

Improving medical education: an experience report on academic mentoring in prehospital emergencies using realistic simulations as an educational tool

Mejorando la formación médica: un relato de experiencia sobre la tutoría académica en emergencias prehospitalarias utilizando simulaciones realistas como herramienta educativa

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Abstract: Medical education based on realistic simulations has been a widely used teaching strategy for the development of technical and non-technical skills in the training of medical professionals. In this way, simulations associated with the exercise of academic tutoring have the potential to improve the self-confidence and learning of the future professional. **Objective :** To provide evidence of an experience report on medical learning provided by the experience of students in the role of tutors in the pre-hospital emergency subject. **Report :** Between April and July 2023, in the role of tutors in a basic life support curricular subject, medical students were offered the possibility of acting as tutors and developing simulated activities involving cardiorespiratory arrest scenarios and initial care for polytraumatized patients. It was observed that the interaction between tutors and students contributed to the recognition of the importance of learning soft skills (*soft skills*). **Results :** Based on current research on the positive outcomes of simulation-based medical education, it is perceived that tutoring in emergency disciplines is a useful resource for improving non-technical skills, such as leadership, communication and teamwork, in the context of medical training. **Conclusion :** Academic tutoring is a suitable tool for medical students' learning and has proven to be effective for training in medical emergency situations.

Keywords: Teaching; Prehospital care; Simulation training; Academic mentoring; Medical training;

Resumen: La educación médica basada en simulaciones realistas ha sido una estrategia de enseñanza ampliamente utilizada para el desarrollo de competencias técnicas y no-técnicas en la formación de profesionales médicos. De esta manera, las simulaciones asociadas con el ejercicio de la tutoría académica tienen el potencial de mejorar la autoconfianza y el aprendizaje del futuro profesional. **Objetivo:** Evidenciar un relato de experiencia sobre el aprendizaje médico proporcionado por la experiencia de los estudiantes en el rol de tutores en la asignatura de emergencias prehospitalarias. **Relato:** Entre abril y julio de 2023, en el rol de tutores en una asignatura curricular de soporte básico de vida, se ofreció a los estudiantes de medicina la posibilidad de actuar como tutores y desarrollar actividades simuladas que involucraban escenarios de paro cardiorrespiratorio y atención inicial al politraumatizado. Se observó que la interacción

entre tutores y estudiantes contribuyó al reconocimiento de la importancia del aprendizaje de habilidades blandas (*soft skills*). **Resultados:** De acuerdo con las investigaciones actuales sobre los resultados positivos de la educación médica basada en simulaciones realistas, se percibe que el ejercicio de la tutoría en disciplinas de emergencia es un recurso útil para el perfeccionamiento de competencias no-técnicas, como liderazgo, comunicación y trabajo en equipo, en el contexto de la formación médica. **Conclusión:** Las tutorías académicas son herramientas propicias para el aprendizaje de los estudiantes de medicina y resultaron ser eficaces para el entrenamiento en situaciones de emergencias médicas.

Palabras clave: Enseñanza; Atención Prehospitalaria; Entrenamiento por simulación; Tutoría académica; Formación médica

1. Introduction

It is of utmost importance that health professionals develop, during their career, skills to handle emergency situations, including training for pre-hospital care (1-2). However, this ideal scenario contrasts with the reality experienced by recently graduated professionals, who feel poorly prepared to handle the care of patients in life-threatening situations (3), especially because such situations require non-technical skills from professionals to deal with adverse situations. From this perspective, for some time now, simulation-based medical education has been promoted by contemporary educational institutions as a strategy to train qualified professionals to handle pre-hospital and hospital emergencies (1, 4-5). For example, research was conducted with a military medical team to evaluate how realistic simulations, with recreated injuries and wounds, positively influence the improvement of technical and non-technical skills (6).

In the medical field, training with realistic simulations in the medical emergency disciplines can help students acquire knowledge and self-confidence (7). In this sense, it is notable that most medical students prefer to train with simulated patients (SP) instead of mannequins (3), since this strategy contributes to academic performance and the development of social skills (*soft skills*), such as communication, leadership and teamwork (2-3).

Given the above, it is clear that simulation-based education, being very similar to the reality of healthcare, provides a space for safe learning (8). In addition, another favorable aspect concerns the costs involved, since the expenses related to realistic simulations, with the preparation of the scenes and the training of the PS, are lower compared to the acquisition and maintenance of mannequins (3).

From this perspective, the objective of this experience report is to describe an active teaching methodology in the format of academic tutoring based on simulated patients, in order to improve the learning of pre-hospital emergencies of students in the medical career and the positive experience with teaching lived by tutors.

2. Methods

The teaching strategy presented in this experience report is implemented through monitors, who are students enrolled in the Faculty of Medicine who previously took pre-hospital emergencies and were approved in the selection process to opt for academic follow-up. In the selection process, the monitors took a theoretical test, with questions about pre-hospital emergencies, including the resolution of clinical cases. Thus, during the period from April to July 2023, after approval, the monitors had the task of contributing with the teacher responsible for teaching the Skills and Communication Laboratory II (LHC II) subject, among whose topics taught was the initial care of the poly-trauma victim in the pre-hospital environment.

The role of the instructors was to meet with the students enrolled in the course in weekly meetings, lasting an average of one hour, on alternate days of the week, so that all students enrolled in the course had the opportunity to participate. The meetings took place in the skills and

simulations laboratory, which had basic objects and equipment for training in prehospital care, such as mannequins for cardiopulmonary resuscitation (CPR) simulation, gloves, resuscitation bags, oxygen cylinders, among others. Thus, the instructors met with the students to resolve possible doubts and, mainly, to contribute to the practical requirements of the discipline, developing hypothetical clinical cases and suggesting that the students freely practice what prehospital care would be like in each case.

During the meetings, the instructors were in charge of creating simulated clinical scenarios and cases based on their creativity and previously acquired theoretical knowledge, and helping the students solve these clinical cases. To create and provide practical solutions to the recreated cases, the instructors relied on study materials previously offered by the subject teacher, such as guides and manuals for pre-hospital emergency care. In this sense, the instructors reviewed the topics weekly according to the instructions of the subject coordinator, with the aim of staying up to date and prepared for the activities.

Students enrolled in the LHC II discipline had weekly theoretical and practical classes taught by the professor, and, also weekly, academic follow-up was carried out after the classes. Therefore, the theoretical and practical contents were previously taught to the students by the professor in charge of the subject with the entire class, at pre-established times, so that the follow-up sessions were carried out with the objective of complementing specific skills through simulated training.

In addition to organizing weekly meetings with the students, the instructors were responsible for monitoring and assisting in the practical classes given by the teacher, contributing to the organization of the environment and clarifying the students' doubts.

At the end of the theoretical and practical content, students completed a practical evaluation, individually or in a team, in which they had to demonstrate their technical and non-technical skills for pre-hospital emergency care. The students being tested were organized into care teams, with one member acting as leader and the other three assisting the simulated victim. In these evaluations, the monitors played the role of victims or witnesses, in order to make the experience more realistic.

The simulations used some distracting elements, such as loud music, environmental obstacles, makeup and artificial blood, as well as personal protective equipment and appropriate material for first aid to the victim, such as an oxygen cylinder, flexible splints, cervical collars, among other first aid items.

The grading was done through an OSCE (Objective Structured Clinical Examination) type instrument that followed the care algorithm based on the protocols of international societies, as appropriate.

3. Results

The simulated cases in follow-up meetings and practical evaluations were previously detailed and tested between the monitors and the LHC II teacher, covering the most frequent situations in the care of polytraumatized patients, such as asphyxia, reduced level of consciousness, amputations (figure 1), fractures and gunshot wounds (figure 2). All simulations were developed within the practical classes laboratory, however, in a fictitious manner, the simulated cases were described as if they occurred in different environments, such as bars, churches, bathrooms, among others.



Figure 1. Simulations of polytrauma patients.



Figure 2. Simulations of gunshot wounds.

The makeup was performed by a laboratory technician, a nurse with teaching and care experience (Figure 3). Regarding clothing, the monitors in charge of simulating the polytrauma victims were instructed to wear clothing that facilitated access to the wounds, such as shorts and sleeveless shirts, so that the students had easy exposure and access to the simulated victim. Thus, the responsibility of the monitors, when simulating the role of victim and spectators, required seriousness and knowledge about the clinical case, especially with regard to the care protocols and skills necessary to solve the case.

As a result of this evaluation, it was observed that the vast majority of students, who were also frequent in the follow-up offered prior to the practical test, obtained good grades, demonstrating that the teaching strategy based on training with realistic simulations had been successful for the individual and collective training and development of skills for prehospital care in medical emergencies.

It was possible to analyse how carefully and confidently the students behaved in the practical test scenarios, observing possible risks and dangers for the fictitious clinical case, such as the presence of sharp or flammable objects, for example, given that they had the opportunity to simulate other similar clinical cases in pre-test monitoring.



Figure 3. Details of the makeup performed.

From this perspective, given that the simulated victims were the monitors themselves, who had accompanied the students throughout the course, in practical classes and in follow-up meetings, it was evident that the students felt safe to carry out the service, since at other opportune moments they had similar simulations.

The experience of the monitors in living the educational strategy of academic monitoring with realistic simulations was presented as a complement to medical training, allowing them to acquire learning in the field of teaching, in addition to contributing to the improvement of medical practice in emergency care situations. Therefore, there is no doubt that academic monitoring brings benefits to both those who are monitored and those who provide the monitoring service.

In this way, the experience provided a double benefit: for the students, an improvement in technical and non-technical skills was observed throughout the semester, since the repetition of the procedures during the tutoring sessions created a safe environment for learning. For the tutors, the experience was valuable, since they not only learned the specific content of the discipline, such as initial care in pre-hospital emergencies, but they also acquired the necessary knowledge to teach that content to other professionals.

The application of this methodology in different contexts and student populations is expected to increase medical training, both in relation to technical and non-technical skills, especially in high-pressure environments. Furthermore, the adoption of academic tutoring with this design can enhance the teaching of other clinical disciplines in the medical degree.

4. Discussion

Academic tutoring is understood to be an educational tool that can contribute to individualized teaching. It is observed that educational models in medical training lack sufficient practice in training students, especially in the field of emergencies, a scenario in which rapid interventions are required (7). Due to this high-pressure environment, it is reasonable to assume that students do not have opportunities to train or actively participate in the care of seriously ill patients during training, which contributes to the lack of preparation in the healthcare field (9). Therefore, reformulating teaching is vital to improve effectiveness and meet the rigorous principles required in the medical community, to which simulation-based medical education can contribute (4, 10). Supported by the literature, simulation-based medical education can offer a valuable approach to acquiring clinical skills, self-confidence and management in the face of unexpected emergency situations (3, 7, 9-10). Therefore, the use of tutors as simulated patients can be an alternative for

teaching, since the ability to act works as an element of modulation of realism close to the intended learning objectives (8, 10).

Furthermore, simulated emergency scenarios are capable of producing in students a level of stress comparable to the levels that physicians exhibit in real-life situations (3, 11). This can be evidenced by the analysis of Sterz et al., given that the majority of students in the study considered the simulated patients to be more faithful than the mannequins, in line with the international literature confirming that this practice is similar to real relationships between physicians and patients (3). Stress induced during training can be beneficial for students, as it develops non-technical skills or social skills, which are fundamental for the applied clinical environment (2), as well as fostering the development of responsibility and therapeutic resilience (10). Similarly, when tutors take on the role of SP, there is also the possibility of developing social skills by contiguity.

Another benefit of using simulated patients is the respect for the costs involved, which are substantially lower than those of mannequins. I studied with medical students at a university in Germany, comparing the costs of simulated patients and mannequins in one semester, in a course involving three simulated stations, chest pain, dyspnea and decreased level of consciousness. It is reiterated that this course is offered five times per semester. For both, the expenses for the simulated patient will amount to 4,050 Euros, while those for the mannequins will cost 5,200 Euros (3).

The self-confidence of academics, whether tutors or students, in carrying out practical and protocolized procedures is one of the several non-technical skills that can be improved through simulated training proposed by simulation-based medical education (3, 6, 7, 9-10, 14). Thus, another important aspect of the use of simulation is the increase in empathy, since through this the medical student can have a greater understanding and awareness of patients and their clinical conditions, in addition to facilitating greater participation of the patient in decision-making (15).

The benefit for tutors is highlighted, as they had the opportunity to deepen their knowledge of emergencies and urgencies, given that they had the opportunity to help and resolve the doubts of other students. In addition, they were able to develop a bond with the teacher in charge of the subject and, finally, exchange experiences and knowledge with the students they assisted.

5. Conclusions

- Through this teaching tool based on academic monitoring, it was observed that both students and monitors obtained satisfactory learning results, as they improved technical and non-technical skills.
- It is noteworthy that the teaching strategy also allowed the monitors to consolidate knowledge, by having experience in teaching, as well as adequate communication skills to express themselves objectively, enabling simulation in the role of patient and victim.
- In this way, the simulated clinical cases in the weekly follow-up meetings favored the consolidation of theoretical learning and soft skills.
- Practical simulations, in the format of academic monitoring, are favorable strategies for teaching pre-hospital emergency care, and can provide solid learning to medical students who play the role of monitors, in addition to positively impacting the training of future doctors.

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