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ORIGINAL

Evidence of the usefulness of clinical simulation in building the professional competencies of medical students

Evidencia de la utilidad de la simulación clínica en la construcción de las competencias profesionales de los estudiantes de medicina

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ABSTRACT

Clinical simulation is a key tool for balancing the development of medical skills and patient safety. Following reports from the institute of medicine highlighting the need to prevent medical errors In the United States, an initiative that extended to global healthcare, simulation was implemented as a tool in medical training to bridge the theory - practice gap. The UAI reaffirmed this commitment to clinical simulation training, despite challenges in its implementation, to strengthen education and ensure the competence of future healthcare professionals. The aim of this study is to obtain feedback from UAI students who have received clinical simulation classes.

Keywords: Continuing Medical Education; Undergraduate Medicine; Simulation; Translational Study; Formative Assessment.

RESUMEN

La simulación clínica es una herramienta clave para equilibrar el desarrollo de habilidades médicas y la seguridad del paciente. Tras los informes del Institute of Medicine que destacaron la necesidad de prevenir errores médicos en Estados Unidos, iniciativa que se extendió por el área de la salud mundial, implementando la simulación como herramienta en la formación médica para cerrar la brecha teoría - práctica. La UAI reafirmo este compromiso formativo de la simulación clínica, a pesar de desafíos en su implementación, para fortalecer la formación y garantizar la competencia de los futuros profesionales de la salud. El objetivo de este estudio es obtener retroalimentación de los alumnos de la UAI que han recibido clases de simulación clínica.

Palabras clave: Educación Médica Continuada; Medicina Pregrado; Simulación; Estudio Traslacional; Evaluación Formativa.

INTRODUCTION

Background of clinical simulation

In 1999, the Institute of Medicine (IOM) published its first report entitled “To Err is Human: Building a Safer Health System,” concluding that billions of Americans die each year from medical errors associated with care, hundreds of thousands suffer or barely escape with non-fatal injuries, which could be prevented in a high-quality health system.[1,2,3,4]

Since that 1999 report explicitly promoted the prevention of medical errors through a high-quality healthcare system, the 2001 IOM report, "Crossing the Quality Chasm: A New Health System for the 21st Century," established six goals for a high-quality healthcare system. To be met, these goals had to promote a change in medical education based on low-, medium-, and high-fidelity clinical simulation to alert future physicians early on to errors during the acquisition of the skills necessary for medical practice that meets these established goals.[1,3,5,6]

Clinical simulation, feedback, ethics, and patient-centered care

Medical simulation addresses the need to balance skill development with patient safety, mitigating ethical tension by promoting learning without unnecessary risk to the patient.[2,4,7] The integration of simulation into medical education has been highlighted as an effective strategy for closing the gap between theory and clinical practice, demonstrating improvements in students' knowledge, skills, and performance, and even a change in patient perception.[8,9,10]

Although challenges remain, such as curriculum integration and documentation of effectiveness, research has demonstrated the benefits of simulation in teaching key medical competencies.[7,11,12] Effective analyses reveal the importance of simulation technology and its ability to improve teaching and competency assessment.[8,13] In addition, studies have demonstrated the effectiveness of simulation in teaching basic science, clinical knowledge, and procedural skills, as well as its usefulness in evaluating learners.[14,15,16]

The formative assessment approach offers a valuable tool for fostering reflection and deep learning in simulation contexts and indirect patient interactions.[16,17] Despite the challenges, the drive toward patient safety and the expansion of simulation in medical education reinforces the ethical commitment to prioritizing patient well-being.[18,19] Evidence-based medical simulation represents a vital tool for strengthening medical education and ensuring the competence and safety of future health professionals.[12,20] The study is motivated to identify possible areas for improvement in the learning of medical skills in clinical simulation within the UAI, enhancing it through the acquisition of feedback from students trained at the institution.

METHOD

This is a descriptive cross-sectional study. We selected UAI students who had completed the rotating internship by March 24, 2024, and used the following inclusion and exclusion criteria.

Inclusion criteria

- Final-year medical students at the UAI.
- Participants have experienced at least one clinical simulation session during their training.
- Informed consent to participate in the study.
- Ability to complete questionnaires and participate in interviews.
- Volunteers who have not been previously exposed to similar research on clinical simulation.

Exclusion Criteria

- Students from other academic years who are not in their final year of medicine at the UAI.
- Participants who have not experienced any clinical simulation sessions.
- Inability to provide informed consent.
- Participants with mental health issues that may affect their ability to participate.
- Those who have participated in similar research on clinical simulation in the past year.

The study environment will be exclusively university-based, and we will collect data through surveys. The surveys were developed according to the 12 sections outlined by McGaghie in 2010: A critical review of simulation-based medical education research.[7] The survey questions have five predetermined answers from A to E. Depending on the question, these answers are evaluated from excellent to very poor.

RESULTS

The total survey sample is 57 students who have participated at least once in the UAI simulators. The gender distribution is 33 % male and 67 % female, as shown in figure 1. Fifty-seven percent of respondents had previous experience in a health center outside the UAI, compared to 47 % who had not yet gained any experience in a hospital or health center outside the UAI's activities. We ensured that 100 % of students had participated in the simulator at least once.

McGaghie's 12 sections

All responses are shown in figure 2.

- Question 1: 49 % of respondents believe the experience was positive and the helpful feedback, but

it could have been more detailed.

- Question 2: 53 % of respondents think that the practice was adequate.
- Question 3: 51 % think there is a need to improve curriculum integration.
- Question 4: 51 % think there is a need to improve how results are measured.
- Question 5: 54 % think that the simulations are adequate and realistic.
- Question 6: 75 % think simulation is effective for acquiring and maintaining skills.
- Question 7: 61 % think they need more time to master the skills.
- Question 8: 63 % think transferring their skills to clinical practice is acceptable but could be improved.
- Question 9: 47 % think that team training was ineffective and uncollaborative.
- Question 10: 79 % think that the assessments accurately represent their skills.
- Question 11: 67 % think instructor training is acceptable but could be improved.
- Question 12: 60 % think the educational context is adequate but could be improved.

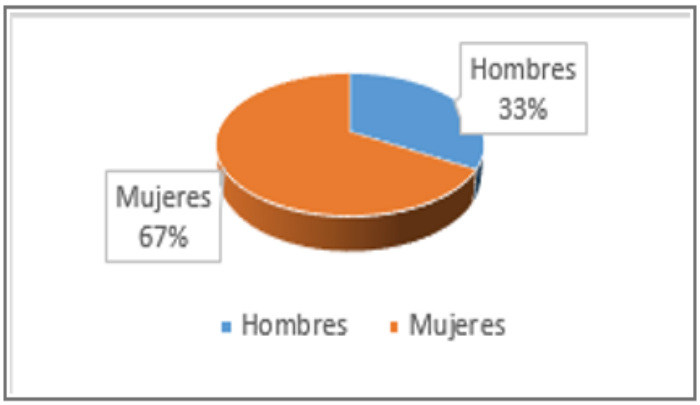

Figure 1. Gender distribution

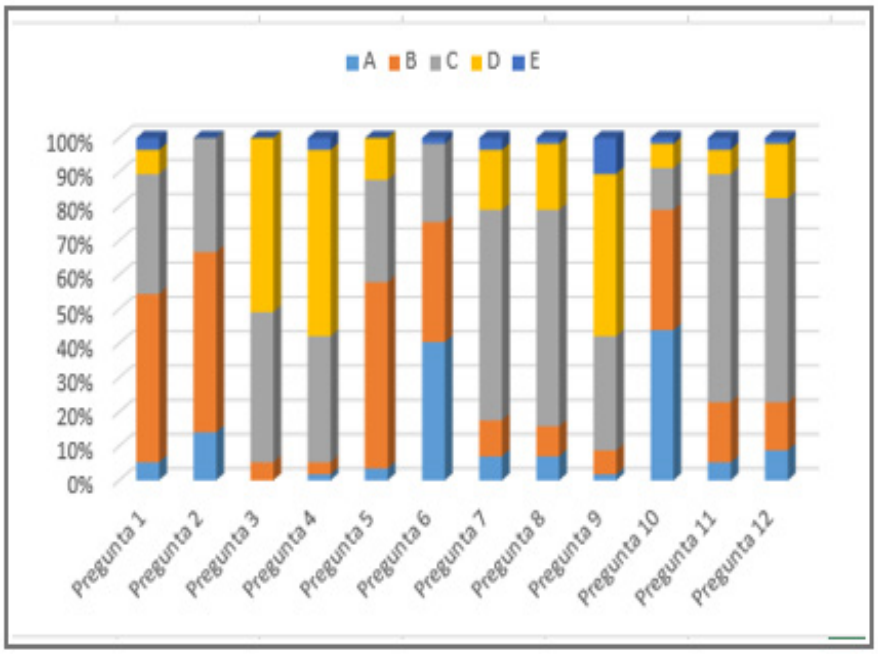

Figure 2. Survey responses

DISCUSSION

Strengths identified in clinical simulation applied at the UAI

A large majority (75 %) of participants perceive simulation as effective for acquiring and maintaining clinical skills, supporting its implementation as a teaching strategy.[3,21] A considerable percentage (54 %) consider the simulation scenarios appropriate and realistic, suggesting a satisfactory approximation to the authentic clinical environment.[19] The evaluations reflect the participants' skills, as 79 % of the results indicated.

Areas for improvement:

There is a perceived need to optimize the integration of simulation activities into the curriculum, as 51 % of participants indicated. A significant percentage (51 %) believe that the methods for evaluating and measuring the results obtained in the simulation should be improved. Sixty-one percent of respondents say they need more exposure time to achieve adequate mastery of the skills, which could involve revising the duration or intensity of the simulation sessions. Although the transfer of skills to actual clinical practice is rated as acceptable by 63 %, there is room for improvement in this area. Team training and collaboration during simulated scenarios were perceived as ineffective by 47 % of participants, representing a priority area for improvement.[22,23] Instructor training and the overall educational context were rated as acceptable but improvable by 67 % and 60 % of respondents, respectively.[24,25]

CONCLUSIONS

The findings suggest that although clinical simulation is valued as practical and realistic, there are opportunities for improvement in areas such as curriculum integration, assessment methods, exposure time, skill transfer to real clinical practice, teamwork training, and instructor training. Addressing these areas further enhances the benefits of simulation in training healthcare professionals.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTION

Conceptualization: Darcy Walter Palacios Baldoceda.
Writing – original draft: Darcy Walter Palacios Baldoceda.
Writing – review and editing: Darcy Walter Palacios Baldoceda.