

Review Article

The Impact of Nursing Education on Reducing Surgical Errors and Improving Outcomes

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How to cite this article:

Bashir A, Khan N. The Impact of Nursing Education on Reducing Surgical Errors and Improving Outcomes. J Surg Nurs Allied Health Sci. 2025;1(1):20-23.

Date of Submission: 2025-02-18

Date of Acceptance: 2025-03-25

A B S T R A C T

Surgical errors remain a significant concern in healthcare, contributing to patient morbidity, mortality, and increased healthcare costs. The role of nursing education in mitigating these errors and improving surgical outcomes has become increasingly recognized. Nurses are integral members of the surgical team, involved in every phase of the surgical process, from preoperative preparation to postoperative care. Comprehensive nursing education, including specialized perioperative training, simulation-based learning, and continuous professional development, equips nurses with the necessary skills and knowledge to identify risks, adhere to safety protocols, and provide high-quality patient care. This article explores the impact of nursing education on reducing surgical errors by enhancing nurses' competencies in areas such as communication, sterile technique, patient monitoring, and complication management. Furthermore, it highlights how improved nursing education leads to better patient outcomes, including faster recovery, reduced complications, and increased patient satisfaction.

Keywords: Nursing Education, Surgical Errors, Patient Outcomes, Perioperative Care

Introduction

Surgical errors are a major concern in healthcare, contributing significantly to patient morbidity and mortality. According to the World Health Organization (WHO), surgical errors are preventable, yet they remain a leading cause of complications, extended recovery times, and even death in some cases. One of the critical factors in minimizing surgical errors and improving patient outcomes is the role of nurses. Nursing professionals are integral members of the surgical team, and their education and training play a vital role in enhancing patient safety. This article reviews the impact of nursing education on reducing surgical errors and improving surgical outcomes, highlighting the importance of nursing competencies, continuous education, and interdisciplinary collaboration.^{1,2}

The Role of Nurses in Surgery

Nurses play a critical and multifaceted role in the surgical environment, serving as essential members of the surgical team and significantly contributing to patient safety, successful outcomes, and the smooth functioning of surgical procedures. Their responsibilities span across the entire surgical process, including preoperative, intraoperative, and postoperative phases.³ In the preoperative phase, nurses are responsible for assessing patients, gathering medical histories, verifying surgical procedures, educating patients about what to expect, and ensuring informed consent is obtained. They also assist with the preparation of the surgical site, perform required tests, and ensure that the patient is physically and mentally ready for surgery. In the intraoperative phase, nurses, particularly

scrub nurses and circulating nurses, work directly in the operating room. Scrub nurses maintain sterile techniques, assist the surgeon by handing instruments, and monitor the surgical field, while circulating nurses ensure proper patient positioning, manage supplies, and coordinate communication among the team members. They also track the patient's vital signs and assist anesthesiologists in monitoring the patient's condition during surgery. During the postoperative phase, nurses are responsible for monitoring patients in the recovery room, assessing their responses to anesthesia, managing pain, and observing for signs of complications such as infection, bleeding, or organ dysfunction. They educate patients on post-surgical care, including wound care, medication administration, and lifestyle modifications. Throughout each stage, nurses are advocates for patient safety, ensuring adherence to surgical protocols, checking for potential errors, and fostering a collaborative environment that emphasizes communication within the multidisciplinary team. By effectively carrying out these roles, nurses are instrumental in reducing surgical errors, improving patient outcomes, and contributing to the overall success of surgical interventions.^{4,5}

Nursing Education and Competency Development

Nursing education, particularly specialized training in perioperative care, plays a pivotal role in enhancing nurses' knowledge and skills in the operating room. The education of nurses in the areas of anatomy, physiology, pharmacology, and surgical techniques provides a foundation for understanding the complexities of surgery. However, as the medical field evolves and surgical practices become more advanced, it is crucial for nurses to engage in continuous education to stay current with the latest best practices and innovations.⁶

- **Continuing Education and Certification:** In addition to formal nursing programs, ongoing professional development, certifications, and continuing education courses are essential for nurses working in surgical settings. Certification programs, such as the CNOR (Certified Nurse Operating Room), are designed to ensure that nurses possess advanced knowledge of surgical procedures, patient care, and sterile techniques. Studies have shown that certified nurses are more likely to follow established guidelines, resulting in fewer complications and errors during surgery.⁸
- **How Nursing Education Reduces Surgical Errors**
Surgical errors often result from miscommunication, inadequate preparation, poor teamwork, lack of knowledge, and failure to follow protocols. Nurses, as essential members of the surgical team, play a key role in reducing these errors through their education and clinical expertise. The following are some of the ways in which nursing education helps minimize surgical errors:
- **Preoperative Patient Assessment:** The preoperative patient assessment is a critical aspect of surgical nursing that plays a pivotal role in ensuring patient safety, identifying potential risks, and optimizing the conditions for surgery. This assessment occurs before the surgical procedure and involves a comprehensive evaluation of the patient's physical, psychological, and medical status. The goal of the preoperative assessment is to gather essential information to guide clinical decision-making, prepare the patient for surgery, and mitigate the risk of complications during and after the procedure. Nurses perform detailed assessments, starting with a medical history review. This includes understanding the patient's past surgical history, allergies, current medications, chronic conditions (e.g., diabetes, hypertension, cardiovascular diseases), and family history of medical issues. Nurses also inquire about any known reactions to anesthesia or previous complications related to surgical procedures. This information is crucial for identifying factors that could increase the risk of complications, such as an adverse reaction to anesthesia or difficulty managing chronic diseases in the perioperative period.^{9,10}
- **Attention to Detail and Sterile Techniques Attention:** Attention to detail and the use of sterile techniques are paramount in ensuring patient safety during surgical procedures, and nurses play a critical role in maintaining these standards in the operating room (OR). The operating room environment is highly controlled, and even minor lapses in attention can result in severe consequences,
- **Perioperative Nursing Education:** Perioperative nursing education focuses specifically on preparing nurses for their roles in the operating room. This includes training in preoperative patient assessment, intraoperative nursing care, and postoperative recovery. Nurses learn to recognize potential complications early and respond promptly. The emphasis is on enhancing clinical skills, critical thinking, and the ability to manage high-stress situations effectively.
- **Simulation-Based Training:** Simulation-based training has become a key component of modern nursing education. By utilizing high-fidelity simulators and mock surgeries, nursing students and professionals can practice critical skills in a controlled environment before working with real patients. This type of education helps build confidence, improve decision-making abilities, and familiarize nurses with surgical protocols and emergency procedures, all of which contribute to reducing the likelihood of surgical errors.^{7,8}

such as infections, prolonged recovery times, or surgical errors. Nurses are essential in upholding sterile practices and ensuring that every aspect of the surgical process is meticulously executed to prevent contamination and errors.¹¹ Attention to detail is integral to the nurse's role in the operating room, where precision and accuracy are crucial. Nurses must consistently monitor the condition of the surgical field, observe the patient's vital signs, and ensure all instruments and supplies are correctly prepared and positioned. Any discrepancy, no matter how small, can lead to complications. For example, a nurse may notice an incorrectly labeled medication or an instrument that is out of place and address these issues before they can affect the surgery. In addition, nurses must adhere to strict protocols for patient identification, surgical site marking, and the verification of the surgical procedure, ensuring that no wrong-site surgery occurs. The meticulous documentation of these processes also helps ensure that any details are not overlooked during the surgical process. The concept of sterile technique is one of the cornerstones of surgical nursing, and its importance cannot be overstated. Surgical infections are one of the most serious complications of surgery, and maintaining a sterile environment is critical in reducing the risk of these infections. Nurses are responsible for maintaining and monitoring the sterile field in the operating room, which includes ensuring that all surgical instruments, drapes, and dressings are properly sterilized before use. Nurses must also ensure that the surgical team adheres to proper hand hygiene, wears appropriate personal protective equipment (PPE), and avoids any breach of the sterile field during the procedure. In addition to maintaining sterile equipment, nurses must ensure that the sterile field is kept free from contaminants throughout the surgery. This involves supervising the use of sterile gloves, gowns, drapes, and covers and ensuring that all personnel entering the operating room follow established procedures to prevent contamination. For example, even minor breaches in sterile technique, such as a small tear in a sterile drape or a member of the surgical team touching a non-sterile surface, can lead to infection. Nurses are trained to spot and address such breaches immediately, ensuring that the procedure continues in a safe and sterile environment.^{12,13}

- **Effective Communication:** Miscommunication among surgical team members is one of the leading causes of surgical errors. Nurses receive training in effective communication strategies, such as the use of checklists, verbal handoffs, and standardized protocols. Tools like the Surgical Safety Checklist, which was introduced by the WHO, have proven to be effective in reducing

errors by ensuring that all team members are on the same page regarding the patient's status and the surgical procedure. Nurses play a central role in the implementation of these tools, ensuring that important details are communicated clearly and that nothing is overlooked.

- **Intraoperative Monitoring and Support:** During surgery, nurses are responsible for monitoring the patient's vital signs, managing anesthesia equipment, and assisting the surgical team as needed. They are trained to recognize abnormal signs and symptoms, such as changes in heart rate, blood pressure, or oxygen saturation levels, which may indicate complications. Early detection of these issues allows the team to intervene promptly and prevent further harm to the patient.¹¹
- **Postoperative Care and Complication Management:** After surgery, nurses play a crucial role in monitoring the patient's recovery and identifying complications such as bleeding, infection, or adverse reactions to anesthesia. Postoperative education is a key component of nursing education, teaching nurses how to assess surgical wounds, manage pain, and educate patients about recovery protocols. Nurses with advanced knowledge of postoperative care are more effective at identifying complications early, leading to better outcomes.⁴

Improving Patient Outcomes Through Nursing Education

Patient outcomes in surgery depend on multiple factors, including the expertise of the surgical team, the quality of preoperative and postoperative care, and the adherence to safety protocols. Nursing education improves patient outcomes by enhancing the overall quality of care provided at each stage of the surgical process.

- **Increased Patient Safety:** Well-trained nurses contribute significantly to patient safety by adhering to evidence-based practices and protocols. For example, studies have shown that the use of checklists and proper patient handoff procedures can significantly reduce the likelihood of adverse events during surgery. Furthermore, educated nurses are better able to advocate for patients, ensuring that their needs are met and that potential risks are mitigated.^{13,14}
- **Faster Recovery Times:** Nurses are trained to manage postoperative care effectively, which can speed up the recovery process and reduce the risk of complications. For instance, nurses who are proficient in pain management, wound care, and patient education help patients recover more quickly, reducing hospital stays and the likelihood of readmission.
- **Improved Patient Satisfaction:** Nurses with advanced education and training are more likely to provide

compassionate, patient-centered care. This improves the overall patient experience, leading to higher levels of patient satisfaction. Patients who feel well-informed and supported are more likely to follow recovery instructions, which contributes to better outcomes.

- **Reduction in Healthcare Costs:** By preventing complications and reducing the incidence of surgical errors, nursing education can help lower healthcare costs. Fewer complications mean fewer extended hospital stays, reduced need for additional treatments, and a lower rate of readmissions. This not only benefits patients but also healthcare systems by reducing the financial burden associated with preventable errors and complications.^{14,15}

Conclusion

Nursing education plays a critical role in reducing surgical errors and improving patient outcomes. Through comprehensive training and ongoing professional development, nurses acquire the knowledge and skills necessary to contribute effectively to the surgical process. From preoperative assessment to postoperative care, well-educated nurses help ensure patient safety, improve recovery times, and prevent complications. The continued advancement of nursing education, particularly in the areas of perioperative care and simulation-based learning, holds the potential to further reduce surgical errors and enhance overall healthcare outcomes. As the healthcare environment continues to evolve, the importance of nursing education in improving surgical safety and patient outcomes cannot be overstated.

Conflict of Interest: None

Source of Funding: None

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process: None

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