org/10.1590/2175-35392020202380

27. Menezes A. A autoeficácia no processo de aprendizagem. Rev Esp Acad [Internet]. 2020 [cited Jun 12, 2023];20(224):176-8. Available from: https://periodicos.uem.br/ojs/index.php/EspacoAcademico/article/view/51324

28. Bressa RC, Murgo CS, Sena BCS. Associations between teacher self-efficacy and the use of Objective Structured Clinical Examination in medical education. Rev Bras Educ Med. 2021;45(1):e001. doi:https://doi.org/10.1590/1981-5271v45.1-20200130.ING