Original Article
doi: https://doi.org/10.1590/1983-1447.2023.20220186.en

Construction and validation of simulated scenarios in the emergency care of patients with chest pain

Construção e validação de cenários simulados no atendimento de emergência ao paciente com dor torácica

Construcción y validación de escenarios simulados en laatención urgente de pacientes con dolor torácico

Mayara dos Santos Barbosa[a]
Lívia Maria Lopes Ferreira[a]
Raphael Raniere de Oliveira Costa[b]
Rodrigo Guimarães dos Santos Almeida[c]
Fábio da Costa Carbogim[d]
Angélica da Conceição Oliveira Coelho[e]

How to cite this article:
Barbosa MS, Ferreira LML, Costa RRO, Almeida RGS, Carbogim FC, Coelho ACO. Construction and validation of simulated scenarios in the emergency care of patients with chest pain. Rev Gaúcha Enferm. 2023;44:e20220186. doi: https://doi.org/10.1590/1983-1447.2023.20220186.en

ABSTRACT

Objective: To construct and validate clinical simulation scenarios for emergency care for patients with chest pain.
Methods: A methodological study carried out in two stages: construction and validity. The construction took place through the survey of evidence from national and international literature. The validity stage took place through instrument assessment by judges, according to the Content Validity Index and application of a pilot test with the target audience. Fifteen judges with expertise in simulation, teaching and/or care participated in the research, in addition to 18 nursing students, in the pilot test.
Results: Two scenarios of clinical simulation were constructed, and all the assessed items obtained a value above 0.80, showing evidence of validity, being considered instruments suitable for application.
Conclusion: The research contributed to the development and validity of instruments that can be applied for teaching, assessment and training in clinical simulation in emergency care for patients with chest pain.
Keywords: Health education. Emergencies. Chest pain. Acute coronary syndrome. Simulation exercise. Validation study.

RESUMO

Objetivo: Construir e validar cenários de simulação clínica para o atendimento de emergência ao paciente com dor torácica.
Métodos: Estudo metodológico realizado em duas etapas: construção e validação. A construção deu-se por meio do levantamento de evidências da literatura nacional e internacional. A etapa de validação deu-se mediante avaliação dos instrumentos pelos juízes, conforme Índice de Validação de Conteúdo e aplicação do teste-piloto com o público-alvo. Participaram da pesquisa 15 juízes com expertise em simulação, docência e/ou assistência, além de18 estudantes de Enfermagem, no teste piloto.
Resultados: Foram construídos dois cenários de simulação clínica e todos os itens avaliados obtiveram valor acima de 0,80 apresentando evidência de validade, sendo considerados instrumentos aptos para aplicação.
Conclusão: A pesquisa contribuiu para a elaboração e a validação de instrumentos que podem ser aplicados para o ensino, avaliação e capacitação em simulação clínica no atendimento de emergência ao paciente com dor torácica.
Palavras-chave: Educação em saúde. Emergências. Dor no peito. Síndrome coronariana aguda. Exercício de simulação. Estudo de validação.

RESUMEN

Objetivo: Construir y validar escenarios de simulación clínica para la atención de emergencia de pacientes con dolor torácico.
Métodos: Estudio metodológico realizado en dos etapas: construcción y validación. La construcción se dio a través del levantamiento de evidencias de la literatura nacional e internacional. La etapa de validación se dio a través de la evaluación de los instrumentos por parte de los jueces, según el Índice de Validación de Contenido y aplicación de la prueba piloto con el público objetivo. Quince jueces con experiencia en simulación, enseñanza y/o asistencia participaron de la investigación, además de 18 estudiantes de enfermería, en la prueba piloto.
Resultados: Se construyeron dos escenarios de simulación clínica y todos los ítems evaluados obtuvieron un valor superior a 0,80, mostrando evidencias de validez, siendo considerados instrumentos aptos para su aplicación.
Conclusión: La investigación contribuyó al desarrollo y validación de instrumentos que pueden ser aplicados para la enseñanza, evaluación y entrenamiento en simulación clínica en la atención de emergencia a pacientes con dolor torácico.
Palabras clave: Educación en salud. Urgencias médicas. Dolor en el pecho. Síndrome coronario agudo. Ejercicio de simulación. Estudio de validación.

[a] Universidade Federal de Juiz de Fora (UFJF), Faculdade de Enfermagem, Programa de Pós-Graduação em Enfermagem. Juiz de Fora, Minas Gerais, Brasil.
[b] Universidade Federal do Rio Grande do Norte (UFRN), Programa de Pós-Graduação em Educação, Trabalho e Inovação em Medicina. Natal, Rio Grande do Norte, Brasil.
[c] Universidade Federal de Mato Grosso do Sul (UFMS), Instituto Integrado de Saúde. Campo Grande, Mato Grosso do Sul, Brasil.
[d] Universidade Federal de Juiz de Fora (UFJF), Faculdade de Enfermagem, Departamento de Enfermagem Aplicada. Juiz de Fora, Minas Gerais, Brasil.
[e] Universidade Federal de Juiz de Fora (UFJF), Faculdade de Enfermagem, Departamento de Enfermagem Básica. Juiz de Fora, Minas Gerais, Brasil.

INTRODUCTION

Cardiovascular diseases (CVD) are the leading cause of death in the world, surpassing the number of deaths from car accidents, cancer, respiratory, infectious and other diseases[1]. Among CVDs, Acute Coronary Syndromes (ACS) stand out, namely, Unstable Angina (UA), STEMI and NSTEMI acute myocardial infarction, caused by the rupture of an atheromatous plaque, causing partial or total obstruction of a coronary artery[2].

This sequence of events results in conditions that range from injury to death of the heart muscle, demanding a precise and assertive assessment from health professionals. Chest pain is one of the most common symptoms, but it can radiate to other parts of the body, in addition to being associated with dyspnea, sweating, nausea and/or vomiting[2,3].

The main goals of this service include electrocardiogram (ECG) acquisition and medical evaluation within 10 minutes of arrival at the emergency department, in addition to pain relief and prevention of ischemic disorders. This is necessary to ensure that there is no delay in reperfusion therapy, that is, door-to-needle time (Fibrinolysis within 30 min) and door-to-balloon time (Percutaneous Coronary Intervention (PCI) within 90 min)[2–4].

Considering the need for constant training and updating of professionals working in urgency and emergency services, continuing education is a potential tool capable of reducing errors during care, in order to favor safe care. Therefore, it is necessary to use methods and strategies suitable for this demand[5].

In this context, simulation deserves mention, as it is a strategy that helps in the training of health professionals, anticipating clinical practice without exposing patients to avoidable errors caused by lack of experience, knowledge and safety in performing procedures[6].

In Brazil, simulation started with isolated activities. It was not regularly included in the curriculum frameworks and, therefore, has been encouraged by the National Curricular Guidelines (NCGs) of health courses, which recommend the use of diversified methodologies to provide collaborative and meaningful learning, based on action-reflection-action[7].

Studies reinforce that successful simulated practices are based on careful elaboration, validation and previous tests and contribute as a facilitating instrument for professors and professionals of continuing education centers of health and teaching institutions[8,9]. In addition, simulation has been playing an important role in urgent and emergency situations, as it provides a safe experience in critical situations[10].

In view of the aforementioned, the present study aimed at the construction and validation of simulated scenarios for the emergency care of patients with chest pain.

METHOD

This is a methodological study of construction and validation of a simulated scenario carried out at a public university and a private university in the inland of the state of Minas Gerais, from April 2020 to September 2021. A methodological study investigates, organizes and analyzes data to construct, validate and evaluate instruments and research techniques[11]. The two stages of the research are described below: 1) construction of instruments and simulation scenarios based on the literature on the topic addressed and 2) content validation by expert judges in the area and pilot test with the target audience.

In the construction stage, evidence from national and international literature, guidelines and health manuals related to the theme were investigated, having as theoretical support the protocols of the Advanced Cardiovascular Life Support (ACLS), American Heart Association (AHA) and Sociedade Brasileira de Cardiologia (SBC)[2–4,12]. The instruments were constructed according to the recommendation criteria of the International Nursing Association for Clinical Simulation and Learning (INACSL) for simulated clinical experiences[13].

The instruments constructed include the guide of two scenarios and their respective checklists. The guide of the scenarios was based on a structured model[14] resulting in 21 items that provide guidance on its applicability. The scenarios include a clinical case and a checklist that cover technical and non-technical skills related to the care of patients with chest pain. The checklists were constructed according to the Objective Structured Clinical Examination (OSCE) model used as an educational assessment tool in the health area, totaling 26 items[15].

The validation stage was carried out remotely, by an email invitation sent to the judges (email available on Lattes). The sample of judges was obtained for convenience in order to meet the scope of the research, carried out by the Lattes Platform, available on the website of the National Council for Scientific and Technological Development (CNPQ). Also, the snowball or "snowball" sampling method, which consists of expanding the research sample through recommendation was applied. Participants who had already been selected recommended other possible judges as long as they met the profile required to participate in the study[16].

A total of 35 professionals who met the inclusion criteria were invited to participate in the study. These were health professionals with expertise in simulation, teaching and/or urgent and emergency care. Health professionals who have not responded to emails after three follow-up attempts, within an estimated period of 45 days were excluded from the study. Of the 35 invited professionals, 15 make up the panel of judges. In order to carry out the validation, it is recommended that the constructed instrument be evaluated by at least five to ten expert judges on the topic addressed[11].

For this stage, a validation form was elaborated on the Google Forms Platform, with five sections referring to the characterization of the judges, including the Free and Informed Consent Form (TCLE) and the instruments of the scenarios, which totaled approximately 60 items. For each item, pertinence, relevance and clarity of the content were verified, and Pasquali's psychometric procedures were adopted as reference[17]. Moreover, all items had a sub-item with the option of response to an open-ended question reserved for comments and suggestions by the judges. The period for analysis and response was 15 days.

Data analysis was performed based on the Content Validation Index (CVI) in SPSS version 24 software. This validation method calculates the similarity of agreement of the judges in the answers to each individual item about a certain content present in the instrument, through a four-item Likert-type scale, structured with questions related to the scenario and that meet the objective of the study: 1- totally disagree, 2- partially disagree, 3- partially agree and 4- totally agree[18].

For the individual evaluation of the items, the score is calculated through the sum of responses "3" or "4" divided by the number of total responses. Items that obtained scores of "1" or "2" must be eliminated or revised. The instrument shall be considered valid when it reaches a value equal to or greater than 0.80[18].

After the CVI result of each item was obtained, calculation of the arithmetic mean was performed in Excel to evaluate the mean of each question, through the sum of the items: Pertinence (P), Relevance (R) and Clarity (C) divided by 3. With the calculation of the mean, it is possible to identify whether a given observation is above or below the parameters[19].

After the validation stage with the judges, a pilot test was carried out with the target audience composed of undergraduate nursing students, whose curriculum proved that they attended basic disciplines required for work in the scenarios. They were students of the 6th and 8th grades of two Universities in the city of Juiz de Fora, in Minas Gerais (MG). The pilot test was carried out in two moments, due to the pandemic period: the first test was carried out in July 2021, with the participation of three students, in the return to face-to-face activities, which met all biosafety recommendations. Later, in September 2021, with the pandemic situation more stabilized, the pilot test was reapplied to 15 more students.

The pilot test was carried out through lectures and practical training, followed by prebriefing, participation in simulated scenarios and debriefing. Participants were invited to respond to the Student Satisfaction and Self-Confidence in Learning scale to assess satisfaction and self-confidence with simulated learning, validated in Portuguese[20]. Pilot test and scale data will not be explored in this article.

The study was approved by the Ethics Committee for Research involving Human Beings, according to Protocol no 4,130,193, as established in Resolution 466/2012, of the National Health Council. All participants agreed to participate in the research and signed the TCLE. It should be noted that this article is part of the master's thesis entitled "Construction and validation of instruments for simulated clinical experiences in emergency care for patients with chest pain" of the Graduate Program in Nursing at Universidade Federal de Juiz de Fora. Data were collected by a master's student from the Graduate Program in Nursing.

RESULTS

A total of 15 judges participated in this study, with a prevalence of males (62.5%), aged 24-55 years old and the average time of professional experience ranged from 3 to 30 years. Regarding professional training, all are graduate nurses, as follows: doctors (18.8%), masters (43.8%) and specialists (37.4%).

Tables 1 and 2 below show the CVI of the constructed instruments. All items evaluated had satisfactory agreement, with values above 0.80. Table 1 presents the validation of the guide to the scenarios.

Table 2 shows the CVI values of the checklists for the two scenarios: Screening and Emergency care.

There was no need for new rounds because the first round of validation among the judges obtained results with recommended values. The judges' suggestions, in addition to the CVI value, were considered so that the instruments achieved greater clarity and objectivity. Items of the scenarios guide (2 to 7 and 19 to 21), as well as the first scenario items (2 to 7) and the second scenario items (2,4, 15 and 16) have been adjusted to provide greater clarity in writing.

In the pilot test stage with the target audience, a satisfactory result (95%) was obtained regarding the satisfaction and self-confidence of the students, measured with the use of a validated scale[20]. This reaffirms the contributions of the application of simulated scenarios for a more confident and

safe performance of the participants, providing benefits for teaching and for future practical performance.

Next, in Chart 1, the scenario guide is presented in its final version in full to advise its application.

Table 1 – Guide of scenarios regarding the Content Validation Index (CVI). Juiz de Fora, Minas Gerais, Brazil, 2021

SCENARIO GUIDE	P	R	C	CVI
1 – Theme	1	1	1	1
2 – Prior knowledge of the learner	0.87	0.87	0.8	0.85
3 – Learning objectives	0.87	0.87	0.87	0.87
4 – Theoretical foundation	0.93	1	0.93	0.95
5 – Scenario fidelity	1	1	0.93	0.98
6 – Is the clinical case consistent?	1	1	1	1
7 – Characterization of the actors	1	1	0.93	0.98
8 – Human resources	0.93	1	1	0.98
9 – Material resources	1	1	1	1
10 – Reason for admission	1	1	1	1
11 – Vital parameters	1	1	1	1
12 – Expected interventions	1	0.93	1	0.98
13 – Expected outcomes	1	1	1	1
14 – Scenario complexity	1	1	1	1
15 – Physical space	1	1	1	1
16 – Estimated time for the scenario	1	1	1	1
17 – Validation of the scenario	1	1	1	1
18 – Development of the scenario:	1	1	1	1
19 – Simulation assessments	1	1	0.93	0.98
20 – Debriefing	1	1	0.93	0.98
21 – Application of the security and self-confidence scale	0.93	0.93	0.93	0.93

Source: Elaborated by the authors, 2021.
Note: P: pertinence / R: relevance / C: clarity / CVI: Content Validation Index

Table 2 – Checklist for evaluation of scenarios regarding the Content Validation Index (CVI). Juiz de Fora, Minas Gerais, Brazil, 2021

CHECKLIST OF THE SCENARIO OF SCREENING	P	R	C	CVI
Activity 1	1	1	1	1
Activity 2	0.93	0.93	0.93	0.93
Activity 3	0.93	0.93	0.93	0.93
Activity 4	0.93	0.93	0.93	0.93
Activity 5	0.93	0.93	0.93	0.93
Activity 6	0.93	0.93	0.93	0.93
Activity 7	0.87	0.87	0.87	0.87
Activity 8	1	1	1	1
Activity 9	1	1	1	1
Activity 10	1	1	1	1
CHECKLIST OF THE EMERGENCY CARE SCENARIO	**P**	**R**	**C**	**CVI**
Activity 1	1	1	1	1
Activity 2	1	1	0.93	0.98
Activity 3	1	1	1	1
Activity 4	1	1	0.93	0.98
Activity 5	1	1	1	1
Activity 6	1	1	1	1
Activity 7	1	1	1	1
Activity 8	1	1	1	1
Activity 9	1	1	1	1
Activity 10	1	1	1	1
Activity 11	1	1	1	1
Activity 12	1	1	1	1
Activity 13	1	1	1	1
Activity 14	1	1	1	1
Activity 15	0.93	0.93	0.93	0.93
Activity 16	0.87	0.87	0.87	0.87

Source: Elaborated by the authors, 2021.
Note: P: pertinence / R: relevance / C: clarity / CVI: Content Validation Index

SCENARIOS GUIDE SCREENING AND EMERGENCY CARE OF PATIENTS WITH CHEST PAIN	
PREVIOUS COMPONENTS OF THE SCENARIO	
1 – Theme:	CARE FOR PATIENTS WITH CHEST PAIN.
2 – Prior knowledge of the learner:	With theoretical content (lecture classes through slides and theoretical direction based on current references) and practice, through practical training, which can be repeated as many times as necessary. To approach the methodology, the group will have the opportunity to participate in a realistic simulation scenario in a room with 1 volunteer and the other participants as observers of the scene.
3 – Learning objectives:	To develop technical and non-technical competences and skills among students for the care of patients with chest pain.
4 – Theoretical foundation:	ACLS, 2013/2020 AHA, 2015/2020 BRUNNER & SUDDARTH, 2015. GRUPO BRASILEIRO DE CLASSIFICAÇÃO DE RISCO, 2018 SOCIEDADE BRASILEIRA DE CARDIOLOGIA, 2015
PREPARATION OF THE SCENARIO	
5 – Scenario fidelity:	Hybrid scenarios of clinical simulation using mixed technologies, and a simulated patient (actors and mannequins without interaction), in addition to monitor and ECG simulators without real-time interaction.
6 – Are the clinical cases consistent? (Description of the cases to the participant and the instructor)	**CLINICAL CASE 1- SCREENING:** Patient P.K, 42 years old, male, was admitted to the hospital emergency room with chest pain radiating to the left arm. On physical examination, he has dyspnea, nausea, and cool, clammy skin. Also, he is accompanied by a family member, who reports that the patient experienced strong emotion. The nursing technician has already checked the vital signs. You are the professional (nurse/doctor) in charge of this unit and will coordinate the flow of this patient care. Initial vital signs: At screening (BP: 90x50 mmHg, HR: 126 bpm, SpO2: 91%, RR: 23 rpm). • Conduct data collection objectively, based on the acronym SAMPLE. • Classify the urgency of care according to the Manchester protocol. • Transfer the patient's case to the sector that will be responsible for continuing the care. ...

Chart 1 – Scenario guide. Juiz de Fora, Minas Gerais, Brazil, 2021

SCENARIOS GUIDE SCREENING AND EMERGENCY CARE OF PATIENTS WITH CHEST PAIN	
6 – Are the clinical cases consistent? (Description of the cases to the participant and the instructor)	**CLINICAL CASE 2 – EMERGENCY CARE:** Patient P.F, 43 years old, was admitted to the hospital emergency room with chest pain, in addition to nausea, dizziness and dyspnea. After screening, the patient was classified as an orange priority and sent to his sector to receive immediate first care. The patient is monitored for evaluation of continuous vital signs. You are the professional in charge of the emergency unit, you will coordinate care and assign functions to others if necessary. The following are present in the scene: the patient, the companion and a nursing technician. Vital signs – (Visible on the monitor): (BP: 70 x 50 mmHg, HR: 132 bpm, SpO2: 89%, AxT:35.7ºC). • Start care as recommended for patients with chest pain. • Depending on the care priorities, you can assign to the nursing technician the procedures that he/she can perform. • Perform 12-lead ECG correctly.
7 – Characterization of the actors and instructions on the performance:	Plain clothes, expression of pain on the face, hand on the chest, is agitated and bewildered. You are a middle-aged man, plainly dressed, with a complaint of chest pain and shortness of breath. Shows agitation, anxiety, reports constant increase in pain. Unable to answer questions asked by the nursing staff. Companion: Patient's relative, simple clothing. Provides information about the patient, saying: "he is hypertensive, diabetic and has experienced strong emotion just now" She is anxious and worried about the situation. Nursing technician – scenario 1: Stands beside the wheelchair and takes the chair to the patient, if requested by the participant that the patient be taken in the wheelchair. Nursing technician – scenario 2: He is present in the scenario and introduces himself right at the beginning, saying: – Hello! I'm the nursing technician on duty, I'm here to help with whatever it takes! He is calm and proactive, ready to carry out the actions that are delegated by the nurse (oxygen and venous access).NOTE: If assigned to perform the ECG, the actor must say that he does not know how to perform the procedure. Tip: If the participant is not paying attention to the monitor, the actor asks if the participant has already looked at the vital signs and if everything is fine.
8 – Human resources:	Target Audience: Academics and/or health professionals who sign up for the activity and have been exposed to the theoretical and practical content programmed to carry out the activity. Facilitator: researchers, professionals trained to carry out educational intervention in Universities and Hospitals. Actors: People trained to play the role of patient, companion and Nursing Technician.

Chart 1 – Cont.

SCENARIOS GUIDE SCREENING AND EMERGENCY CARE OF PATIENTS WITH CHEST PAIN	
9 – Material resources:	**Structural Composition:** Table, chairs, hospital bed stretcher with identification badge, screen, sink, infectious and non-infectious waste, emergency room identification, medical gas alarm panel, IV pole, wheelchair, complete blood pressure and ECG monitor, ECG machine. **Materials needed for the participant's performance:** Surgical gloves, cotton, gauze pad, alcohol, electrically conductive gel, material for oxygen therapy (fluidizer connected to oxygen and O2 catheter), central venous tray- IV support. **Separate materials:** Needles, syringes, disposable diaper, disposable kit for trichotomy, stethoscope, axillary thermometer, device for measuring blood pressure, pulse oximetry, macromolecule nebulization.
10 – Reason for admission	Chest pain that can radiate to left arm and dyspnea.
11 – Vital parameters:	Initial vital signs: At screening (BP: 90x50 mmHg, HR: 126 bpm, SpO2: 91%, FR: 23 rpm). Vital signs–at the emergency room: (BP: 70 x 50 mmHg, HR: 132 bpm, SpO2: 89%, AxT: 35.7ºC). Visible on the monitor.
12 – Expected interventions:	It is expected that the participant **- In scenario 1:** Perform the screening objectively, based on guidance contained in the SAMPLE history; Carry out the correct risk classification, according to Manchester; Perform a complete and consistent handover. **- In scenario 2:** Recognize the hemodynamically unstable patient; Evaluate and carry out interventions as recommended; Assign functions to the nursing team, such as venous access with a large-bore catheter, blood collection; Perform the ECG, interpret it or call the doctor within 10 min and record the care.
13 – Outcomes expected:	Acquisition of skills and competencies in the initial emergency care of patients with chest pain. Aimed at technical and communication skills with the patient and family, in addition to the team.
14 – Scenario complexity:	Low and medium fidelity clinical simulation scenario.
15 – Physical space:	Practical laboratories (educational or health institutions) or In Situ are recommended.

Chart 1 – Cont.

SCENARIOS GUIDE SCREENING AND EMERGENCY CARE OF PATIENTS WITH CHEST PAIN	
16 – Estimated time for the scenario:	Total of 10 to 15 minutes to carry out the 2 scenarios. For each individual scenario, 5-7 minutes.
17 – Validation of the scenario:	After the judges' evaluation and suggestions, adjustments will be made, and then pilot testing of the scenarios will be conducted.
FINAL SCENARIO of COMPONENTS	
18 – Development of the scenario:	**Scenario 1:** - Anamnesis: Hypertensive, diabetic, without allergies. - Risk classification – code orange–Patient sent to rest. **Scenario 2:** - Physical examination: Initial assessment with ABCDE approach. -Evolution: Patient is admitted to the emergency service complaining of chest pain. In the emergency room, patient vital signs are monitored, signs of instability are noticed.After the initial contact with the patient, the student must identify the severity of the situation and perform the ECG within the appropriate time in the OSCE station. - Critical scenario factor: A patient with hypotension, dyspnea and tachycardia with low oxygen saturation, needs O^2 support. - Clues: the nursing technician and the patient's companion will provide information to the participant according to their questioning.
19 – Simulation assessment:	It will be done through a checklist of tasks based on the Objective Structured Clinical Examination (OSCE).
20 – Debriefing:	Conducting the reflection and analysis debriefing: moment of feedback with review of care together with the student, through the evaluation checklist, evaluating strengths, weaknesses and improvements.Occurs after the simulated scenario. The estimated duration of the session is 30 minutes.
21 – Application of the Safety and Satisfaction scale	Application of the scale to students to assess their satisfaction with learning through simulation.

Chart 1 – Cont.
Source: Elaborated by the authors, 2021.

Chart 2 includes the screening scenario for application in the OSCE model, which was designed to assess non-technical skills, such as decision-making, critical thinking and communication with patients and the team.

Chart 3 shows the scenario of emergency care for patients with chest pain, which was designed to assess technical and non-technical skills, according to the OSCE model.

SCREENING – CHEST PAIN (NON-TECHNICAL SKILLS)	YES	NO
1 – Does the participant introduces himself-herself to the patient and approach him demonstrating calmness and offering support?		
Conducts data collection objectively based on **SAMPLE** history, according to ACLS, 2013:		
2 – **S: Signs and symptoms**: What is the patient feeling/complaints (pain, nausea, sweating, shortness of breath)? Is the patient aware of the **type of pain** felt (burning, tightness, whether the pain goes away with rest or if it is constant), the **site of the pain** (chest or other) **and level (**0-10)?		
3 – **A: Allergies:** medicine, food, substance?		
4 – M: Medications and/or treatments used: **-**What medications are you currently using? -Did you forget or exceed a dose? -Did you take any medication for erectile dysfunction in the 24h or 48h? -Do you use any energetic, anabolic or illicit drug, such as cocaine?		
5 – P: Health problems or current illness: Do you have a history of high blood pressure, diabetes, lung disease, kidney disease or another problem? Is there a case in the family? -Have you had symptoms of angina or previous AMI? -Have you had heart surgery before??		
6 – L: When the patient last drank or had food**:**		
7 – E: Event environment: -When did the symptoms start, were you doing any activity or stressful situation? -Did the symptoms start suddenly or gradually?		
8 – With regard to clinical signs: Did you carry out the risk classification as ORANGE, according to the Manchester protocol??		
9 – Do you request a wheelchair to take the patient to bed rest, avoiding efforts?		
10 – Do you report the case to the emergency care sector (nursing and medical staff)? Is handover complete and consistent?		

Chart 2 – *Checklist* Evaluation-screening. Juiz de Fora, Minas Gerais, Brazil, 2021
Source: Elaborated by the authors, 2021.

EMERGENCY CARE–CHEST PAIN (TECHNICAL SKILLS)	YES	NO
1 – Does the participant introduce himself/herself to the patient and explain the conduct (demonstrates calmness and support)?		
2 – Does the participant report hand hygiene and/or use of procedure gloves?		
3 – The participant observed vital signs on the monitor and paid attention to the abnormal parameters: **Oxygen saturation** (<90%). Dos he/she request installation of the oxygen therapy system?		
4 – **Venous access with large-bore catheter**? (Delegates to the nursing technician) *****In case of training at an institution that has a protocol, include **request for blood collection** and other tests.		
Performed the 12-lead ECG correctly. Check the steps below:		
5 – V1: At the fourth intercostal space to the right of the sternum.		
6 – V2: At the fourth intercostal space to the left of the sternum.		
7 – V3: Between leads V2 and V4.		
8 – V4: At the fifth intercostal space at midclavicular line		
9 – V5: At the fifth intercostal space, at left anterior axillary line.		
10 – V6: At the fifth intercostal space at the midaxillary line.		
11 – aVR: right arm absolute potential. **RA**		
12 – aVL: left arm absolute potential.**LA**		
13 – aVF: left leg absolute potential. **LL**		
14 – N: Neutral electrode, right leg**RL**		
15 – Did the participant evaluate the ECG or request a doctor for an evaluation within 10 min?		
16 – Did the participant record the care provided (Reported that he/she will do it)?		

Chart 3 – *Checklist* Evaluation – Emergency care. Juiz de Fora, Minas Gerais, Brazil, 2021
Source: Elaborated by the authors, 2021.

DISCUSSION

The scenarios constructed in this study are relevant in the initial care of patients with chest pain, in emergency care, since clinical management must be carried out by trained teams, in order to guarantee that the first therapeutic interventions can be initiated[21].

It is known that expeditious care is a key aspect to avoid injuries, sequelae and even death of patients in these emergencies[4,12]. Thus, an attempt was made to improve such

scientific knowledge, through simulation scenarios that addressed fundamental theoretical and practical aspects to provide safe and effective care.

There is evidence in the literature about the effectiveness of clinical simulation for the acquisition of technical and non-technical skills[22–24]. As for technical skills, studies have demonstrated the contribution in the practical performance of professionals, in addition to the improvement of morbidity and mortality rates of patients directly related to the incorporation of *in situ* simulation training[22,23].

Regarding non-technical skills, it is recognized that an adequate communication between health professionals and the team and patients contributes to the provision of high-quality care. Studies report a significant improvement in interdisciplinary and patient communication after simulation training[22,24].

Therefore, the use of clinical simulation has proved to be a promising method in health education, contributing to the improvement of the skills required by the profession. The method covers ethical, cognitive, psychomotor aspects, which include decision-making, clinical reasoning, teamwork, communication, among others[25,26].

A review study reported the occurrence of many inconsistent processes to develop valid and reliable simulated scenarios, which often neglect evidence-based approaches to determine validity and reliability. The construction of scenarios must always be based on scientific evidence and follow systematic processes so that an evidence-based practice prevails and, consequently, the scenarios are useful, disseminated and replicated in other contexts[27].

Therefore, it is necessary to standardize the construction and development of simulated scenarios. The International Nursing Association for Clinical Simulation and Learning (INACSL) developed the document Standards for Best Practices in Simulation, which brings together evidence-based content for all stages of practice and construction of simulated experiences[13]. Other studies stress the importance of systematized construction in compliance with the recommendations[14,28].

According to INACSL[13], it is necessary to assess the needs of a group in the development of simulation activities, focusing on the construction of specific, measurable, achievable, tangible and timely objectives, in order to guide the design, development and the experience-based simulation approach. In addition, a facilitative, participant-centered approach should be maintained, and preparation materials and resources should be provided in advance to bring participants closer to the theme and methodology.

Initially, a prebriefing is recommended, which is the moment to provide information in a clear and objective way about the clinical case, the manikins, the equipment and the proposed time of the simulation environment. The simulation-based experience with debriefing, a time reserved for providing feedback and understanding the feelings, difficulties and solving doubts of the participants, should be used[13,14,28].

Moreover, a pilot test should be carried out prior to implementing the simulation-based experience to identify and correct potential flaws in the development and include valid, consistent and reliable assessment tools, checklists and other assessment measures in the pilot test[13,28].

With regard to validity, an instrument is valid when its construction and applicability allow the faithful measurement of what is proposed. Reliability refers to how stable and consistent an instrument is[11,29], a reliable scenario must be replicable and consistent each time the simulation exercise is repeated[27].

Thus, the validation process was carried out through the analysis of the CVI, which obtained a considerable value, with the answers of the judges, and a validated scale[20] was applied to the target audience on the simulated experience that obtained a positive response. regarding satisfaction and self-confidence with the application of simulated scenarios.

The application of a scale capable of measuring the participants' satisfaction and self-confidence with learning has contributed to the assessment of the achievement of learning objectives and performance, in addition to being a strong indication for the use and evaluation of teaching strategies[20]. In another study, the application of the scale reinforced a significant increase in the participants' satisfaction and self-confidence after activities with simulated experiences compared to the traditional method[30].

Studies show the advantages of using simulation, capable of promoting an approximation with reality, knowledge, security, self-confidence, clinical reasoning, precision in skills and reflection[31,32]. Clinical simulation has proven to be a promising and effective strategy for current and future challenges in health education[33].

In this study, the validated scenarios are of low and medium fidelity, and can be performed with simulated patients, which include manikins without script interaction for actors, in addition to monitor and ECG simulators without real-time interaction, and therefore, easy to replicate. It is expected that the availability of scenarios will contribute to the training and education of health professionals in the context of emergencies.

A limitation of this study is the impossibility of performing other types of validity and reliability. The research was carried out during the COVID-19 pandemic, which impacted the applicability stage of the scenarios, with the pilot test being carried out only with nursing students. Although the test was

not applied to the entire target audience, it is suggested that its applicability be expanded to include medical education and professional training, as its construction was validated by expert judges in both areas (Nursing and Medicine).

It is understood that the topic addressed is not just a matter to be addressed in emergencies, but in all areas of care, as a patient with risk factors for CVD can start with acute of complications, such as infarction, in circumstances such as in a primary care consultation or admission to a ward for treatment of a chronic illness. Thus, medical and nursing professionals must be prepared to recognize the symptoms and intervene according to a more appropriate conduct.

CONCLUSION

The present study contributed to the construction and validation of clinical scenarios in emergency care for patients with chest pain, listing the initial conduct to be applied by physicians and nurses.

The scenarios were prepared based on current evidence in the literature and have evidence of validity with a CVI value above 0.80, according to 15 expert judges. It is concluded that the scenarios can be applied for teaching, evaluation and training in clinical simulation in emergency care for patients with chest pain.

To reinforce the importance of this theme, further research is suggested related to essential procedures and behaviors for health professionals in the emergency service. We also emphasize the importance of further studies using the scenarios resulting from this research, such as application and replication, which will make it possible to reaffirm the degree of consistency with which the instrument measures the attribute of the study.

REFERENCES

1. Sociedade Brasileira de Cardiologia [Internet]. Cardiômetro: mortes por doenças cardiovasculares no Brasil. Rio de Janeiro: SBC; 2021 [cited 2021 Feb 9]. Available from: http://www.cardiometro.com.br/
2. Aehlert B. ACLS: suporte avançado de vida em cardiologia. 4. ed. Rio de Janeiro: Elsevier; 2012.
3. Disque K. Advanced Cardiac Life Support (ACLS): 2015-2020 guidelines and standards. 4. ed. Las Vegas: Satori Continuum Publishing; 2016.
4. Piegas LS, Timerman A, Feitosa GS, Nicolau JC, Mattos LAP, Andrade MD, et al. V Diretriz da Sociedade Brasileira de Cardiologia sobre Tratamento do Infarto Agudo do Miocárdio com Supradesnível do Segmento ST. Arq Bras Cardiol. 2015;105(2 Suppl 1):1-105. doi: http://doi.org/10.5935/abc.20150107
5. Rodrigues GVB, Cortez EA, Almeida YS, Santos ECG. Educação permanente em saúde em serviços de urgência e emergência: uma revisão integradora. Res Soc Dev. 2020;9(8):e14985269. doi: https://doi.org/10.33448/rsd-v9i8.5269
6. Associação Brasileira de Educação Médica. Simulação em saúde para ensino e avaliação: conceitos e prática [Internet]. São Carlos, SP: Cubo Multimídia, 2021 [cited 2021 Feb 9]. Available from: https://doi.org/10.4322/978-65-86819-11-3
7. Ministério da Saúde (BR). Conselho Nacional de Saúde. Resolução nº 569, de 8 de dezembro de 2017. Aprova o Parecer Técnico que dispõe sobre os Princípios Gerais para as Diretrizes Curriculares Nacionais dos Cursos de Graduação da Área da Saúde. Diário Oficial União. 2018 fev 26 [cited 2021 Feb 9];38(Seção 1):85-90. Available from: https://pesquisa.in.gov.br/imprensa/jsp/visualiza/index.jsp?data=26/02/2018&jornal=515&pagina=85&totalArquivos=252
8. Negri EC, Pereira Júnior GA, Cotta Filho CK, Franzon JC, Mazzo A. Construction and validation of simulated scenario for nursing care to colostomy patients. Texto Contexto Enferm. 2019;28:e20180199. doi: http://doi.org/10.1590/1980-265X-TCE-2018-0199
9. Carvalho LR, Zem-Mascarenhas SH. Construction and validation of a sepsis simulation scenario: a methodological study. Rev Esc Enferm USP. 2020;54:e03638. doi: https://doi.org/10.1590/S1980-220X2019021603638
10. Miranda FBG, Mazzo A, Pereira Junior GA. Use of high fidelity simulation in the preparation of nurses for urgency and emergency care: scoping review. Sci Med. 2018;28(1):ID28675. doi: http://doi.org/10.15448/1980-6108.2018.1.28675
11. Polit DF, Beck CT. Fundamentos de pesquisa em enfermagem: avaliação de evidências para a prática da enfermagem. 7. ed. Porto Alegre: Artmed; 2011.
12. Amsterdam EA, Wenger NK, Brindis RG, Casey Jr DE, Ganiats TG, Holmes Jr DR, et al. 2014 AHA/ACC guideline for the management of patients with non-st-elevation acute coronary syndromes: a report of the american college of cardiology/american heart association task force on practice guidelines. J Am Coll Cardiol. 2014;64(24):e139-e228. doi: https://doi.org/10.1016/j.jacc.2014.09.017
13. INACSL Standards Committee. INACSL standards of Best practice: simulation design. Clin Simul Nurs. 2016;12(S):S5-S12. doi: https://doi.org/10.1016/j.ecns.2016.09.005
14. Fabri RP, Mazzo A, Martins JCA, Fonseca AS, Pedersoli CE, Miranda FBG, et al. Development of a the oretical-practical script for clinical simulation. Rev Esc Enferm USP. 2017;51:e03218. doi: http://doi.org/10.1590/s1980-220x2016265103218
15. Zanetti ACB, Moura AA, Zanetti MOB, Ramos D, Bonelli MCP, Alcoforado CLGC. Structured objective clinical examination as an educational tool in healthcare: comprehensive review. Rev Baiana Enferm. 2017;31(4):e20484. doi: http://doi.org/10.18471/rbe.v31i4.20484
16. Vinuto J. A amostragem em bola de neve na pesquisa qualitativa: um debate em aberto. Tematicas. 2014;22(44):203-20. doi: http://doi.org/10.20396/tematicas.v22i44.10977
17. Pasquali L. Instrumentação psicológica: fundamentos e práticas. Porto Alegre: Artmed; 2010.
18. Alexandre NMC, Coluci MZ. Validade de conteúdo nos processos de construção e adaptação de instrumentos de medidas. Cien Saude Colet. 2011;16(7):3061-8. doi: http://doi.org/10.1590/s1413-81232011000800006
19. Kühn DD. Pesquisa e análise de dados: problematizando o rural e a agricultura numa perspectiva científica [Internet]. Porto Alegre: Editora da UFRGS; 2017 [cited 2021 Feb 3]. Available from: http://www.ufrgs.br/cursopgdr/downloadsSerie/derad604.pdf
20. 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: http://doi.org/10.1590/0104-1169.0472.2643

21. Grupo Brasileiro de Classificação de Risco. Nota técnica 001/2018: associação entre Protocolo Manchester de classificação de risco e protocolo de dor torácica [Internet]. Belo Horizonte: GBCR; 2018 [cited 2021 Feb 3]. Available from: https://www.gbcr.org.br/wp-content/uploads/2021/05/Nota-Tecnica-Dor-toacica.pdf
22. Blackmore A, Kasfiki EV, Purva M. Simulation-based education to improve communication skills: a systematic review and identification of current best practice. BMJ Simul Technol Enhanc Learn. 2018;4(4):159-64. doi: http://doi.org/10.1136/bmjstel-2017-000220
23. Goldshtein D, Krensky C, Doshi S, Perelman VS. In situ simulation and its effects on patient outcomes: a systematic review. BMJ Simul Technol Enhanc Learn. 2019;6(1):3-9. doi: http://doi.org/10.1136/bmjstel-2018-000387
24. Shao YN, Sun HM, Huang JW, Li ML, Huang RR, Li N. Simulation-based empathy training improves the communication skills of neonatal nurses. Clin Simul Nurs. 2018;22:32-42. doi: http://doi.org/10.1016/j.ecns.2018.07.003
25. Yamane MT, MachadoVK, Osternack KT, Mello RG. Simulação realística como ferramenta de ensino na saúde: uma revisão integrativa. Rev Espaço para a Saúde. 2019;20(1):87-107. doi: https://doi.org/10.22421/15177130-2019v20n1p87
26. Miranda FBG, Mazzo A, Pereira Junior GA. Assessment of individual and interprofessional skills of health prefessionals in simulated clinical activies: a scoping review. Interface. 2018;22(67):1221-34. doi: http://doi.org/10.1590/1807-57622017.0628
27. Mirza N, Cinel J, Noyes H, McKenzie W, Burgess K, Blackstock S, et al. Simulated patient scenario development: a methodological review of validity and reliability reporting. Nurse Educ Today. 2020;85:104222. doi: http://doi.org/10.1016/j.nedt.2019.104222
28. 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
29. Souza AC, Alexandre NMC, Guirardello EB. Psychometric properties in instruments evaluation of reliability and validity. Epidemiol Serv Saude. 2017;26(3):649-59. doi: https://doi.org/10.5123/S1679-49742017000300022
30. Costa RRO, Medeiros SM, Coutinho VRD, Mazzo A, Araujo MS. Satisfaction and self-confidence in the learning of nursing students: randomized clinical trial. Esc Anna Nery. 2020;24:1-9. doi: http://doi.org/10.1590/2177-9465-EAN-2019-0094
31. Domingues I, Martins E, de Almeida CL, Silva DA. Contribuições da simulação realística no ensino-aprendizagem da enfermagem: revisão integrativa. Res Soc Dev. 2021;10(2):e55710212841. doi: https://doi.org/10.33448/rsd-v10i2.12841
32. Yamane MT, Machado VK, Osternack KT, Mello RG. Simulação realística como ferramenta de ensino na saúde: uma revisão integrativa. Rev Espaço para Saúde. 2019;20(1):87-107. doi: http://doi.org/10.22421/15177130-2019v20n1p87
33. Herrera-Aliaga E, Estrada LD. Trends and innovations of simulation for twenty first century medical education. 2022;10:619769. doi: http://doi.org/10.3389/fpubh.2022.619769

Authorship contribution:
Conceptualization: Mayara dos Santos Barbosa, Fábio da Costa Carbogim, Angélica da Conceição Oliveira Coelho.
Writing – original draft: Mayara dos Santos Barbosa.
Escrita – review and editing: Mayara dos Santos Barbosa, Lívia Maria Lopes Ferreira, Raphael Raniere de Oliveira Costa, Rodrigo Guimarães dos Santos Almeida, Fábio da Costa Carbogim, Angélica da Conceição Oliveira Coelho.
Investigation: Mayara dos Santos Barbosa, Lívia Maria Lopes Ferreira, Raphael Raniere de Oliveira Costa, Rodrigo Guimarães dos Santos Almeida.
Methodology: Mayara dos Santos Barbosa, Fábio da Costa Carbogim, Angélica da Conceição Oliveira Coelho.
Supervision: Fábio da Costa Carbogim, Angélica da Conceição Oliveira Coelho.

The authors declare that there is no conflict of interest.

Corresponding author:
Angélica da Conceição Oliveira Coelho
E-mail: angelica.coelho@ufjf.br

Associate editor:
Helga Geremias Gouveia

Received: 06.27.2022
Approved: 09.29.2022

Editor-in-chief:
João Lucas Campos de Oliveira