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Assessment of stress in nursing students during acute coronary syndrome simulation

Avaliação do estresse de estudantes de enfermagem em simulação de síndrome coronariana aguda

Evaluación del estrés de estudiantes de enfermería en simulación de síndrome coronaria aguda

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ABSTRACT

Objective: To assess stress in nursing students during acute coronary syndrome simulation. **Methods:** This was a cross-sectional quantitative study. The sample consisted of 33 students, divided into 15 pairs and one trio. Inclusion criteria were being regularly enrolled in the fourth year of the nursing program, enrolled in the Clinical Practice in High Complexity course, and not holding a prior degree in the health field. Students who, for any reason, missed one or more preparatory stages for the simulation, such as the theoretical classes on the subject, were excluded from the analysis. Data collection was carried out using the Kezkak questionnaire. **Results:** The items most associated with increased stress levels among students were confusing medications, causing physical harm to the patient, performing poorly and harming the patient, sustaining a needlestick injury with a contaminated needle, and feeling unable to help the patient. The items causing the least stress were talking to the patient about their suffering, relationships with fellow nursing students, not knowing how to end a conversation with the patient, becoming emotionally involved with the patient, and the patient not showing respect. **Conclusion:** Simulation-based education prepares students for real clinical contexts. Stress is incorporated as a means of enabling students to perform their functions effectively.

Descriptors: Patient simulation; Nursing students; Psychological stress.

RESUMO

Objetivo: Avaliar o estresse em estudantes de enfermagem em simulação de síndrome coronariana aguda. **Métodos:** Trata-se de um estudo quantitativo transversal. A amostra foi composta por 33 estudantes, sendo eles separados em 15 duplas e um trio. Como critério de inclusão, tem-se: estar regularmente matriculado no quarto ano do curso de enfermagem, estar vinculado à disciplina de Práticas Clínicas em Alta Complexidade e não possuir graduação prévia na área da saúde. Foram descontinuados das análises aqueles que, por qualquer motivo, tenham faltado a uma ou mais etapas prévias à simulação, como as aulas teóricas referentes ao tema. A coleta de dados foi realizada por meio do questionário deKezkak. **Resultados:** Pode-se observar que, em relação aos itens que mais elevaram o nível de estresse dos estudantes, destacaram-se: confundir a medicação, causar dano físico ao doente/paciente, fazer mal meu trabalho e prejudicar o doente/paciente, picar-se com uma agulha infectada e sentir que não posso ajudar o doente. Os itens que causaram menos estresse foram: falar com doente do seu sofrimento, a relação com os colegas estudantes de enfermagem, não saber como terminar o diálogo com o doente/paciente, envolver-me emocionalmente com o doente/paciente e que o doente/paciente não me respeite. **Conclusão:** O ensino baseado em simulação prepara o aluno para o contexto clínico real. O estresse está inserido como forma de habilitar o estudante e fazer com que ele realize suas funções com efetividade.

Descritores: Simulação de pacientes; Estudantes de enfermagem; Estresse psicológico.

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RESUMÉN

Objetivo: Evaluar el estrés en estudiantes de enfermería en simulación de síndrome coronario agudo. **Métodos:** Se trata de un estudio cuantitativo transversal. La muestra estuvo compuesta por 33 estudiantes, distribuidos en 15 duplas y un trío. Como criterio de inclusión, se establecieron los siguientes: estar matriculado regularmente en el cuarto año del curso de enfermería, estar vinculado a la asignatura de Prácticas Clínicas en Alta Complejidad y no tener título universitario previo en el área de la salud. Fueron excluidos del análisis aquellos que, por cualquier motivo, faltaron a una o más etapas previas a la simulación, como las clases teóricas relacionadas con el tema. La recolección de datos se realizó mediante el cuestionario de Kezkak. **Resultados:** Se observó que, en relación con los ítems que más elevaron el nivel de estrés de los estudiantes, se destacaron: confundir la medicación, causar daño físico al paciente, hacer mal mi trabajo y perjudicar al paciente, pincharse con una aguja infectada y sentir que no puedo ayudar al paciente. Los ítems que causaron menos estrés fueron: hablar con el paciente sobre su sufrimiento, la relación con los compañeros de clase, no saber cómo terminar el diálogo con el paciente, involucrarse emocionalmente con el paciente y que el paciente no me respete. **Conclusión:** La enseñanza basada en simulación prepara al estudiante para el contexto clínico real. El estrés está presente como una forma de habilitar al estudiante y lograr que desempeñe sus funciones con efectividad.

Descriptores: Simulación de paciente; Estudiantes de enfermería; Estrés psicológico.

Highlights

1. High-fidelity clinical simulation was used to assess the stress levels of nursing students in an acute coronary syndrome scenario.

2. The highest stress levels were related to fear of medication errors, causing harm to the patient, and accidents with biological material.

3. Interpersonal and communication factors had a lower stress impact during the simulation.

4. Moderate stress proved to be a relevant pedagogical component for the development of clinical reasoning and professional safety.

5. Simulation-based teaching promotes technical preparation, confidence, and better student performance in real clinical settings.

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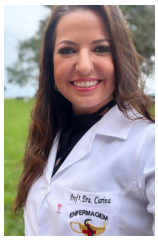

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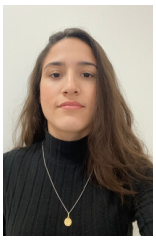

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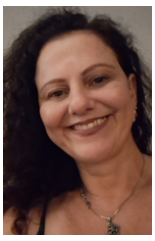

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Introduction

Simulation-Based Education (SBE) is a learning method that involves creating a hypothetical situation based on a real scenario within a simulated, safe, and controlled environment. This strategy enables students to develop competencies, promotes participation and active learning, integrates theoretical and practical knowledge, and allows for reflection and repetition without causing risk or harm to the intended recipient of the action [1].

The method aims to reproduce scenarios that closely resemble those found in clinical practice, encouraging students to understand, reason, and act to solve problems. Consequently, stress levels are expected due to the variety of skills required for execution. On the other hand, students recognize that they are in a learning environment free from judgment, where mistakes can occur and be corrected without causing harm to patients, which in turn contributes to reducing stress levels. Authors have noted that low to moderate stress levels can lead to new learning experiences [2, 3, 4] and help students perform beyond their usual cognitive capacity, thereby enhancing their learning potential [5].

Understanding the students' stress levels and the changes this may cause enables instructors to provide educational support, thereby helping students improve their performance [6].

SBE has been gaining prominence as a teaching methodology, particularly in nursing, with the goal of enhancing the qualification of future professionals. Understanding the impact of stress on students and refining the teaching-learning strategy through simulation is essential to improve student performance and, consequently, the quality of care when they are placed in real-life clinical settings after having experienced clinical cases in a simulated environment.

These opportunities for students to experience situations that reflect real work scenarios stimulate numerous skills and help reduce stress when associated with resilience and confidence gained in advance, ensuring adaptation to face challenges [7].

Simulations can take place in various clinical contexts, such as Cardiovascular Diseases (CVDs), which deserve special attention as they are leading causes of mortality in Brazil and worldwide. According to estimates from the Global Burden of Disease (GBD) study, the number of CVD cases increased considerably between 1990 and 2019, rising from 271 million to 523 million, along with CVD-related deaths, which went from 12.1 million in 1990 to 18.6 million in 2019 (4). Among CVDs, Acute Coronary Syndrome (ACS), including Acute Myocardial Infarction (AMI) and unstable angina, stands out as a leading cause of mortality[8].

Chest pain is the main symptom, which may radiate to the left arm, right arm, and/or jaw, and may be associated with other symptoms such as nausea, sweating, and abdominal pain. Nurses are responsible for risk stratification of these patients in emergency services, as they possess the technical and scientific knowledge and skills required to perform this role and initiate the necessary measures to ensure prompt and effective treatment[9].

Thus, SBE can contribute to the development of students' clinical competencies, including knowledge, skills, and attitude, so that when they encounter a real situation in their professional practice, they can act with confidence and reduced stress, having had the opportunity to practice beforehand in a controlled, risk-free, and ethical environment without exposing the patient.

Therefore, the objective of the present study was to assess stress in nursing students during acute coronary syndrome simulation.

Methods

This was a cross-sectional quantitative study, which represents the situation during the period observed by the researcher and is conducted at a single point in time [10]. This article follows the checklist proposed by the STROBE initiative to ensure quality and transparency in observational studies.

The study was carried out in the city of Bandeirantes, in the northern region of the state of Paraná, at the nursing practice laboratory of the State University of Northern Paraná. The sample consisted of students enrolled in the fourth year of the university's nursing program, divided into 15 pairs and one trio.

Inclusion criteria were students regularly enrolled in the fourth year of the nursing program in 2021, registered in the Clinical Practice in High Complexity course, and without a prior degree in the health field. Students who, for any reason, missed one or more preparatory stages for the simulation, such as the theoretical classes on the topic, were excluded from the analysis.

To provide students with prior knowledge, a dialogued theoretical class on ACS was delivered via the Google videoconferencing platform. After the theoretical class, students received a case study to consolidate the content. Data collection took place after the simulation practice, which consisted of three distinct stages.

In the first stage, the pre-briefing was conducted. According to the literature, these actions involve establishing a fiction contract with the students, in which both facilitator and student commit to respecting and ensuring the psychological safety and confidentiality of the simulation experience. The briefing also included orientation on the learning scenario, manikins, equipment, and materials used in the simulation [11].

In the second stage, the simulation was carried out using a high-fidelity simulator, Nursing Anne Laerdal®, along with its Laerdal SIMPAD®, which displayed signs and symptoms of ACS. During the simulation, the students performed nursing interventions on the patient in a physical setting designed to replicate a realistic clinical environment. This setting included medications, a hospital stretcher, a multiparameter monitor simulator, an IV stand, masks, catheters, and an oxygen cylinder. The interventions performed included requesting an ECG, taking the patient's medical history, conducting a physical examination, administering oxygen therapy, giving oral medications, and infusing intravenous medications.

In the third stage, the debriefing was conducted with the aim of encouraging students to engage in critical and reflective thinking, learning from their own experiences [12]. The following questions were asked: Could you define the clinical case of this simulation? What did you think of your performance during the simulation? What did you learn today during the simulation session? Did the group achieve the objective of the simulation?

Subsequently, the students' stress levels were assessed after the simulation using the Kezkak questionnaire, which has been validated in Portuguese (13) and, in this study, was applied in an adapted version [14]. The questionnaire consisted of 31 items with four stress level classifications: 0 = Not at all, 1 = A little, 2 = A lot, and 3 = Very much.

For data analysis, categorical variables were presented as relative frequency distributions, in percentages, using the Statistical Package for the Social Sciences (SPSS), version 2.0.

Student participation was contingent upon signing the Informed Consent Form (ICF). In accordance with the Resolution of the National Research Ethics Council, this study was approved by the Research Ethics Committee under CAAE: 17393827639449.

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Results

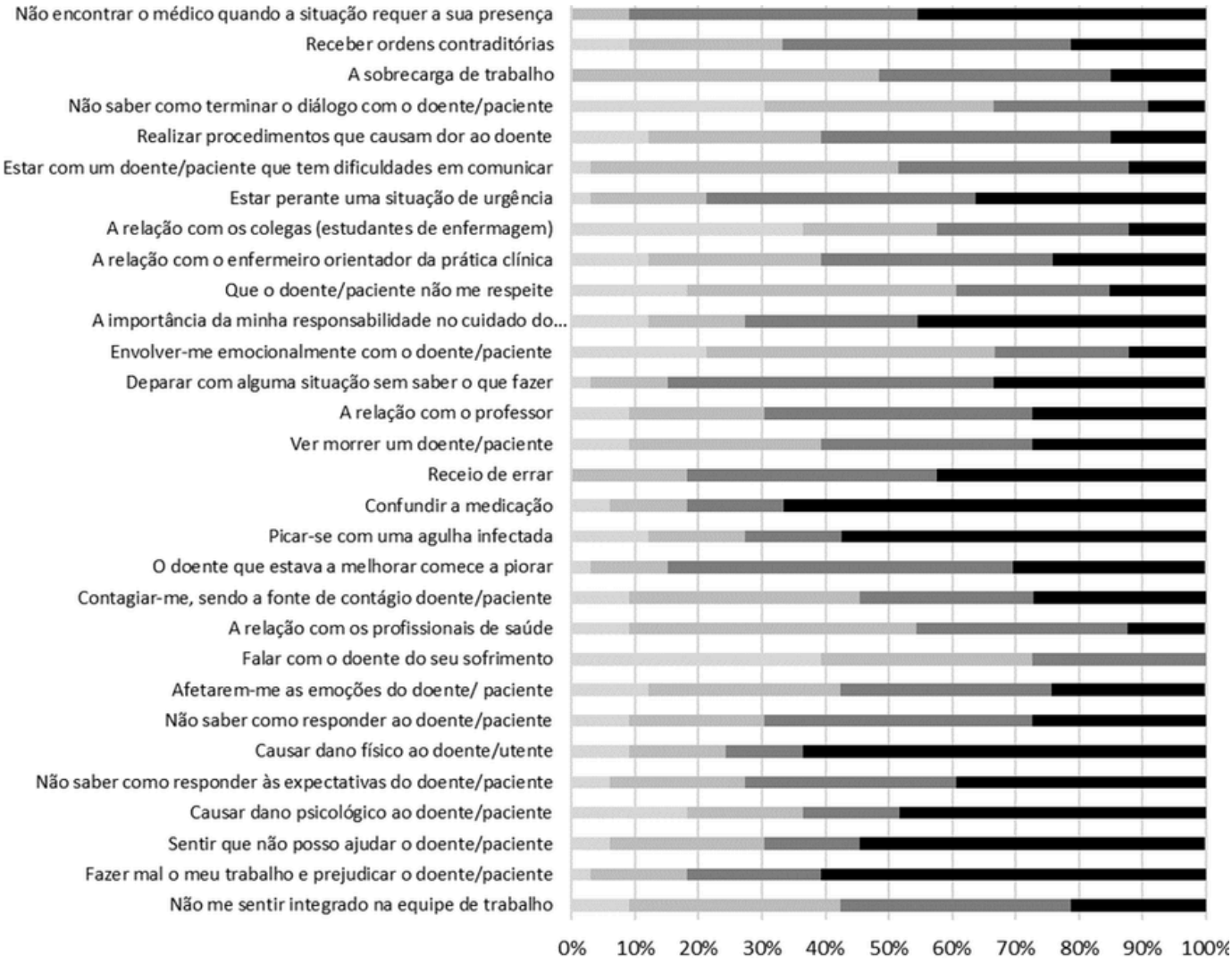

Figure 1 – Distribution of stress assessment among nursing students during high-fidelity simulation, according to the Kezkak questionnaire. Bandeirantes, PR, Brazil, 2022.

A total of 33 fourth-year nursing students, all female, participated in the study. The mean age of the participants was 22 years.

The data regarding the factors that triggered higher stress levels and those that caused lower stress levels in students during the simulation of care for a patient with ACS are presented in Figure 1:

It can be observed that, among the items reported by nursing students as causing the highest stress levels, the most notable were confusing medications, causing physical harm to the patient, performing poorly and harming the patient, sustaining a needlestick injury with a contaminated needle, and feeling unable to help the patient.

Conversely, the items that caused the least stress among students were talking to the patient about their suffering, relationships with fellow nursing students, not knowing how to end a conversation with the patient, becoming emotionally involved with the patient, and the patient not showing respect.

Discussion

Clinical simulation has been transforming teaching and learning in nursing by providing students with new experiences that mimic realistic clinical situations, thereby evoking a wide range of emotions. Accordingly, the present study analyzed the factors that trigger higher stress levels and those that cause lower stress levels in nursing students following an Acute Coronary Syndrome (ACS) simulation.

When exposed to this type of scenario, students must apply the competencies and skills necessary to ensure efficient care. It is the responsibility of nursing professionals to provide comprehensive patient care, requiring them to be prepared and qualified to recognize clinical signs and understand the diagnostic methods for cardiovascular diseases during patient admission, history-taking, and care [8].

The scientific literature indicates that the complexity of the ACS scenario and the realism of the simulator are stress-inducing factors among healthcare students, as the manikin's speech and reactions are essential elements of the simulation, placing students in situations that replicate reality so they can experience the associated emotions [4].

When ACS simulation scenarios increase stress levels, one contributing factor may be the students' lack of prior experience with this teaching method [14].

It was observed that the items most associated with higher stress levels among nursing students in the ACS simulation were related to lack of competence and emotional involvement. The item that caused the highest stress level was "confusing medications."

A high stress level in this item may be linked to the various actions and clinical reasoning that the student must apply in ACS situations, based on the patient's signs and symptoms, such as the immediate initiation of oxygen therapy, the use of platelet inhibitors, the correct dosage and method of administration, when to use vasodilators and how to administer them, identifying indications and contraindications, and even the use of opioid analgesics. This study highlights how widespread this stressor is among nursing students and how skill deficits in this area impact factors related to harming the patient, whether through causing physical injury, performing poorly, or compromising patient care.

The complexity involved in the preparation and administration of medications in Acute Coronary Syndrome simulation is essential for putting into practice the scientific principles that support nursing actions, ensuring the prevention and reduction of errors. Inexperience and lack of knowledge are contributing factors to medication errors. A study conducted by Nascimento, Freitas, and Oliveira (2016) showed that errors in the medication process occur due to lack of preparation, insufficient knowledge, work overload, and communication failures, resulting in harm to the patient as well as feelings of guilt and concern among nursing professionals [15].

The second most stressful item during the care simulation, according to the students, was "causing physical harm to the patient." According to the International Classification for Patient Safety (ICPS), incidents are events that may cause or have caused unnecessary harm to the patient. When a professional experiences an event, particularly one involving serious harm to a patient, they may face negative consequences afterward due to stress, exposure, ethical considerations, and potential legal penalties to which they are subject [16].

The third item was "performing poorly and harming the patient." The hospital environment is complex and demands constant updating and attention, requiring professionals to adopt effective attitudes to ensure safe care. It is essential to identify the causes of incidents and implement measures to prevent or minimize errors in healthcare delivery. A study conducted with healthcare professionals involved in

unexpected situations reported emotional reactions such as shock, sadness, and anxiety, with many stating that they mentally replayed the sequence of events continuously [17].

The fourth item with the highest stress level was "sustaining a needlestick injury with a contaminated needle." Occupational accidents involving exposure to biological material are common among healthcare professionals due to the conditions under which their work is performed, and they may occur through needle punctures. Nursing students, during their undergraduate training, are exposed to this risk, and puncture wounds from needles containing infected blood are of particular concern, especially when involving the human immunodeficiency virus (HIV), which can be fatal [18]. Fear is the initial reaction, followed by distress and concern, which may lead the professional to take time off work and seek psychological support [19].

The fifth item with the highest stress level was "feeling that I cannot help the patient." One of the primary goals for students in the healthcare field is to help patients and alleviate their suffering. When faced with helplessness, feelings of unpreparedness may arise in certain situations, along with inexperience. Healthcare students are prone to experiencing pressure when confronted with a failure during care or a lack of readiness to deal with the possibility of death [20].

The authors suggest that the increase in these stress-inducing factors may be related to the students' ability to develop self-assessment and critical reflection in the learning process. Furthermore, they identify the need to acquire specific competencies that are essential to ensuring safe patient care[14]. Regarding the items that caused the least stress among students, such as "talking to the patient about their suffering," "relationships with fellow nursing students," "not knowing how to end a conversation with the patient," "becoming emotionally involved with the patient," and "the patient not showing respect," it was observed that these are linked to interpersonal relationships in dealing with patients, the healthcare team, and fellow students. SBE fosters the development of non-technical skills, such as communication, teamwork, and leadership, which are essential from the very beginning of future nurses' training [21].

One of the advantages of clinical simulation is the opportunity to learn from mistakes and to practice in a simulated environment, making simulation a valuable tool for helping students manage their emotions when entering the workforce, due to the preparation provided through realistic cases [22].

Experiencing stress does not necessarily lead to negative outcomes. Moderate stress levels can help students perform beyond their usual cognitive capacity, potentially enhancing their learning ability. When exposed to stress, the sympathetic nervous system is activated in response to the situation [22]. Even high stress levels, when appropriately incorporated into the simulation environment, do not necessarily have a negative impact [14].

Studies emphasize that repeating scenarios can be essential to reducing stress. Simulation in nursing education fosters the development of confidence during clinical practice, as it can lower stress levels. Simulations create stressful situations, and repeated exposure to these scenarios allows students to become familiar with them, thereby reducing stress [23].

Understanding their emotions and the effects on academic performance can help students identify potential challenges in professional practice, leading them to seek alternatives aimed at improving their knowledge and enhancing their professional qualifications.

Therefore, the present + study presents data on stress-inducing factors as beneficial elements in SBE within a high-fidelity Acute Coronary Syndrome scenario.

The limitation of this study was that the students had not previously experienced high-fidelity

clinical simulation, which may have contributed to their stress by exposing them to something entirely new.

This research contributes to nursing by demonstrating that the main stressors among students are related to lack of competence and emotional involvement. These findings provide valuable input for nursing educators to develop strategies that address the factors identified in this study.

Conclusion

Stress in nursing students during acute coronary syndrome simulation was assessed, and the most stressful items, according to the students, were associated with a perceived lack of competence in patient care, while the least stressful were related to interpersonal relationships.

SBE is considered a teaching methodology that can help reduce stress during patient care by prior experience, task repetition, and practice in a safe environment, allowing for greater confidence and satisfaction in real patient care.

It is expected that the results of this study may contribute to nursing education and future research by identifying the main stressors students face during patient care and by supporting the improvement of learning strategies. To develop competencies and clinical reasoning, it is essential to understand the factors and concerns that may hinder students, so that stress becomes a source of learning rather than a cause of trauma.

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Authors' Contribution

Rodrigues, MG: Conception and design of the research; Analysis and interpretation of the data; Writing of the manuscript; Critical revision of the manuscript for important intellectual content. Silveira, GM: Conception and research design; Data collection; Data analysis and interpretation; Statistical analysis; Funding acquisition. Bartolato-Major, C: Critical review of the manuscript regarding important intellectual content. Martins, MA: Critical review of the manuscript regarding important intellectual content. Martins, EAP: Critical review of the manuscript regarding important intellectual content. Moreira, ACMG: Conception and design of the research; Data acquisition; Analysis and interpretation of data; Statistical analysis; Obtaining funding; Critical review of the manuscript for important intellectual content.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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