Literature Review

TEXTO & CONTEXTO ENFERMAGEM
TEXT & CONTEXT NURSING TEXTO & CONTEXTO ENFERMERÍA

MOBILE SIMULATION: SCIENTIFIC CONTRIBUTIONS FOR THE HEALTH AREA

Cristiane Costa Reis da Silva[1]
Maria Isabel Domingues Fernandes[1]
Rui Carlos Negrão Baptista[1]
Rosana Maria de Oliveira Silva[2]
Luciana Bihain Hagemann de Malfussi[3]
Gilberto Tadeu Reis da Silva[2]

[1]Escola Superior de Enfermagem de Coimbra, Unidade de Investigação em Ciências da Saúde. Coimbra, Portugal.
[2]Universidade Federal da Bahia, Escola de Enfermagem. Salvador, Bahia, Brasil.
[3]Universidade Federal de Santa Catarina, Programa de Pós-Graduação em Enfermagem. Florianópolis, Santa Catarina, Brasil.

ABSTRACT

Objective: to identify and analyze in the literature the use of the mobile simulation strategy for health professionals and for the community.
Method: a scoping review based on the procedures recommended by the Joanna Briggs Institute. The search databases were the following: PubMed, CINAHL via EBSCO, Scopus, LILACS, Portugal's Open Access Scientific Repository and CAPES Dissertations Database. The guiding question was the following: What contributions of the mobile simulation have been identified and assessed in the training processes of health professionals and of the community? There was no limitation regarding publication year, and nine studies were selected.
Results: 2011 had the highest number of publications on this theme, most of them coming from the United States. It was evidenced that the mobile simulation contributed to the training of health professionals and community-dwelling individuals, favored the development of the professionals' clinical competencies, and proved to be an effective tool to take training to remote zones.
Conclusion: mobile simulation is a modality that contributes to the development of the simulated practice regarding the active teaching method; however, it is still little explored, and expanding the perspectives of its implementation emerges as a challenge.

DESCRIPTORS: Simulation. Patient simulation. Training by simulation. Education in health. Health staff. Participation of the community.

HOW CITED: Silva CCR, Fernandes MID, Baptista RCN, Silva RMO, Malfussi LBH, Silva GTR. Mobile simulation: scientific contributions for the health area. Texto Contexto Enferm [Internet]. 2021 [cited YEAR MONTH DAY]; 30:e20200111. Available from: https://doi.org/10.1590/1980-265X-TCE-2020-0111

SIMULAÇÃO MÓVEL: CONTRIBUTOS CIENTÍFICOS PARA A ÁREA DA SAÚDE

RESUMO

Objetivo: identificar e analisar na literatura a utilização da estratégia da simulação móvel para profissionais de saúde e para a comunidade.
Método: revisão de escopo baseada nos procedimentos recomendados pelo Instituto Joanna Briggs. As bases de busca foram: PubMed, CINAHL via EBSCO, Scopus, LILACS, Repositório Científico de Acesso Aberto de Portugal e Banco de Teses da Capes. A pergunta norteadora foi: quais contribuições da simulação móvel têm sido identificadas e avaliadas nos processos de formação de profissionais de saúde e da comunidade? Não se delimitou ano de publicação, e foram selecionados nove estudos.
Resultados: o ano de 2011 obteve o maior número de publicações sobre a temática, a maioria proveniente dos Estados Unidos. Evidenciou-se que a simulação móvel contribuiu para a formação de profissionais da saúde e pessoas da comunidade, favoreceu o desenvolvimento de competências clínicas dos profissionais e revelou-se como uma ferramenta efetiva para levar treinamento e capacitações para zonas remotas.
Conclusão: a simulação móvel é uma modalidade que contribui para o desenvolvimento da prática simulada enquanto método de ensino ativo; entretanto, ainda é pouco explorada, e configura-se como um desafio ampliar as perspectivas de sua implementação.

DESCRITORES: Simulação. Simulação de paciente. Treinamento por simulação. Educação em saúde. Pessoal de saúde. Participação da comunidade.

SIMULACIÓN MÓVIL: CONTRIBUCIONES CIENTÍFICAS PARA AL CAMPO DE LA SALUD

RESUMEN

Objetivo: identificar y analizar en la literatura el uso de la estrategia da simulación móvil para profesionales de la salud y para la comunidad.
Método: revisión sistemática exploratoria basada en los procedimientos recomendados por el Instituto Joanna Briggs. Las bases de datos de la búsqueda fueron las siguientes: PubMed, CINAHL via EBSCO, Scopus, LILACS, Repositorio Científico de Acceso Abierto de Portugal y Base de datos de Tesis de Capes. La pregunta guía fue la siguiente: ¿qué contribuciones de la simulación móvil se han identificado y evaluado en los procesos de formación de profesionales de la salud y de la comunidad? No hubo restricciones con respecto al año de publicación, y se seleccionó un total de nueve estudios.
Resultados: el año 2011 obtuvo la mayor cantidad de publicaciones sobre la temática, la mayoría proveniente de los Estados Unidos. Quedó evidenciado que la simulación móvil contribuyó a la formación de profesionales de la salud y de residentes de la comunidad, favoreció el desarrollo de competencias clínicas de los profesionales y demostró ser una herramienta efectiva para acercar la capacitación a zonas remotas.
Conclusión: la simulación móvil es una modalidad que contribuye al desarrollo de la práctica simulada en cuanto al método de enseñanza activa; sin embargo, sigue siendo poco explorada, y ampliar las perspectivas de su implementación se configura como un desafío.

DESCRIPTORES: Simulación. Simulación de paciente. Capacitación por simulación. Educación en salud. Personal de salud. Participación de la comunidad.

INTRODUCTION

Clinical simulation is a strategy for teaching in health that uses clinical scenarios to develop various aptitudes related to activities regarding education, assessment, research, and integration of health systems.[1] By recreating and anticipating to students real life situations, which soon they will face, it contributes to safe care, in addition to increasing confidence to make decisions in the future.[2–3]

Simulation can involve the use of high-fidelity interactive computer mannequins or the participation of trained actors. In both cases, the intention is to enable learning and the development of critical-reflective thinking and clinical reasoning,4 develop skills and attitudes necessary for the professional practice, as well as to enhance the training of health professionals, intending to improve the clinical practice.[5]

Another relevant aspect of the clinical simulation is the possibility of exercising safe practices in the promotion of patient, family, and community care. It can also be implemented in different contexts, such as in the assistance of individuals, family members, community residents, and vulnerable populations.[6]

Clinical simulation has evolved during the last decades.[7] Currently, a number of studies have assessed the use of this strategy with different designs, such as the following: *in situ* simulation,[8] defined by the application of the clinical simulation technique directly at the places where the professional practice takes place; simulation with actors,[9] which makes use of dramatization to recreate contexts similar to those experienced in the real practice; and also Mobile Simulation (MS),[10–11] which is not conducted in a fixed place, but in a transitory environment, which can be a mobile laboratory (truck, bus, van) or a device that travels *in situ* (within a clinical assistance facility or environment).

Specifically in MS, study object of this review, the clinical simulation travels to the professionals, inverting the most usual model of performing this type of activity in simulation centers. It was driven by the need to reach a higher number of professionals, within an increasingly economist society context, in which time is very valued.[12]

The literature asserts[13] that the use of MS to develop skills can be an effective way to train professionals, since it promotes realistic training, exempted from stressful elements, which favors learning. In addition to that, it expands participation opportunities, as it can be developed even in rural and difficult-to-access areas.[14]

Up to the present day, no review on this simulation strategy has been found in the literature. It is therefore believed that this review study may compile diverse knowledge that support researchers and encourage the implementation and development of mobile simulation units for clinical practice and for the community.

Given the above, the objective of the study was to identify and analyze how the use of the MS strategy for health professionals and for the community has been reported in the literature.

METHOD

This is a scoping review, which allows expanding the view on a certain theme, as well as summarizing and disclosing the results of studies and surveys in a specific knowledge area.[15]

This review was prepared according to the methodology recommended by the Joanna Briggs Institute,[15] adapted for this study, contemplating the following items: description of the title, objective, research question, search strategies, inclusion criteria, data extraction and synthesis (Chart 1).

Chart 1 – Protocol for conducting the scoping review entitled Mobile simulation: Scientific contributions for the health area2019.

Title: Mobile simulation: scientific contributions for the health area

1. Objective: to identify and analyze in the literature the use of the mobile simulation strategy for health professionals and for the community.

2. Guiding question: what contributions of the mobile simulation have been identified and assessed in the training processes of health professionals and the community?

3. Search strategies:
3.1. Databases:
Database 1: PubMed;
Database 2: CINAHL via EBSCO;
Database 3: Scopus;
Database 4: LILACS.

3.2. Search by descriptors and keywords - Conducted in December 2019:

Database 1: PubMed
"simulation mobile" OR "Mobile Simulation" OR "Mobile Medical Simulation" OR "ambulance simulator" OR "simulator-based unit" OR "simulator-based units" OR "mobile healthcare simulation" OR "Mobile High Fidelity Medical Simulation" OR "Mobile training" OR "Mobile Pop Up Simulation" OR "Mobile emergency simulation" = 41 articles found.
Database 2: CINAHL via EBSCO
"simulation mobile" OR "Mobile Simulation" OR "Mobile Medical Simulation" OR "ambulance simulator" OR "simulator-based unit" OR "simulator-based units" OR "mobile healthcare simulation" OR "Mobile High Fidelity Medical Simulation" OR "Mobile training" OR "Mobile Pop Up Simulation" OR "Mobile emergency simulation" = 29 articles found.
Database 3: Scopus
TITLE-ABS-KEY ("simulation mobile" OR "Mobile Simulation" OR "Mobile Medical Simulation" OR "ambulance simulator" OR "simulator-based unit" OR "simulator-based units" OR "mobile healthcare simulation" OR "Mobile High Fidelity Medical Simulation" OR "Mobile training" OR "Mobile Pop Up Simulation" OR "Mobile emergency simulation") = 232 articles found.
Database 4: LILACS
"simulation mobile" OR "Mobile Simulation" OR "Mobile Medical Simulation" OR "ambulance simulator" OR "simulator-based unit" OR "simulator-based units" OR "mobile healthcare simulation" OR "Mobile High Fidelity Medical Simulation" OR "Mobile training" OR "Mobile Pop Up Simulation" OR "Mobile emergency simulation" = 0.

4. Inclusion criteria: studies of any kind that addressed the use of mobile simulation to train professionals, the community, family members, and patients. Studies available in electronic format in the English, Spanish and Portuguese languages were included; there was no restriction in relation to the publication period.

5. Exclusion criteria: articles that reported the use of mobile simulation through cell phone applications and computer software programs.

6. Data extraction: the selection of the articles was initiated by assessing titles and abstracts. It was carried out by two researchers and, when there was no consensus between them, the opinion of a third researcher was requested, who decided on including or not the article in the study. An instrument prepared by the authors according to the guidelines set forth in the Joanna Briggs Institute manual was used, consisting in items related to the title, study method, data, locus, objectives, population (age and gender) and results.

7. Synthesis of the information: the studies were analyzed seeking to identify the use and contribution of mobile simulation for health professionals and for the community.

Source: Adapted from the Joanna Briggs Institute Reviewers' Manual 2014.[15]

The research question that guided the search and selection of articles was elaborated by using the PCC (Participants, Concept and Context) acronym,[15] where the participants are health professionals, community-dwelling individuals, patients and family members; the concept is the simulated practice; and the context is the mobile simulation.

The Portugal's Open Access Scientific Repository (*Repositório Científico de Acesso Aberto de Portugal*, RCAAP) and the Dissertations Database of the Coordination for the Improvement of Higher Level Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*, Capes) from Brazil were consulted to survey the studies available in the grey literature.

It is important to note that the existing descriptors in databases are not specific to the type of simulation of this study and, for this reason, the standard terms in the Health Sciences Descriptors (*Descritores em Ciências da Saúde*, DeCS), the Virtual Health Library (*Biblioteca Virtual em Saúde*, BVS), and the MeSH Database were not used.

Three categories that allowed discussing the theme emerged from data analysis: 1. mobile simulation to train health professionals and the community; 2. interventions used in the simulated practice; and 3. assessment of the intervention's results in the simulated practice. Figure 1 synthesizes the process for the selection of articles.

For being a scoping review, this study did not need to be approved by any Research Ethics Committee; however, ethical aspects were considered, such as citing the authors of the selected articles.

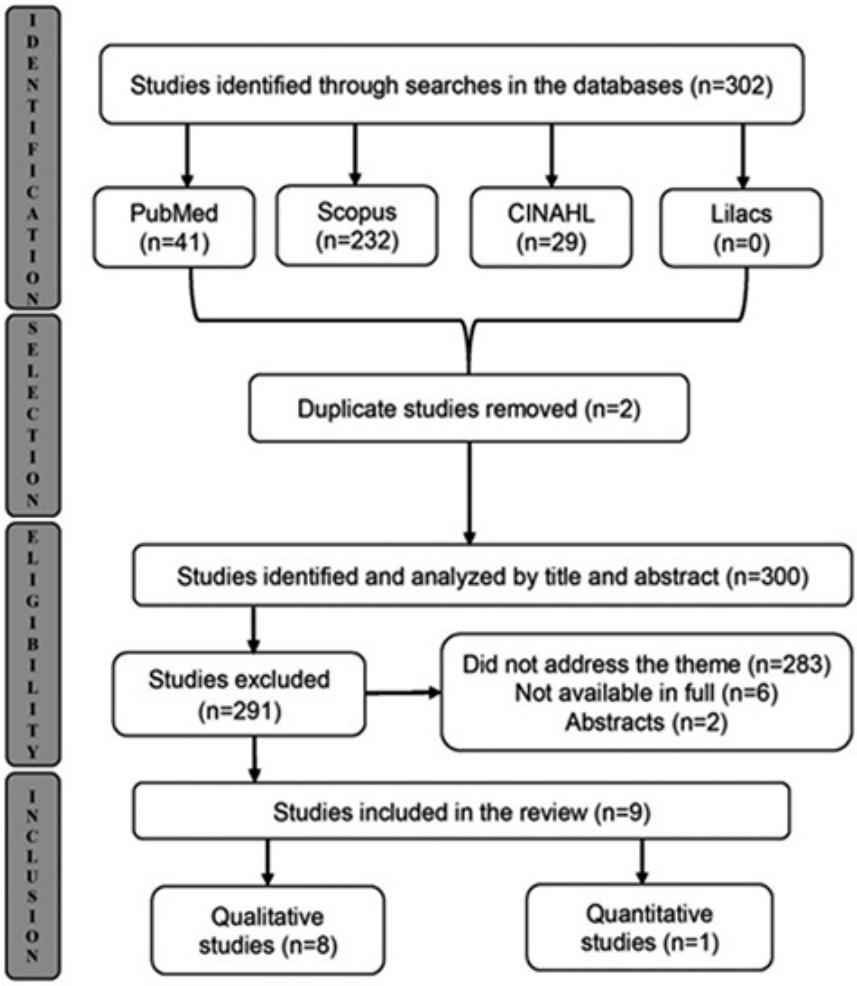

Figure 1 – Flowchart of the selection of the primary studies included in the integrative review according to the databases.Cidade, Estado, país. 2019.

RESULTS

The research in databases resulted in a total of 302 articles, of which 9 were included in the review. Of the 291 articles excluded, 283 did not meet the research objective; 6 were not available in full; and 2 were abstracts. Contact was established with the authors of all the articles that were unavailable, although only two answered reporting that they did not have access to those publications.

Of the nine articles analyzed (Chart 2), two were published in 2011. In relation to language, all were published in English. In 6 articles, (n=6; 66.6%), the objective was to train health professionals or medical students, and three (n=3;33,3%) reported the development of an educational activity in the community.

Regarding the method adopted in the studies, eight (n=8;88,8%) were qualitative (case/experience reports), and one was quantitative. Chart 2 presents the main information extracted from the primary studies included in this review.

Chart 2 – Synthesis of the primary studies included in the integrative review. Cidade, Estado, país. 2019. (n=9)

Study code	Author Title	Year of publication Place/ Country	Method	Population (age and gender)	Objectives and Context	Results
A1	Tribe HC, Harris A, Kneebone R. Life on a knife edge: using simulation to engage young people in issues surrounding knife crime[16]	2018 London, United Kingdom	Qualitative	Community-dwelling adolescents (n=70). From 13 to 19 years old in the first workshop; from 14 to 19 years old in the second workshop.	To conduct a workshop to promote learning and change in behavior related to knife injuries. Educational workshop conducted in a bus.	From four to six weeks after the second workshop, the data captured through photographs and videos, observations, and notes in the field diary suggested that the workshop could promote learning and a change in the participants' behavior in the future.
A2	Martin D, Bekiaris B, Hansen G. Mobile emergency simulation training for rural health providers[13]	2017 Province of Manitoba, Canada.	Qualitative descriptive	131 professionals from a multidisciplinary team (nurses, resident physicians, pilots of an aerial mobile ICU, medical students, paramedics, assistant physicians).	To improve the critical care skills of rural health service providers. To provide an educational session on emergency for rural health service providers contemplating at least nine different professions.	The interviewees reported that the general quality of learning was excellent and that the simulation developed clinical reasoning and decision-making skills, as well as it allowed for self-reflection.

Chart 2 – Cont.

Study code	Author Title	Year of publication Place/ Country	Method	Population (age and gender)	Objectives and Context	Results
A3	Bischof JJ, Panchal AR, Finnegan GI, Terndrup TE. Creation and validation of a novel mobile simulation laboratory for high fidelity, prehospital, difficult airway simulation[17]	2016 Ohio, United States. Emergency Department.	Qualitative descriptive	19 specialists in airways conducted 57 simulation sessions.	To develop and validate a prehospital airway simulator in a mobile simulation laboratory. Development and validation of an airway simulator in a mobile simulation laboratory.	The mobile simulation laboratory was tested by paramedics. The success rate was 44% in the first intubation attempt. The mobile simulation laboratory created a reproducible and high-fidelity learning environment.
A4	Pena G, Altree M, Babidge W, Field J, Hewett P, Maddern, G. Mobile Simulation Unit: taking simulation to the surgical trainee[18]	2015 Australia (metropolitan region and two rural areas).	Qualitative descriptive	55 participants (staff physicians, resident physicians, interns, scholarship students, and graduates in Medicine).	To develop a Mobile Simulation Unit for the training of surgical skills in urban and rural areas. Training of basic surgical skills. A post-training questionnaire was filled out to know the perception about the mobile simulation environment and the relevance of the simulation activities.	The use of a mobile simulator provides education in surgery, as it is viable and practical. The simulator enables simulation training at the surgery interns' workplace, regardless of their geographic location.

Chart 2 – Cont.

Study code	Author Title	Year of publication Place/ Country	Method	Population (age and gender)	Objectives and Context	Results
A5	Xafis V, Babidge W, Field J, Altree, M, Marlow N, Maddern G. The efficacy of laparoscopic skills training in a Mobile Simulation Unit compared with a fixed site: a comparative study[10]	2013 Australia	Quantitative (cohort)	144 participants (medical students in their last year, resident physicians, and staff physicians).	To compare the results of laparoscopy skills training with mobile simulation versus simulation laboratories. Both cohorts were similar, which points out that the lack of randomization in the places was not detrimental.	Training in laparoscopic simulation provided by the Mobile Simulation Unit is not inferior to training in a fixed location, proving to be an effective tool in the training and continuing education of physicians in Australia.
A6	Shaikh FM, Hseino H, Hill AD, Kavanagh E, Traynor O. Mobile surgical skills education unit: a new concept in surgical training[12]	2011 Dublin, Ireland.	Qualitative, experience report	Graduate students in Medicine (resident physicians).	To allow that surgical interns learn the main surgical techniques and procedures in a qualified laboratory in their own hospitals. A mobile program to teach surgical skills to the interns in the basic Surgery course.	The mobile surgical skills teaching unit offered the interns the opportunity to be trained in their own hospitals, using realistic models, in a friendly and non-stressful manner, which improved their technical skills, without compromising patient safety.
A7	Higbee D. New mobile simulation service rolls out health care training to rural areas[19]	2011 Missouri, United States (including the rural area).	Qualitative (experience report)	800 participants, among health professionals and community-dwelling individuals (high-school students interested in studying Medicine).	To provide training in a mobile simulation unit to develop skills, teamwork, situation awareness, and the ability to make decisions. Training for advanced life support, pediatrics and pregnancy.	Simulation training and skills such as teamwork, situation awareness, and decision-making were improved.

Study code	Author Title	Year of publication Place/ Country	Method	Population (age and gender)	Objectives and Context	Results
A8	Weinstock PH, Kappus LJ, Garden A, Burns JP. Simulation at the point of care: reduced-cost, in situ training via a mobile cart[20]	2009 Boston, United States.	Qualitative-descriptive study	425 professionals from the multi-professional team (physicians, nurses, physiotherapists, clinical assistants, radiologists, and technicians).	To develop a mobile simulation cart for training teams in the clinical environment. Didactic, realistic, and video courses and presentations.	The mobile cart provided simulation for hospital teams, highlighting that this was the way adopted for everyone to benefit from this educational tool. This reduced the installation cost and the space requirements for this approach.
A9	Kobayashi L, Patterson MD, Overly FL, Shapiro MD, Williams KA, Jay GD. Educational and research implications of portable human patient simulation in acute care medicine[21]	2008 San Diego, United States.	Qualitative (case report)	Medical professionals and students.	To conduct an educational workshop in trauma assistance. Improving the accessibility of the simulation through on-site training.	The use of technologies and portable mannequin techniques can further advance the simulation of teaching and medical research in acute care. Mobile simulations represent an evolution in medical educational simulation, enabling health professionals to learn and train in non-traditional environments, with better accessibility and reality.

DISCUSSION

Mobile simulation for the training of health professionals and of the community

A number of studies evidenced that MS represents an evolution in the simulation field, but it is inherently more challenging than the simulation that takes place in laboratories, which is static. Therefore, to obtain satisfactory results, the leaders of this simulated practice modality must support their actions on elements that include MS planning, with the assessment of the participants' needs, gaps, objectives, budget and teams, as simulation in laboratories often has more controlled

and predictable budgets, teams, and learning environments, many times certified by accreditation societies.[11]

As an active methodology, clinical simulation is promising both in the teaching and in the research fields, since it enables students and health professionals to learn and train the execution of activities in work environments similar to those where they will work in the real context. Despite that, study A2 corroborates the development of clinical reasoning and decision-making skills, without compromising patient safety. The literature sustains that, for these reasons, simulation is seen as an opportunity of safe and effective training for the professionals.[22]

From the geographic point of view, studies A2, A4, and A7 portray MS as an opportunity for the professionals working in rural areas to train their skills without the need of traveling to big urban areas and simulation centers. A cohort study[23] that compared the mortality rates in traumatized patients seen in rural emergency rooms versus the rates of those assisted in urban trauma centers evidenced that the chances of pre-hospital or emergency room mortality were three times higher for the patients treated in rural emergency departments, especially because all the specialized services were more present in the urban trauma centers.

Study A7 adds that, generally, in the rural areas of the United States, funding is limited for hospitals and clinics to purchase high-technology training equipment to train the health care professionals, and MS responds to this gap.

Based on the studies analyzed (A4 and A7), it is possible to infer the existence of a demand that is not met by clinical simulation, a gap that can be mitigated with the implementation of MS. It contemplates a wide range of individuals who can be benefited from this, such as rescuers, students, professionals, and community residents in general. Training can be adjusted to meet the needs of each of these individuals, preparing them for different situations in health care.

Another advantage is the possibility to conduct this type of activity in a place already known by the participants (at their own work environment). In this regard, the maintained psychological fidelity, for being a previously known scenario, can reduce the anxiety and stress levels of those who participate in the simulated practice and, in this way, favor the acquisition of professional skills and competences and increase knowledge retention (A6).

This study evidenced that MS is being more applied to health professionals. Studies A1 and A7 analyzed the potential of this strategy to work on different health education themes with the community, such as violence with melee weapons and critical care. If applied to the context of sequelae from chronic cardiovascular diseases or to the population aging phenomenon, MS can be seen as a training tool for informal caregivers and family members that is capable of improving the quality of life of care-dependent patients.

Accordingly, MS is potentially useful in regions where preventive health assistance is almost nonexistent, as well as where there is no access to health services, which justifies the development of a mobile system for the promotion of educational activities in the community.

Regarding the costs to implement this simulation modality, it offers financial advantages, since building and maintaining simulation centers is extremely expensive given the need to build and purchase equipment and consumables, as well as hiring employees and instructors.[24]

Accordingly, MS provides benefits to the professionals and, in addition to that, it does not require a fixed space for training, which reduces its costs. Studies A6 and A7 reported expenses between US$ 288,000 and US$ 920,000, approximately, to develop and build the mobile unit and maintain the simulators. It is important to highlight that the use of low-cost mannequins reduced costs (A8). On the other hand, the investment to provide a mobile cart can be a complicating factor, as its creation and maintenance depends on funding.

Interventions used in the simulated practice

Studies A2, A4, and A9 used MS with mannequins to train and improve professional conducts when assisting traumas in order to improve surgical skills, among others. The duration of the training sessions varied from minimal 90-minute sessions to didactic blocks of 3 to 4 weeks. Regarding the time used in the simulated practices in conducting the situation, the literature asserts that there are variations depending on the simulation objective and format, in addition to the scenario, fidelity, and feedback or debriefing method used, suggesting that the simulated practice ends whenever the facilitator sees a positive outcome, so that they are not stuck in a predetermined time that can run out without the scenario having been beneficial to the participants.[25]

Regarding the use of scenarios in MS, it was evidenced that studies A4, A5, and A6 used simulated scenarios; however, they did not report how they were constructed, what stages were followed and what theoretical framework was adopted, an aspect that hindered the identification of specific scenarios developed for MS.

It was also verified that the time mentioned in these studies to conduct the simulated practices was higher than that recommended in the literature,[26] which sets forth briefing (5 minutes), conducting the situation (15 minutes, depending on the objective), and debriefing (20 minutes). It is believed that this has occurred due to the fact that the studies aimed to train skills of a specific technique.

Other studies[26–27] on the construction and development of simulated scenarios support that they are fundamental for planning and training of health care professionals.

Assessment of the results of the intervention in the simulated practice

Study A1 assessed the MS results based on the participants' feedback and identified that, for them, the simulated educational intervention provided a safe environment. In addition to that, after four and six weeks, the intervention was reassessed by means of semi-structured interviews to analyze the level of knowledge retention. At this moment, the participants not only reiterated the learning provided by the activity, but they also mentioned a change in their future behavior. Accordingly, study A8 analyzed the participants' feedback and evidenced the need for more time for the simulated practice, which, for this reason, was extended to last more than the hours initially planned.

Also regarding feedback, study A2 evidenced that MS promoted the development of skills and clinical reasoning, as well as the ability to make decisions. The benefits for all the participants were evident, although they had limited or nonexistent access to high-fidelity mannequins and did not have any specific training for emergency MS.

It is known that feedback is a learning tool because it allows assessing and detecting flaws in order to improve the activity.[28–29] In this way, based on the results presented in the studies analyzed, it is possible to infer a high level of satisfaction in the participants after the simulation training and significant learning.

Study A9 corroborates that MS is viable and has been accepted by the professionals, also for being a training strategy at the workplace and, therefore, more accessible and standardized. In this sense, studies A5 and A6 used written tests to assess the acquisition of technical skills through MS. It is possible to assert that the studies analyzed in this review used diversified ways to assess the mobile simulation practice, evidencing that there is not a single instrument available yet that globally weighs the learning process with the use of MS.

As a limitation, this study presents the difficulty in comparing the findings obtained with other studies due to the reduced number of research studies on MS. However, it is believed that this research contributed to expanding knowledge regarding this important strategy and to encouraging researchers

and professionals to develop scientific productions in this area, since studies on this theme are still scarce, especially those based on scientific evidence.

CONCLUSION

The studies analyzed evidenced that MS contributed to the training of health professionals and of community-dwelling individuals, favored the development of clinical competences in the professionals, and proved to be an effective tool to take training to remote areas, such as the rural areas. It was also evidenced that this simulation modality remains little researched by the scientific community, the following emerging as a challenge: it needs to be further explored in its several implementation perspectives, and in different countries, thus contributing to the development of the simulated practice as an active teaching method.

REFERENCES

1. Negri EC, Pereira GA Júnior, Cotta CK Filho, Franxon JC, Mazzo A. Construction and validation of simulated scenario for nursing care to colostomy patients. Texto Contexto Enferm [Internet]. 2019 [cited 2020 Apr 15];28:e20180199. Available from: https://doi.org/10.1590/1980-265X-TCE-2018-0199
2. Alves NP, Gomes TG, Lopes MMCO, Gubert FA, Lima MA, Beserra EP, et al. Realistic simulation and its attributes for nurse training. Rev Enferm UFPE on line [Internet]. 2019 [cited 2020 Apr 15];13(5):1420-8. Available from: https://doi.org/10.5205/1981-8963-v13i05a239014p1420-1419-2019
3. Sanko J, Mckay M Shekhter I, Motola I, Birnbach DJ. What participants learn, with, from and about each other during inter-professional education encounters: A qualitative analysis. Nurse Educ Today [Internet]. 2020 [cited 2020 Apr 15];5(88):104386. Available from: https://doi.org/10.1016/j.nedt.2020.104386
4. Lopes JIR, Campos JF, Peixoto MAP, Brandão MAG. Use of clinical simulation to improve diagnostic reasoning in Nursing. Esc. Anna Nery [Internet]. 2018 [cited 2020 June 08];22(3):e20170442. Available from: https://doi.org/10.1590/2177-9465-ean-2017-0442
5. Holtschneider ME, Park CW. Simulation and Advanced Practice Registered Nurses: Opportunities to Enhance Interprofessional Collaboration. AACN Adv Crit Care [Internet]. 2019 [cited 2020 Apr 15];30(3):269-73. Available from: https://doi.org/10.4037/aacnacc2019157
6. Akselbo I, Olufsen V, Ingebrigtsen O, Aune I. Simulation as a learning method in public health nurse education. Public Health Nurs [Internet]. 2019 [cited 2020 Apr 15];36(2):226-32. Available from: https://doi.org/10.1111/phn.12560
7. Chiniara G. Clinical Simulation. Education, operations, and engineering. 2nd ed. London (UK): Academic Press; 2019.
8. Kurup V, Matei V, Ray J. Role of in-situ simulation for training in healthcare: opportunities and challenges. Current Opinion in Anesthesiology [Internet]. 2017 [cited 2020 Apr 15];30(6):755-60. Available from: https://doi.org/10.1097/ACO.0000000000000514
9. Fitzgerald M, Ward J. Using Standardized Actors to Promote Family-centered Care. J Pediatr Nurs [Internet]. 2019 [cited 2020 Apr 15];45:20-5. Available from: https://doi.org/10.1016/j.pedn.2018.12.002
10. Xafis V, Babidge W, Field J, Altree M, Marlow N, Maddern G. The efficacy of laparoscopic skills training in a Mobile Simulation Unit compared with a fixed site: a comparative study. Surg Endosc [Internet]. 2013 [cited 2020 Apr 15];27:2606–12. Available from: https://doi.org/10.1007/s00464-013-2798-6
11. Carstens PK, Paulman P, Paulman A, Stanton MJ, Monaghan BM, Dekker D. Comprehensive healthcare simulation: mobile medical simulation. Geneva (CH): Springer; 2020.

12. Shaikh FM, Hseino H, Hill AD, Kavanagh E, Traynor O. Mobile surgical skills education unit: a new concept in surgical training. Simul Healthc [Internet]. 2011 [cited 2020 Apr 15];6(4):226-30. Available from: https://doi.org/10.1097/SIH.0b013e318215da5e

13. Martin D, Bekiaris B, Hansen G. Mobile emergency simulation training for rural health providers. Rural and Remote Health [Internet]. 2017 [cited 2020 Apr 15];17:4057. Available from: https://doi.org/10.22605/RRH4057

14. Peterson J, Pearce P, Ferguson L, Langford CA. Understanding scoping reviews: definition, purpose, and process. J Am Assoc Nurse Pract [Internet]. 2017 [cited 2020 Apr 15];29(1):12-6. Available from: https://doi.org/10.1002/2327-6924.12380

15. Joanna Briggs Institute. Joanna Briggs Institute Reviewers' Manual. Adelaide (AU): Joanna Briggs Institute; 2014. [cited 2020 Apr 15]. Available from: http://www.joannabriggs.org/assets/docs/sumari/reviewersmanual-2014.pdf

16. Tribe HC, Harris A, Kneebone R. Life on a knife edge: using simulation to engage young people in issues surrounding knife crime. Adv Simul (Lond) [Internet]. 2018 [cited 2020 Apr 15];3:20. Available from: https://doi.org/10.1186/s41077-018-0079-0

17. Bischof JJ, Panchal AR, Finnegan GI, Terndrup TE. Creation and validation of a novel mobile simulation laboratory for high fidelity, prehospital, difficult airway simulation. Prehosp Disaster Med [Internet]. 2016 [cited 2020 Apr 15];31(5):465-70. Available from: https://doi.org/10.1017/S1049023X16000534

18. Pena G, Altree M, Babidge W, Field J, Hewett P, Maddern G. Mobile Simulation Unit: taking simulation to the surgical trainee. ANZ J Surg [Internet] 2015 [cited 2020 Apr 15];85(5):339-43. Available from: https://doi.org/10.1111/ans.12549

19. Higbee D. New Mobile Simulation service rolls out Training to rural areas. Missouri Nurse [Internet]. 2011 [cited 2020 Apr 15]. Available from: https://medicine.missouri.edu/news/new-mobile-simulation-service-rolls-out-training-rural-areas

20. Weinstock PH, Kappus LJ, Garden A, Burns JP. Simulation at the point of care: Reduced-cost in situ training via a mobile cart. Pediatric Critical Care Medicine [Internet] 2009 [cited 2020 Apr 15];10(2):176-81. Available from: https://doi.org/10.1097/pcc.0b013e3181956c6f

21. Kobayashi L, Patterson MD, Overly FL, Shapiro MD, Williams KA, Jay GD. Educational and research implications of portable human patient simulation in acute care medicine. Acad Emerg Med [Internet] 2008 [cited 2020 Apr 15];15(11):1166-74. Available from: https://doi.org/10.1111/j.1553-2712.2008.00179.x

22. Clapper T. In situ and mobile simulation: Lessons learned authentic and re-source intensive. Clinical Simulation in Nursing [Internet] 2013 [cited 2020 Apr 15];9(11):e551-e557. Available from: https://doi.org/10.1016/j.ecns.2012.12.005

23. Fleet R, Lauzier F, Tounkara FK, Turcotte S, Poitras J, Morris J, et al. Profile of trauma mortality and trauma care resources at rural emergency departments and urban trauma centres in Quebec: a populationbased, retrospective cohort study. BMJ Open [Internet] 2019 [cited 2020 June 08];9:e 028512. Available from: https://doi.org/10.1136/ bmjopen-2018-028512

24. Danzer E, Dumon K, Kolb G, Pray L, Selvan B, Resnick AS, Morris JB, Williams NN.What is the cost associated with the implementation and maintenance of an ACS/APDS-based surgical skills curriculum? J. Surg. Educ [Internet] 2011 [cited 2020 Apr 15];68(6):519-25. Available from: https://doi.org/10.1016/j.jsurg.2011.06.004

25. Lioce L, Meakim CH, Fey MK, Chmil JV, Mariani B, Alinier G. Standards of best practice: Simulation standard IX: simulation design. Clinical Simulation in Nursing [Internet] 2015 [cited 2020 June 08];11(6):309-15. Available from: https://doi.org/10.1016/j.ecns.2015.03.005

26. Cogo ALP, Lopes EFS, Perdomini FRI, Flores GE, Santos MRR. Construction and development of realistic simulation scenarios on safe drug administration. Rev Gaúcha Enferm [Internet] .2019 [cited 2020 Apr 15];40(Spe):e20180175. Available from: https://doi.org/10.1590/1983-1447.2019.20180175

27. Kaneko RMU, Lopes MHBM. Realistic health care simulation scenario: what is relevant for its design? Rev Esc Enferm USP [Internet] 2019 [cited 2020 Apr 15];53:e03453. Available from: https://doi.org/10.1590/S1980-220X2018015703453

28. Almeida DR, Nodari CH, Guimarães CM, Coutinho AOR, Bez MR. Simulation as a teaching-learning strategy in nursing: an integrative review. Rev Educ Saúde [Internet]. 2018 [cited 2020 Apr 15];6(2):98-105. Available from: http://periodicos.unievangelica.edu.br/index.php/educacaoemsaude/article/view/3138/2465

29. Schmidt E, Goldhaber-Fiebert SN, Ho LA, McDonald KM. Simulation exercises as a patient safety strategy: A systematic review. Ann Intern Med [Internet]. 2013 [cited 2020 Apr 15];159(2):160. Available from: https://doi.org/10.7326/0003-4819-158-5-201303051-00010

NOTES

CONTRIBUTION OF AUTHORITY

Study design: Silva CCR, Malfussi LBH, Fernandes MID, Baptista RCN.
Data collection: Silva CCR, Malfussi LBH.
Data analysis and interpretation: Silva CCR, Malfussi LBH, Fernandes MID, Baptista RCN.
Discussion of the results: Silva CCR, Malfussi LBH, Fernandes MID, Baptista RCN, Silva RMO, Silva GTR.
Writing and/or critical review of the content: Fernandes MID, Baptista RCN, Silva GTR.
Review and final approval of the final version: Silva CCR, Malfussi LBH, Fernandes MID, Baptista RCN, Silva RMO, Silva GTR.

ACKNOWLEDGMENT

To Daniela Filipa Batista Cardoso for her collaboration with the strategies to search for the studies.

FUNDING INFORMATION

Coordination of Improvement of Higher Level Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*, CAPES). Number 001.

CONFLICT OF INTERESTS

There is no conflict of interests.

EDITORS

Associated Editors: Mara Ambrosina de Oliveira Vargas, Gisele Cristina Manfrini, Monica Motta Lino.
Editor-in-chief: Roberta Costa**.**

HISTORICAL

Received: April 23, 2020.
Approved: June 18, 2020.

CORRESPONDING AUTHOR

Cristiane Costa Reis da Silva
cristianereisfb@gmail.com