Improving PACU Emergency Response Using AI Enhanced Simulation

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INTRODUCTION

Post-anesthesia care unit (PACU) patients face a high risk of rapid postoperative deterioration, requiring prompt recognition and intervention to prevent adverse outcomes. Despite established protocols, factors such as subtle warning signs, cognitive overload, and inconsistent team coordination can challenge effective emergency responses. Integrating artificial intelligence (AI) into simulation-based education offers an innovative way to enhance clinical vigilance decision-making, and teamwork by creating diverse, realistic, and unexpected scenarios that better prepare nurses for potential complications.

IDENTIFICATION OF THE PROBLEM

While staff are trained in standard procedures, opportunities exist to improve team coordination, confidence, and structured response under high-acuity conditions. There was a need for an educational intervention combining high realism with structured guidance to reinforce communication and leadership.

PURPOSE OF THE STUDY

In PACU nurses and inter-professional teams, does AI-enhanced simulation improve recognition and timely response to postoperative bedside emergencies compared to traditional training? The purpose was to enhance staff preparedness, promote effective communication, and strengthen team performance under emergent conditions.

METHODS

- A simulation-based quality improvement initiative was developed using high-fidelity scenarios with AI-generated pre-briefing, scenario content, and debriefing guidance.
- Inter-professional PACU teams participated in simulated postoperative deterioration events.
- Structured debriefs, facilitated with AI-informed prompts, reinforced situational awareness, role clarity, and adherence to protocols were used.
- Post-session surveys evaluated perceived improvements in clinical recognition, response time, confidence, and overall preparedness.

OUTCOMES/RESULTS

- AI-assisted simulations significantly increased knowledge, participant confidence and readiness.
- Teams reported earlier recognition of deterioration, faster activation of emergency protocols, and stronger inter-professional collaboration.
- AI-supported content enhanced realism and educational depth, particularly in rapid decision-making and communication.
- Although participants initially found the simulation challenging, once familiar with the format, they reported it to be feasible, practical and valuable for clinical learning.

CONCLUSION

AI-enhanced simulation is an effective strategy to improve recognition and response to PACU emergencies. It empowers nurses as frontline responders, reinforces communication, and enhances protocol adherence.

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