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“Hand Hygiene Compliance among Surgical Nurses: Barriers and Solutions”

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Abstract: Hand hygiene is universally acknowledged as the most effective and low-cost measure for preventing healthcare-associated infections (HAIs). Despite clear evidence, hand hygiene compliance among healthcare workers—particularly surgical nurses—remains below optimal levels. Surgical nurses are pivotal in ensuring aseptic practices, reducing surgical site infections, and safeguarding patients in perioperative and ward settings. However, barriers such as heavy workloads, skin irritation, inadequate resources, insufficient knowledge, time pressures, and organizational culture hinder effective adherence to recommended protocols. This paper critically examines these barriers and explores potential solutions, including education, infrastructural support, behavior change interventions, and leadership engagement. It further highlights innovative strategies such as electronic monitoring systems and multimodal interventions to strengthen compliance. The discussion underscores the need for a holistic, system-wide approach where institutional accountability and individual responsibility work hand-in-hand. Improving surgical nurses' compliance not only enhances patient safety but also reduces healthcare costs and strengthens infection control measures.

Keywords: Hand hygiene; surgical nurses; compliance; barriers; solutions; infection prevention; healthcare-associated infections; surgical site infections.

Introduction

Healthcare-associated infections (HAIs) are a major public health challenge worldwide. They account for significant morbidity, mortality, and economic burden, especially in surgical wards where patients are highly vulnerable. Surgical site infections (SSIs), a major subset of HAIs, result in prolonged hospital stays, higher costs of care, delayed recovery, and increased psychological stress for patients and families. Globally, it is estimated that one in ten hospitalized patients acquire at least one infection during their hospital stay, and surgical patients represent one of the most at-risk groups.

Hand hygiene has long been recognized as the cornerstone of infection prevention. Since Ignaz Semmelweis first demonstrated the life-saving role of hand disinfection in the 19th century, hand hygiene has been universally recommended in clinical practice. Both the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) emphasize hand hygiene as the most critical intervention in preventing infection transmission. The WHO's “Five Moments for Hand Hygiene” provides a structured guideline for healthcare professionals to maintain compliance during patient care.



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Surgical nurses occupy a critical position in this framework. They provide direct care to patients before, during, and after surgery, frequently coming into contact with open wounds, invasive devices, and sterile fields. Their role requires rigorous adherence to infection control measures, yet compliance rates remain inconsistent. Research indicates that surgical nurses, despite awareness of hand hygiene importance, face systemic and individual-level barriers that compromise adherence. Understanding these barriers and identifying effective solutions is essential to strengthen patient safety and quality of care.

This article discusses in detail the barriers to hand hygiene compliance among surgical nurses and highlights evidence-based strategies and solutions to address them. By doing so, it provides a comprehensive understanding of the issue and emphasizes the collective responsibility of nurses, healthcare institutions, and policymakers in promoting hand hygiene culture.

Importance of Hand Hygiene in Surgical Nursing

Hand hygiene is not just a routine procedure but a fundamental professional responsibility for surgical nurses. Their work involves caring for patients undergoing invasive procedures, monitoring surgical wounds, administering medications, and assisting in operative and postoperative care. In each of these stages, hands become a primary vehicle for microbial transmission. The simple act of neglecting hand hygiene before touching a patient or performing a sterile task can introduce pathogens that compromise recovery.

In the operating room, surgical nurses handle critical equipment such as catheters, dressings, and surgical instruments. If hands are contaminated, the risk of transmitting organisms into sterile body cavities is extremely high. Likewise, in postoperative wards, contact with intravenous lines, drains, and wound dressings

requires scrupulous adherence to the WHO's Five Moments for Hand Hygiene.

Hand hygiene also protects nurses themselves from occupational exposure to pathogens such as methicillin-resistant *Staphylococcus aureus* (MRSA), hepatitis viruses, and other multidrug-resistant organisms. This dual protection—for both patient and caregiver—makes compliance a professional obligation and an ethical imperative. Despite this, maintaining high levels of adherence requires overcoming several systemic and behavioral challenges, which are outlined below.

Barriers to Hand Hygiene Compliance among Surgical Nurses

1. Workload and Time Constraints

One of the most frequently cited barriers is the overwhelming workload faced by surgical nurses. In operating theatres and surgical wards, the pace of work is often rapid and unpredictable. Nurses are expected to prepare patients, assist surgeons, manage equipment, monitor vital signs, and respond to emergencies—all within limited time frames. When tasks pile up, nurses may perceive hand hygiene as time-consuming and prioritize immediate patient care activities instead.

Emergencies in surgical settings further exacerbate this problem. For instance, during unexpected bleeding, airway obstruction, or cardiac arrest, nurses may bypass hand hygiene protocols in the rush to intervene. While the intention is to save lives, the unintended consequence is increased infection risk. Additionally, inadequate staffing ratios increase the burden on individual nurses, further limiting opportunities to perform hand hygiene consistently.

2. Skin Irritation and Dermatitis

Another common barrier is the adverse effect of frequent handwashing and the use of alcohol-based hand rubs. Surgical nurses are required to disinfect hands multiple times during shifts, leading to dryness, cracks, and



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dermatitis. Such skin conditions not only cause discomfort but also reduce willingness to perform hand hygiene. In some cases, painful dermatitis leads to glove use without proper disinfection, undermining safety.

Moreover, harsh disinfectants or soaps lacking emollients aggravate skin issues. Continuous glove use in surgical settings can trap sweat and irritants, compounding the problem. Nurses experiencing these symptoms often associate hand hygiene with discomfort, resulting in reduced compliance over time.

3. Lack of Resources and Accessibility

Resource availability plays a critical role in hand hygiene compliance. In many healthcare facilities, particularly in low- and middle-income countries, surgical wards lack sufficient sinks, functional soap dispensers, or adequate supplies of alcohol-based hand rubs. Even in advanced healthcare systems, poorly placed dispensers or malfunctioning equipment can act as deterrents.

When sinks are located far from patient beds or hand rub dispensers are empty, nurses may skip hand hygiene opportunities altogether. In surgical theatres where every second counts, inconvenience becomes a significant barrier. This infrastructural inadequacy signals a lack of institutional prioritization, which negatively affects compliance culture.

4. Insufficient Knowledge and Training

Although most nurses are aware of hand hygiene importance, gaps in knowledge persist. Studies reveal that many surgical nurses are unsure about proper duration, technique, or sequence of handwashing. Misconceptions such as believing glove use eliminates the need for disinfection are common.

Knowledge deficits also arise from insufficient continuing education. In busy hospitals, infection control training may not be updated regularly, leaving nurses unaware of the latest guidelines. Furthermore, new staff or student nurses may not receive adequate orientation on hand hygiene

protocols in surgical environments. Such deficiencies contribute to inconsistent and suboptimal practices.

5. Attitudes, Habits, and Cultural Factors

Behavioral and cultural aspects strongly influence compliance. In some institutions, hand hygiene is not actively enforced, leading nurses to view it as optional rather than mandatory. When senior staff members or surgeons neglect proper hand hygiene, it creates a culture where such lapses are normalized. Peer influence and group dynamics often dictate whether individuals comply or not.

Personal habits also matter. Nurses who develop shortcuts over time may rationalize skipping hand hygiene, especially if they have not personally witnessed infection outcomes. Cultural perceptions regarding infection risks—such as beliefs that brief contact with intact skin is harmless—can further weaken adherence.

6. Perception of Low Risk

Perception plays a central role in shaping compliance. Some surgical nurses underestimate the risk of transmission during routine activities, such as checking vital signs or adjusting bed linens. Because these actions seem harmless, the perceived need for hand hygiene decreases. This false sense of security overlooks the fact that pathogens can survive on intact skin and surfaces, spreading indirectly to vulnerable surgical wounds.

Moreover, when infection rates are low in a unit, staff may assume that strict hand hygiene is unnecessary. This complacency contributes to lapses in compliance, despite evidence showing that even a single transmission can trigger outbreaks.

Solutions to Improve Hand Hygiene Compliance

1. Education and Training Programs

Education is the foundation of behavior change. Regular training sessions help nurses refresh their knowledge, update themselves with evolving guidelines, and correct



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misconceptions. For surgical nurses, targeted modules focusing on the role of hand hygiene in preventing SSIs are highly effective.

Interactive teaching methods such as workshops, role-plays, and simulation-based learning improve retention and engagement. Video demonstrations and competency checklists further reinforce correct techniques. Continuing education also fosters professional accountability, reminding nurses that hand hygiene is central to patient safety.

2. Skin Care and Hand Hygiene Products

Providing skin-friendly hand hygiene products directly addresses the issue of dermatitis. Alcohol-based hand rubs enriched with emollients reduce dryness, while pH-balanced soaps minimize irritation. Institutions can also provide compatible moisturizing creams to be used during breaks.

By alleviating discomfort, such measures improve willingness to comply. Regular dermatological assessments and staff feedback on product suitability ensure that supplies remain effective and acceptable. When nurses experience fewer skin problems, they are more motivated to maintain proper hand hygiene practices.

3. Accessibility and Infrastructure Improvements

Ensuring that sinks and alcohol-based rubs are readily accessible at the point of care is a practical yet powerful intervention. Dispensers should be placed strategically near patient beds, in operating rooms, and at ward entrances. Regular maintenance prevents situations where equipment is broken or empty.

Hospitals should invest in automated dispensers and sensor-based systems that enhance convenience. Clear visibility of supplies reinforces the perception that hand hygiene is an institutional priority, nudging nurses toward compliance.

4. Role Modeling and Leadership Support

Leaders within the nursing and surgical teams play a decisive role in shaping compliance culture. When nurse managers, senior nurses, and surgeons consistently model proper hand hygiene, junior staff are more likely to follow suit. Visible commitment from leadership signals that hand hygiene is non-negotiable.

Institutions can also recognize and reward role models who demonstrate exemplary compliance. Leadership-driven campaigns and open discussions on infection control cultivate a shared sense of responsibility, reducing peer-related barriers.

5. Use of Reminders and Visual Cues

Visual prompts are effective behavioral nudges. Posters near sinks, floor markings, and electronic screen reminders continuously reinforce the message. In surgical wards, checklists can incorporate hand hygiene reminders alongside routine tasks.

Auditory cues, such as alarms linked to sensor systems, also help staff remain vigilant. These cues act as constant reinforcements, especially in high-pressure environments where staff may forget or overlook steps. Over time, repeated exposure cultivates habit formation.

6. Monitoring and Feedback Systems

Compliance improves when staff know their performance is being observed. Direct observation by infection control teams, though resource-intensive, provides valuable insights. More advanced systems employ electronic monitoring devices that track hand hygiene opportunities and actual compliance.

Feedback mechanisms are equally important. Sharing results with staff—whether as unit-level statistics or individual performance reports—motivates improvement. Constructive feedback encourages accountability without creating a punitive atmosphere. Recognition for high-performing teams fosters healthy competition and sustained adherence.

7. Multimodal Strategies



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No single intervention guarantees lasting results. WHO recommends multimodal strategies that integrate multiple approaches—system change, staff training, monitoring, reminders, and organizational culture enhancement. Studies consistently show that multimodal interventions achieve higher compliance rates compared to isolated efforts.

For surgical nurses, tailoring multimodal strategies to their unique environment is crucial. Combining education, accessible supplies, skin care products, leadership engagement, and monitoring ensures that barriers are addressed holistically. Such comprehensive programs sustain long-term improvements and embed hand hygiene as a cultural norm.

Evidence-Based Practices and Innovations

Recent innovations offer promising avenues to enhance compliance. Electronic monitoring systems using sensors on dispensers and staff badges provide real-time tracking and reminders. Wearable devices can alert nurses when they miss hand hygiene opportunities, while mobile applications deliver training modules and self-assessment tools.

Gamification has also been introduced in training programs, where nurses participate in interactive games that reward correct behavior. Virtual reality simulations allow staff to practice infection control scenarios in a risk-free environment.

Evidence from hospitals implementing such technologies shows significant reductions in HAIs and SSIs. Nurse-led hand hygiene campaigns, where surgical nurses champion awareness and training, have proven particularly effective in promoting peer-driven compliance. Furthermore, embedding hand hygiene into institutional policies, appraisals, and accreditation standards ensures sustainability beyond short-term interventions.

Summary and Conclusion

Hand hygiene remains the simplest and most cost-effective method of preventing healthcare-associated infections. Yet, compliance among surgical nurses is hindered by barriers such as workload, skin irritation, inadequate resources, knowledge gaps, cultural influences, and low-risk perception. These obstacles persist despite overwhelming evidence of the benefits of proper hand hygiene.

Addressing the issue requires a multifaceted approach. Education and training programs enhance knowledge and correct misconceptions. Skin-friendly products reduce discomfort and improve acceptance. Infrastructure improvements, leadership modeling, and visual cues foster supportive environments. Monitoring and feedback systems drive accountability, while multimodal interventions ensure sustainability.

Innovations such as electronic monitoring, gamified training, and nurse-led campaigns further strengthen adherence. Ultimately, improving hand hygiene compliance among surgical nurses requires both institutional commitment and individual accountability.

By overcoming barriers and implementing evidence-based solutions, healthcare systems can significantly reduce surgical site infections, enhance patient safety, lower healthcare costs, and strengthen overall quality of care. Surgical nurses, as infection prevention champions, play an indispensable role in this mission.

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