

Robotic Surgery: Preparing Perioperative and PACU Nurses for Evolving Roles in Patient-Centered Technology-Enhanced Care

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Introduction: Robotic surgery enhances surgical precision, intraoperative decision-making, and minimally invasive procedures. However, it introduces unique physiological and technical challenges that directly affect perioperative and PACU nursing. Nurses must adapt to these complexities while ensuring patient safety, monitoring, and high-quality, patient-centered care throughout the perioperative and postoperative periods.

Identification of the Problem: While robotic-assisted surgery offers significant benefits, it also presents distinct physiologic and technical challenges, including extreme patient positioning, CO₂ insufflation effects, and restricted access once the robot is docked. These factors increase the complexity of intraoperative monitoring and postoperative safety, requiring nurses to adapt their practice to deliver optimal, technology-integrated care.

QI Question/Purpose of the Study: This project explored the evolving role of nurses in supporting robotic-assisted procedures and identified educational opportunities to strengthen preparedness, promote patient safety, and enhance interdisciplinary collaboration.

Methods: A two-part approach was used: (1) a literature review and expert consultation assessed robotic surgery's impact on perioperative and PACU nursing roles, focusing on physiologic considerations, patient monitoring, communication, and complication recognition; (2) a staff knowledge survey evaluated understanding of robotic procedures, patient positioning, CO₂ insufflation, anesthetic challenges, and recognition of high-risk complications. Survey results informed targeted educational recommendations.

Outcomes/Results: The literature confirmed that robotic surgery increases surgical precision but adds complexity to nursing care, particularly regarding intraoperative monitoring and postoperative vigilance. Survey findings revealed variability in nurses' knowledge of positioning strategies, hemodynamic effects of insufflation, and anesthetic implications, with limited confidence in recognizing rare but serious complications. These gaps highlighted the need for structured, role-specific education

Discussion: Perioperative and PACU nurses are essential to robotic surgical teams, yet formal training on physiologic and technical considerations is inconsistent. Lessons included bridging traditional nursing skills with emerging surgical techniques, addressing gaps in complication recognition, and reinforcing interdisciplinary communication to ensure safe, efficient care.

Conclusion: Robotic surgery introduces new demands on perioperative and PACU nurses, requiring specialized knowledge of positioning, physiologic changes, anesthetic management, and complication recognition. Addressing these educational needs can enhance preparedness, support patient safety, and improve outcomes.

Implications for perianesthesia nurses and future research: Future research should assess the impact of structured robotic surgery education on nurse performance, patient outcomes, and professional confidence.