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Perception of medical students on the use of clinical simulators in their practical training

Percepción de los estudiantes de medicina sobre el uso de simuladores clínicos en su formación práctica

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Abstract

Clinical simulation has been consolidated as an innovative strategy in medical education, as it allows the acquisition of skills in safe and controlled environments before direct contact with real patients. The objective of this study was to analyze students' perceptions of the use of clinical simulators and their impact on confidence during the performance of procedures. A cross-sectional, descriptive, and observational study was conducted with 146 students from the Faculty of Medicine of Tampico "Dr. Alberto Romo Caballero", selected through stratified non-probabilistic intentional sampling. A structured questionnaire with a Likert scale (1–5) was used, adapted and validated ($\alpha = 0.92$). Statistical analysis was performed using SPSS v25, applying descriptive statistics, Pearson correlation, and multiple linear regression. The results showed an overall positive perception (mean > 4.16), highlighting that clinical simulators promote theoretical-practical integration and the development of clinical reasoning. A significant association was identified between the dimensions of realism, usefulness, clinical reasoning, and curricular integration with clinical confidence ($p < 0.05$). The regression model was significant ($p < 0.001$) and explained 79% of the variance, with the main predictors being post-practice confidence ($B = 0.69$) and theory–practice integration ($B = 0.38$). In conclusion, clinical simulation represents a highly effective educational tool that strengthens confidence, improves decision-making, and contributes to safer and more competent medical training.

Palabras clave: clinical simulation; medical education; clinical confidence; clinical reasoning; experiential learning

Resumen

La simulación clínica se ha consolidado como una estrategia innovadora en la educación médica, al permitir la adquisición de habilidades en entornos seguros y controlados antes del contacto con pacientes reales. El objetivo del presente estudio fue analizar la percepción de los estudiantes sobre el uso de simuladores clínicos y su impacto en la confianza durante la realización de procedimientos. Se llevó a cabo un estudio transversal, descriptivo y observacional en 146 estudiantes de la Facultad de Medicina de Tampico "Dr. Alberto Romo Caballero", seleccionados mediante muestreo no probabilístico intencional estratificado. Se utilizó un cuestionario estructurado con escala tipo Likert (1–5), adaptado y validado (α=0.92). El análisis estadístico se realizó con SPSS v25, empleando estadística descriptiva, correlación de Pearson y regresión lineal múltiple. Los resultados evidenciaron una percepción global positiva (media >4.16), destacando que los simuladores clínicos favorecen la integración teórico-práctica y el desarrollo del razonamiento clínico. Se identificó una asociación significativa entre las dimensiones de realismo, utilidad, razonamiento clínico e integración curricular con la confianza clínica ($p<0.05$). El modelo de regresión fue significativo ($p<0.001$) y explicó el 79% de la varianza, siendo los principales predictores la seguridad post-práctica ($B=0.69$) y la integración teoría-práctica ($B=0.38$). En conclusión, la simulación clínica representa una herramienta educativa altamente efectiva que fortalece la confianza, mejora la toma de decisiones y contribuye a una formación médica más segura y competente.

Keywords: simulación clínica; educación médica; confianza clínica; razonamiento clínico; aprendizaje experiencial

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INTRODUCTION

Technological advancements have enhanced practical training in healthcare by creating controlled and safe environments, enabling students to acquire knowledge before direct patient contact. These include the use of high-fidelity physical simulators and virtual/augmented reality tools, which facilitate experiential learning, reduce risks, and contribute to improving safety, confidence, and care quality. Key evaluation methods highlight the importance of perceived effectiveness, utility, clinical reasoning, and curricular integration as determining factors for clinical confidence. Analyzing students' perceptions is a crucial factor in optimizing educational programs and strengthening the formation of future vocation-driven medical professionals.

OBJECTIVE

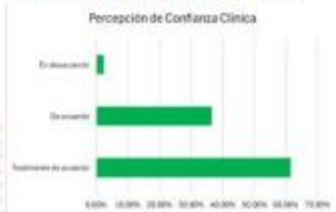
General Objective: To analyze students' perceptions of using clinical simulators and their impact on confidence during clinical procedures.
Specific Objectives: 1) To determine the curricular integration of clinical simulators in the medical curriculum and its association with the perceived confidence of students. 2)To assess the impact of the perception of improvement in clinical reasoning on confidence in performing procedures.

METHODOLOGY

Design: Cross-sectional, descriptive, and observational study conducted at the Faculty of Medicine of Tampico "Dr. Alberto Romo Caballero" with students having practical experience in clinical simulators.
Instrument: Structured Likert-type questionnaire adapted from the "Perception of undergraduate medical students of simulation workshops" (Villagrán et al., 2018).
Sample: 146 students selected through non-probabilistic intentional stratified sampling.
Data Collection: September–October 2025.
Analysis: Data processed with SPSS v25, using descriptive statistics, Pearson correlation, and multiple linear regression to identify the impact of perceptions (effectiveness, utility, clinical reasoning, and curricular integration) on clinical confidence. Significance level set at $p < 0.05$.

RESULTS

The instrument was validated on 14 items with 146 students, and the Cronbach's alpha result was 0.92, showing consistency and reliability.The students' perception was positive, with an average score above 4.16. Notable results (Figure 1) included:"Workshops should be a mandatory component" (Mean = 4.82, SD = 0.45)."Simulation prepares better than exclusive clinical experience" (Mean = 4.73, SD = 0.45).



The measurement of the Pearson correlation scale concludes that the dimensions of Realism, Utility, Clinical Reasoning, and Theoretical-Practical Integration are statistically related ($p < 0.05$) to clinical confidence.The multiple linear regression model (Figure 2) was significant ($p < .001$) and explained 79% of the variance (adjusted $R^2 = .79$). The factors that best predict the increase in confidence are "Feeling more secure" (B = 0.69) and "Integrating theory and practice" (B = 0.38).

CONCLUSIONS

The results of the students' perception of the use of clinical simulators confirm that they are an effective educational tool for theoretical-practical integration. The linear regression model showed that post-practice confidence and theoretical-practical integration are the main factors that increase confidence and improve decision-making in medical students.

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