

Use of realistic simulations for nursing education in the care of polytrauma patients in the prehospital environment



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ABSTRACT

The use of realistic simulations in the treatment of polytrauma patients aims to qualify and train students and health professionals, seeking to achieve uniformity in procedures, promote effective team interaction and improve practical skills. In this way, it is intended to prevent service failures, improve communication effectiveness, and reduce referral delays.

Keywords: Realistic simulations, Nursing education, Polytrauma, Patients.

1 INTRODUCTION

The use of realistic simulations in the treatment of polytrauma patients aims to qualify and train students and health professionals, seeking to achieve uniformity in procedures, promote effective team interaction and improve practical skills. In this way, it is intended to prevent service failures, improve communication effectiveness, and reduce referral delays (ANDRADE et al., 2022)

In this way, it provides the practice of skills in a safe and controlled environment, allowing for better learning, improvement of techniques learned in theory, since they enable the visualization of hypothetical situations that simulate reality (ANDRADE et al., 2022)

This approach brings with it significant advantages, such as providing more efficient training for the student, establishing higher standards of care for the patient, enabling a more objective evaluation, in addition to allowing the control and identification of possible errors, respecting and preserving autonomy. However, it is important to consider the associated disadvantages, such as the financial investment by the individual himself, the need for an adequate physical structure, and the requirement for continuous training of the professionals involved (BARRETO et al., 2016).

According to the National Association of Emergency Medical Technicians (NAEMT), trauma is defined as "a harmful event that results from the release of specific forms of energy or physical



barriers to the normal flow of energy." Here it is important to highlight that exposure to different types of energy – mechanical, chemical, thermal, electrical or irradiation – is due to intentional or unintentional action (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

For Nayduch (2009), trauma can be described as a transfer of energy that the body receives from the external environment, whether it is high, medium or low energy. In this sense, it can be said that in the severe trauma patient we already start losing, since the trauma has already happened, and the body is reacting according to its injuries (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

Thus, polytrauma patients should be evaluated individually, always taking into account their injuries, creating a logic of anatomy and physiology to be able to diagnose this patient as quickly as possible. Grau (2015) defines that the study of the biomechanics of trauma allows a better analysis of the injury mechanisms found in polytraumatized patients, that is, the way in which they were generated is as important as the injuries. That is, the way that traumatic event happened (AMERICAN COLLEGE OF SURGERIES, 2018).

Depending on the event in which it was occasioned, all trauma can be intentional or unintentional. In a situation of driving a vehicle by a person who has ingested a large amount of alcohol, for example, it is an intentional factor (NAYDUCH, 2009). In this sense, the study of trauma kinematics provides the professional with an amplified view for critical reasoning in relation to the mechanism that produced the injury(s), enabling more assertive decision-making (ZAVAGLIA, 2019).

Urgent and emergency care has become more complex every day due to the most diverse causes. According to Grau (2015), traffic accidents and domestic accidents are responsible for increasing the mortality of these patients.

According to the PTHLS 2020, the high global rates of polytrauma patients have a great impact on the world. Around 14 thousand people die daily as a result of traumatic injuries (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

Pessoa et al. (2026) state that in addition to professional preparation for care in trauma situations, it is necessary to restructure the health service network, which is extremely important to ensure more efficient access to specialized urgent and emergency services, especially considering that the demand for care for trauma victims often exceeds the current capacity of the health system.

Trauma is defined in three phases in which actions can be taken to minimize the consequences of traumatic injuries (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020). Thus, in polytrauma patients, time is a definitive factor for survival, and the understanding of the reading of the scene, combined with the knowledge of the phases that led the patient to that situation, makes care faster and more decisive (AMERICAN COLLEGE OF SURGERIES, 2018).



The first phase of trauma is known as Pre-Event, which deals with the reasons that can lead to the traumatic situation. This phase focuses on the prevention of the most diverse accidents, through preventive programs and actions (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

The event is the trauma itself, it is the second phase. This is the exact moment when the injuries happened. In this phase, the actions taken by PHC professionals aim to minimize the problems resulting from trauma (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

On the other hand, the post-event, the third phase of trauma, comprises the consequences of the trauma. This phase may or may not be beneficial for the patient, taking into account the principles and preferences of the severe trauma patient (AMERICAN COLLEGE OF SURGERIES, 2018).

Healthcare professionals who work in pre-hospital care should take a more aggressive approach, targeting the problems that are killing that patient as they are "playing" against the clock (AMERICAN COLLEGE OF SURGERIES, 2018). In this sense, time is crucial in determining the life of this patient. The PHTLS (2020) calls this time the "*Golden Time*", which is the decisive 10 minutes for this victim after the start of care (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

The principles and preferences of severe polytrauma patients must be very well defined by professionals in all areas of health, as they end up confusing these two terms that work together, but have different definitions (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020). In this sense, knowledge of anatomy, physiology, and pathophysiology, as well as the elements that are involved in that situation, contribute to the decision of the approach to that patient (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2022).

The principles, according to PHTLS (2020) are the conditions that are leading that patient to death, that is, if he has a facial trauma obstructing the airways, the principle of the physiology of that patient's life will be the permeability of the upper airways. Also in PHTLS 2020, the preference will be which way the professional will solve that principle. In the case cited above, it would be the definition of which material or technique will be used to clear this airway (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

The **principle** is a basic or scientific or evidence-based foundation for the improvement of the patient's time or survival. **Preference**, on the other hand, refers to the way in which the PHC practitioner achieves the principle, and depends on several factors, such as the existing situation, the patient's condition, the PHC practitioner's knowledge base, skills and experiences, local protocols, and available equipment (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).



Also, according to the ATLS 2020, first responders must keep the patient stabilized with the techniques and equipment available at that time, through a primary patient assessment approach, as described by Rasslan (2016), the primary assessment must be rapid and systematized to define the priority of treatment of this patient (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

1.1 PRIMARY EVALUATION OF POLYTRAUMA IN THE PREHOSPITAL SETTING

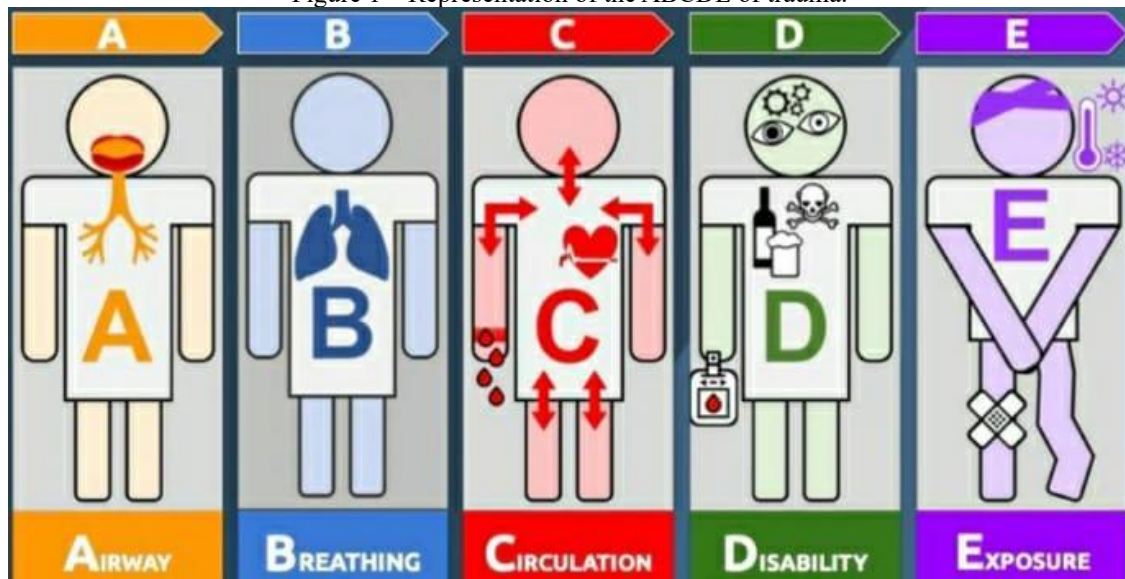
When treating a polytrauma patient, the rescuer should initiate an assessment to "understand" what is happening to that patient. This approach is called primary assessment (ATLS 2018). There are several protocols for the initial assessment of the trauma patient. However, according to Rasslan (2016), the most efficient and up-to-date protocol is the TLS (Trauma Life Support [PHTLS, ITLS, ATLS]) program, applied by the National Association of Emergency Medical Technicians (NAEMT) in cooperation with the American College of Surgeons (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

In PHC and trauma, the most used protocol is the PHTLS, which brings a systematization of assessment focused on principles and preferences, forcing the professional to develop critical thinking and more assertive decision-making in the face of emergencies (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

The primary assessment following the mnemonic ABCDE (Figure 1), which indicates the sequence in which the rescuer should begin the assessment of the victim, advocates an approach in which one should first prioritize what is threatening the victim's life before proceeding with the assessment (RASSLAN, 2016). In this method of assessment, the team can simultaneously treat the death threats of the critically ill patient, focusing on the principles of life. In other words, the assessment begins with the disease that will take the victim's life the fastest to the one that threatens them the least (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).



Figure 1 – Representation of the ABCDE of trauma.



Fonte: Sanarmed (2022).

The evaluation starts with the letter A, which stands for airways along with cervical spine control, principles that threaten the patient's life and can lead to death in a short time (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020). In this logic, if the patient is verbalizing, it indicates that he or she does not have airway involvement, but this does not exempt the professional from evaluating and looking for problems (AMERICAN COLLEGE OF SURGERIES, 2018).

Next, the letter B is used, which corresponds to *breathing*. According to PHTLS 2020, at this stage the entire thoracic inspection should be performed, using propaedeutic methods (inspection, palpation, auscultation, and percussion) (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020). For Grau (2015), ensuring a good assessment of the airways and breathing are crucial to demand the victim's time.

The PHTLS 2020 focuses on the fact that the rescuer, after evaluating the letters A and B, already has a sense of the problems that threaten the patient's life. That is, the principle of life, because if the air is "passing through", but the breathing pattern is irregular, it is known that the problem is in the respiratory part of the patient (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

The next item to be evaluated is the circulation represented by the letter C (*circulation*), a point of the evaluation where the patient's volume condition is analyzed (AMERICAN COLLEGE OF SURGIONS COMMITTEE ON TRAUMA, 2018). Some items should be checked, such as skin condition, pulses, internal or external bleeding (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).



According to ATLS 2018, the last evaluative item that threatens the patient's life is neurological dysfunction, defined as letter D (**disability**) (AMERICAN COLLEGE OF SURGIONS COMMITTEE ON TRAUMA, 2018). The PHTLS 2020 recommendation at this stage of the assessment is that, in addition to using the Glasgow Coma Scale, other tests should be used to verify the victim's level of consciousness. Once the patient verbalizes, he is not necessarily lucid and patient oriented (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

The last evaluation corresponds to the letter E (*environment*), in which the search for other injuries and fractures of minor importance will be made, in addition to the control of hypothermia (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

In its last update, PHTL 2020, brought the letter "X" in front of the mnemonic ABCDE, which became XABCDE. The "X" (**andxbloody**) represents severe hemorrhages, which will lead to the victim's death in a short time (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

In the end, the primary assessment aims to reconcile all the problems of a polytrauma patient, thus increasing the chance of survival through a simple and interactive system using critical thinking and data analysis (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020).

1.2 THE USE OF SIMULATION IN NURSING CARE FOR POLYTRAUMA PATIENTS

Simulation is a form of assessment, where the skills of academics can be tested and corrected through feedback after each simulation. In this way, the teaching process does not end when classes are taught (FREIRE, 2016). Health education is not just a dumping of information to the academic, but a way of promoting health through the process of educating (NALOM et al., 2019).

From this perspective, PHC professionals must have, in addition to theoretical knowledge, practical skills and experience, where simulated training is one of the most used tools (NATIONAL ASSOCIATION OF EMERGENCY MEDICAL TECHNICIANS, 2020). Negri et al. (2017) believe that the practical simulation should be present in the educational curriculum, not as an option, but in the teaching plan interspersed with the theory, thus stimulating the critical reasoning of academics.

Thus, the teacher has a fundamental role in the teaching and learning process. Thus, the student is the constructor of his own knowledge, and the teacher acts as an intermediary in the process (FREIRE, 2016).

Andrade et al. (2022) reiterate the importance of performing realistic simulations in nursing education, as the methodology brings students closer and prepares them to cope with reality, especially in emergency situations, such as in the care provided to polytrauma patients, in which professionals must be prepared to meet the most varied situations that arise.



In this sense, the use of simulation for nursing students through an interactive methodology makes learning better absorbed. Clinical or emergency simulations carried out in skills laboratories within educational institutions propose to reduce risks in student-patient interaction, using systematized training in simulated environments. Thus, aiming to improve the quality of care in health services (ASSOCIAÇÃO BRASILEIRA DE EDUCAÇÃO MÉDICA (ABEM), 2021).

Realistic simulation in the care of polytrauma patients provides nursing students with learning in a playful and dynamic way, a practical experience based on evidence using devices such as scenic makeup, for example, which allows the reproduction of lesions, signs and pathological symptoms, in a safe environment, training the appropriate conducts. In this scenario, it is possible to develop critical perception and promote engagement, teamwork interaction, while also privileging quality and patient safety (ANDRADE et al., 2022).

Thus, the significant challenge of providing quality education in courses in the major area of health and nursing emerges, which can become even more complex when relying exclusively on traditional methodologies. In these circumstances, there are no clear guarantees that learning is taking place, especially when it comes to understanding multiple concepts and experiencing diverse experiences. The adoption of the simulation strategy offers the unique opportunity to practice skills in a safe environment, allowing for continuous improvement of competencies through repeated exposure over time (SILVA; SANTOS AND PEREIRA, 2018).

The National Council of Education (CNE) of Brazil established in 1997, through its Opinion No. 776/97, that:

Undergraduate courses need to be led, through the Curricular Guidelines, to abandon the characteristics that they often have, which are to act as mere instruments for the transmission of knowledge and information, starting to orient themselves to offer a solid basic education, preparing the future graduate to face the challenges of the rapid transformations of society. of the labor market and the conditions of professional practice (BRASIL, Opinion 776, 1997 p.2)

The guidelines for university education, both national and international, point to the need for paradigmatic changes in the teaching, learning and assessment process. These changes aim to transition from training focused on passive transmission of knowledge and memorisation to a model based on competency-based training. In this context, the formation of competencies assumes a singular importance in health education, as it stimulates the development of psychosocial, cognitive and metacognitive skills. These skills are understood as the ability to evaluate and generate information, make decisions, and solve problems (DANIEL; WHAEAD; WINDLE, 2013).

The teaching and learning process must be expressive for professionals, thus, a daily understanding of the topics addressed through simulations increases patient safety, since professionals are safer in providing care. Thus, by improving their reasoning, students feel prepared for the job market (ABEM, 2021).



Practical simulations are a form of active methodology, where the scenarios created by the teacher force students to repeat the process until the proposed objective is achieved (ROSA, 2019). According to Gomes and Germano (2007), this methodology makes the student more prepared for emotional stress, thus reducing errors in procedures.

Nursing has advanced in the implementation of new teaching technologies, and realistic simulation is an approach that has been gaining a prominent position and recognition. This is because quality and safety in care are characteristics that are much discussed in nursing (SILVA; SANTOS AND PEREIRA, 2018).

In view of this scenario, strategies aimed at minimizing care errors are designed and applied to the team with the objective of improving nursing care practices. The labor market demands more and more trained professionals with better qualifications who are able to work safely, and skills to promote the well-being of the population served (VALADARES; SKINNY, 2014).

From these perspectives, realistic simulation should be incorporated into teaching strategies during the nursing education process, becoming a concrete practice. This method enables the recognition and modification of work processes, contributing significantly to the transformation of various realities in the field of health.

2 FINAL THOUGHTS

The use of realistic simulations in nursing education for the care of polytrauma patients in the pre-hospital environment is an innovative and highly effective pedagogical strategy, as it offers students the opportunity to apply their theoretical knowledge in simulated scenarios when replicating real-life situations. In this way, simulations allow for the development of essential skills, such as rapid assessment, decision-making, effective communication, and teamwork.

The controlled nature of these learning environments allows for continuous repetition and practice, contributing to the enhancement of students' skills. By integrating technology into these practices, enabling the use of advanced manikins, virtual reality simulation, or other interactive tools, these technologies can provide a realistic representation of clinical situations, including physiological responses of the simulated patients.

The previous exposure to challenging scenarios provided by realistic simulations contributes to a better performance of students in real situations of care for polytrauma patients. They also provide an opportunity for teachers to update students on the latest protocols, evidence-based practices, and changes in prehospital care guidelines.

However, the use of realistic simulations prepares nursing students to ensure that they are ready to face the complex challenges in clinical practice, especially with regard to the care of polytrauma



patients in the prehospital environment. However, they require engagement on the part of the faculty to ensure effective implementation and ensuring soundness in the teaching-learning process.

Finally, it was evidenced that trauma is a major public health problem, in addition to being a preventable problem. To this end, it is necessary to invest in prevention, highlighting the need for educational actions that involve the population. In addition, it is essential to promote the continuous training and continuing education of health professionals, as well as to implement or improve public policies in emergency areas aimed at the prevention of secondary injuries and efficient treatment of non-preventable injuries.



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