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The role of nurses in preventing nosocomial infections in surgical patients

Abstract

Nosocomial infections are serious complications in surgical patients, contributing to increased morbidity, mortality, and healthcare costs. Nurses play a vital role in preventing these infections through various strategies, including adherence to hand hygiene protocols, proper wound care, use of personal protective equipment (PPE), environmental control, and patient education. This literature review aims to identify and analyze the role of nurses in preventing nosocomial infections in surgical patients.

Keywords: nosocomial infections, surgical patients, infection prevention, nursing role, hand hygiene

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Introduction

Nosocomial infections, also known as hospital-acquired infections (HAIs), remain a significant global health concern. These infections typically occur 48 hours or more after hospital admission and are not present or incubating at the time of a patient's admission.[1] In surgical patients, HAIs can lead to severe complications such as sepsis, pneumonia, urinary tract infections (UTIs), and surgical site infections (SSIs), all of which contribute to prolonged hospital stays, increased morbidity and mortality, and delayed recovery.[2,3] Among these, SSIs are particularly prevalent and account for up to 20% of all HAIs in hospitalized surgical patients.[4]

The burden of nosocomial infections extends beyond the clinical impact on patients. Economically, they place a heavy toll on healthcare systems due to the need for additional treatments, diagnostic procedures, and extended hospitalizations. Zimlichman et al.[5] estimated that HAIs incur billions of dollars in preventable costs annually in the United States alone, highlighting the urgency of effective infection prevention strategies.

Nurses, as the front-line healthcare providers who interact most frequently and directly with patients, hold a pivotal role in the prevention of HAIs. Their responsibilities are multifaceted and encompass strict adherence to evidence-based infection control practices. This includes maintaining hand hygiene, using personal protective equipment (PPE), performing aseptic techniques during invasive procedures, ensuring environmental cleanliness, and monitoring early signs of infection.[1,6]

Hand hygiene remains the single most effective measure to prevent nosocomial infections, yet adherence among healthcare workers, including nurses, can be suboptimal without continuous education and institutional support.[7] The World Health Organization[8] emphasizes the importance of continuous training and behavioral change initiatives to reinforce hand hygiene compliance. Moreover, nurses play an educational role by informing patients and their families about infection risks and encouraging active participation in preventive practices, such as preoperative hygiene and wound care management.[9]

Additionally, nurses are key contributors to surveillance and early identification of infections. By recognizing early signs and symptoms of infection, nurses can initiate timely interventions and communicate promptly with the medical team, thereby preventing further complications. Their involvement in multidisciplinary infection control teams and quality improvement initiatives also enhances institutional efforts to reduce HAIs.[10]

Therefore, a comprehensive understanding of the role of nurses in preventing nosocomial infections is essential not only for ensuring patient safety but also for improving the overall quality of care in surgical settings. Continuous professional development, institutional support, and adherence to infection prevention protocols are imperative to empower nurses in fulfilling this critical role.

Strategies for preventing nosocomial infections by nurses

i Adherence to Hand Hygiene Protocols

Adherence to hand hygiene protocols is the most fundamental and critical step in preventing nosocomial infections in hospitals. Nosocomial infections, also known as healthcare-associated infections (HAIs), are often linked to lapses in proper hand hygiene practices by healthcare workers—especially nurses, who have the most frequent and prolonged contact with patients.[6]

The World Health Organization (WHO) established the *"My Five Moments for Hand Hygiene"*, which outlines key moments when hand hygiene is essential: before touching a patient, before clean/aseptic procedures, after body fluid exposure/risk, after touching a patient, and after touching patient surrounding.[8] These protocols aim to prevent cross-transmission of pathogens in healthcare environments.

Hand hygiene can be performed by washing hands with soap and water or by using alcohol-based hand sanitizers, which are effective in eliminating microorganisms, including gram-positive bacteria, gram-negative bacteria, and viruses.[1] Despite the long-standing implementation and proven effectiveness of these guidelines, adherence to hand hygiene protocols remains a significant challenge in many healthcare facilities worldwide, especially in resource-limited settings.

Several factors influence nurses' compliance with hand hygiene, including:

i Knowledge and attitudes toward infection prevention

ii High workload and time constraints

iii Availability of hand hygiene facilities and supplies

iv Support from hospital management

v A strong institutional culture of patient safety[11]

Effective interventions to improve compliance include ongoing training and education, regular audits with feedback, visual reminders, and incentive programs or recognition for healthcare workers who demonstrate high levels of adherence.

Improving compliance with hand hygiene protocols significantly reduces the risk of healthcare-associated infections, ultimately enhancing patient safety and reducing the long-term healthcare costs associated with infection-related complications.

Challenges and solutions

Challenges in preventing nosocomial infections in surgical patients

a. Heavy workload

Nurses and healthcare professionals often face excessive workloads, which can reduce the time and attention given to infection prevention practices. A high patient-to-nurse ratio can lead to missed hand hygiene opportunities, improper sterilization procedures, and overall reduced compliance with infection control guidelines.[12]

b. Limited resources

In many healthcare settings, especially in low- and middle-income countries, infection control is hindered by a lack of essential resources such as antiseptics, gloves, sterile equipment, and personal protective equipment (PPE). This scarcity can significantly increase the risk of nosocomial infections.[5]

c. Patient non-compliance

Some patients may not adhere to recommended infection prevention practices such as hand hygiene, wound care instructions, or mobility guidelines. This non-compliance can compromise recovery and increase the risk of postoperative infections.[11]

d. Inadequate healthcare facilities

Outdated infrastructure, overcrowded wards, and poor ventilation systems contribute to an environment that facilitates the transmission of healthcare-associated infections. Facilities that lack isolation rooms or proper waste disposal systems are particularly at risk.[13]

Proposed solutions

a. Enhanced training and education programs

Regular training for healthcare workers on the latest infection control protocols is crucial. Continuous education improves knowledge, attitudes, and practices related to infection prevention, leading to better patient outcomes.[14]

b. Use of technology to monitor compliance

The integration of electronic monitoring systems and digital reminders can help track hand hygiene compliance and provide real-time feedback to staff. These technologies have been shown to significantly improve adherence to infection prevention protocols.[10]

c. Improved teamwork and communication

Promoting a culture of teamwork and open communication among multidisciplinary teams is essential for effective infection control. Collaborative efforts and shared responsibilities enhance accountability and help identify and address lapses in infection prevention.[8]

d. Upgrading healthcare facilities

Investing in modern infrastructure, including clean water systems, adequate space for patient care, and improved ventilation, is vital. Upgrading facilities to meet infection control standards can drastically reduce the incidence of nosocomial infections.[13]

Conclusion

Nurses play a pivotal role in preventing nosocomial infections in surgical patients. As front-line healthcare providers, they are uniquely positioned to identify infection risks early, implement evidence-based interventions, and promote a culture of safety within clinical settings. Through rigorous hand hygiene practices, proper wound care, adherence to aseptic techniques, early mobilization, and patient education, nurses can significantly reduce the incidence of healthcare-associated infections (HAIs), particularly in postoperative patients who are highly vulnerable to infection due to surgical wounds and compromised immunity.[6]

In addition, nurses act as advocates for infection control by participating in surveillance programs, reporting potential outbreaks, and collaborating with interdisciplinary teams to develop and revise infection prevention protocols. Their continuous presence at the bedside allows for timely recognition of infection signs and rapid initiation of treatment, which is crucial in minimizing complications and improving surgical outcomes.[15]

However, to maximize their contribution, nurses must be supported through ongoing education, adequate staffing, access to resources, and a strong institutional commitment to infection prevention. Addressing these challenges will empower nurses to practice more effectively and sustain high standards of care.

By implementing effective preventive strategies and addressing existing systemic barriers, nurses can significantly contribute to improving patient safety, reducing morbidity and mortality associated with nosocomial infections, and enhancing overall healthcare quality.[1]

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None.

Conflicts of interest

The authors declares that there are no conflict of interests.

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