THE ROLE OF NURSES IN PREVENTING HOSPITAL ACQUIRED INFECTION

Madiha Zwinny Rakies Aldfery[1*], Sara Zwinny Rakies Aldfery[2], Harbiyyah Abdullah Munawar Al-Dhafiri[3], Fatima Hizam Al-Anazi[4], Suwera Abdullah Saad Alsubaei[5], Eiman Khalf Aldfery[6], Hessah Fhied Saleh Alboqami[7], Sultan Salleh Al Harbi[8]

Abstract:

Background: Hospital-acquired infections (HAIs) are a significant concern in healthcare settings, leading to prolonged hospital stays, increased costs, and potential mortality. Nurses play a pivotal role in preventing HAIs through their knowledge, attitudes, and practices. However, they encounter challenges such as workload, limited resources, inadequate training, antibiotic resistance, communication barriers, and environmental factors.

Objective: This review aims to investigate nurses' knowledge and understanding of the causes and prevention strategies of HAIs, identify their role in preventing such infections, assess current practices and protocols, identify challenges faced, and explore the impact of nurse-led interventions on reducing the incidence of HAIs.

Conclusion: Nurses are essential in preventing HAIs by implementing infection control measures, educating patients, collaborating with multidisciplinary teams, and monitoring for potential outbreaks. Nurse-led interventions, including antimicrobial stewardship programs, are crucial in reducing the incidence of HAIs and combating antibiotic resistance. By addressing challenges and implementing effective strategies, nurses can enhance patient safety, improve healthcare outcomes, and create a safer environment in healthcare facilities.

Keywords: infection control team, infection control link nurse, healthcare-associated infections, HAI.

[1*,6]Nurse, Alnuzha, Hafar Al-Batin, Saudi Arabia
[2]Nurse, Maternity and Children Hospital, Hafar Al-Batin, Saudi Arabia
[3,] Nurse, al faisaliyah, Hafar Al-Batin, Saudi Arabia
[4]Nursing technician, East Muhammadiyah Clinic, Hafar Al-Batin, Saudi Arabia
[5]Nursing technician, Health center Manfuha, Riyadh, Saudi Arabia
[7]Medical Records, Riyadh, Al Kharj, Saudi Arabia
[8]Nurse, Qaisumah General Hospital, Qaisumah, Saudi Arabia

***Corresponding Author:** Madiha Zwinny Rakies Aldfery
*Nurse, Alnuzha, Hafar Al-Batin, Saudi Arabia

DOI:xyz

Introduction:

Hospital-acquired infections, also known as healthcare-associated infections, are infections that are acquired in a healthcare setting and were not present or developing at the time of a patient's admission to the hospital. These infections encompass a variety of types, including catheter-associated urinary tract infections, central line-associated bloodstream infections, surgical site infections, ventilator-associated pneumonia, hospital-acquired pneumonia, and Clostridium difficile infections. Recognizable symptoms indicating an infection include a productive cough, shortness of breath, abdominal pain, rebound tenderness, altered mental status, palpitations, suprapubic pain, polyuria, dysuria, and costovertebral angle tenderness [1].

A significant study conducted by the CDC in 2014 involved a multistate point prevalence survey of healthcare-associated infections, which included 11,282 patients from 183 hospitals in the United States. The report revealed that approximately 4% of hospitalized patients experienced at least one healthcare-associated infection. In 2011, an estimated 648,000 hospitalized patients suffered from a total of 721,800 infections. The most prevalent infections, in descending order, were pneumonia (21.8%), surgical site infections (21.8%), gastrointestinal infections (17.1%), urinary tract infections (12.9%), and primary bloodstream infections (9.9%, including catheter-associated bloodstream infections). Among the pathogens responsible for healthcare-associated infections, Clostridium difficile (12.1%) was identified as the primary pathogen, followed closely by Staphylococcus aureus (10.7%), Klebsiella (9.9%), and Escherichia coli (9.3%) [2]. Skin and surgical site infections are commonly caused by Staphylococcus aureus, with Methicillin-resistant Staphylococcus aureus (MRSA) also occasionally involved. The risk of acquiring hospital-acquired infections is influenced by factors such as the infection control practices at the facility, the patient's immune status, and the prevalence of various pathogens in the community. Risk factors for healthcare-associated infections include immunosuppression, advanced age, prolonged hospital stays, multiple underlying health conditions, frequent healthcare facility visits, mechanical ventilatory support, recent invasive procedures, presence of indwelling devices, and ICU stays. The receipt of intravenous antibiotics within the preceding 90 days is a major risk factor for developing antimicrobial resistance to multiple drugs [3].

Hospitalizations are crucial for managing acute illnesses but also increase the susceptibility of patients to various nosocomial, often antimicrobial-resistant pathogens. These pathogens can be acquired from other patients, healthcare staff, or the hospital environment, with a higher risk observed among patients in the ICU. A point prevalence study involving 231,459 patients across 947 hospitals found that approximately 19.5% of ICU patients had at least one healthcare-associated infection [4].

Clostridium difficile is the causative agent of Clostridium difficile colitis (CDI). Common organisms associated with catheter-associated bloodstream infections (CLABSI) include candida species in adult ICUs and Enterobacteriaceae in adult wards, pediatric ICUs and wards, and oncology wards, as well as Staphylococcus aureus. Pathogens known to cause catheter-associated urinary tract infections (CAUTI) include Enterococcus, Staphylococcus aureus, Pseudomonas, Proteus, Klebsiella, and Candida [5]. According to the National Healthcare Safety Network, common pathogens responsible for surgical site infections (SSI) include Staphylococcus aureus, coagulase-negative Staphylococcus, Enterococcus, E. coli, Pseudomonas aeruginosa, Enterobacter, and Klebsiella pneumoniae. The most prevalent pathogens causing hospital-acquired pneumonia (HAP) and ventilator-associated pneumonia (VAP) are Staphylococcus aureus and Pseudomonas aeruginosa, while E. coli and Klebsiella pneumoniae are more commonly found in pediatric populations [6].

Nursing plays a unique role in preventing hospital infections, as various interventions, practices, and procedures such as hand hygiene, disinfection, sterilization, and waste management are closely tied to patient care and the hospital environment. These measures pose a significant challenge in the prevention of infections in healthcare settings.

Objectives:

The main objectives of this review are:

1. To investigate the knowledge and understanding of nurses regarding the causes and prevention strategies of hospital acquired infections.
2. To identify the role of nurses in preventing hospital acquired infections.
3. To assess the current practices and protocols followed by nurses in preventing hospital acquired infections.
4. To identify the challenges and barriers faced by nurses in effectively preventing hospital acquired infections.

5. To explore the impact of nurse-led interventions on reducing the incidence of hospital acquired infections.

Knowledge, Attitudes and Practices of Nurses Toward Management of Hospital-acquired Infections:

In the realm of healthcare, Infection Control is a critical aspect overseen by care nurses, forming a pivotal component of patient safety initiatives. This encompassing program involves various processes and endeavors aimed at identifying and mitigating the risks associated with the transmission of infections among individuals [7]. An essential objective within infection control programs is the provision of education pertaining to infection prevention and control. Nurses assume a pivotal role in the prevention and management of Healthcare-Associated Infections (HAIs) through the application of their knowledge, attitudes, and practices. Understanding the factors influencing nurses' behaviors in this context is crucial for devising effective strategies to enhance infection control measures within healthcare settings.

Knowledge, as a cornerstone, denotes the information and comprehension that nurses possess regarding HAIs, encompassing their causes, modes of transmission, preventive measures, and treatment options. A comprehensive grasp of these facets is imperative for nurses to adeptly prevent, identify, and manage HAIs in their professional capacity. Attitudes encapsulate nurses' beliefs, values, and perceptions concerning HAIs and infection control practices. Positive attitudes play a pivotal role in fostering adherence to guidelines and best practices, thereby promoting the prioritization of infection control measures. Nurses exhibiting positive attitudes are more inclined to adhere to protocols such as proper hand hygiene, utilization of personal protective equipment, and compliance with isolation procedures, thereby diminishing the risk of HAIs [8].

Conversely, negative attitudes or misconceptions regarding HAIs can engender non-compliance with infection control protocols, subsequently elevating the likelihood of transmission and outbreaks. Practices refer to the actions and behaviors that nurses undertake to prevent and manage HAIs in their daily routines. Adherence to infection control guidelines, meticulous hand hygiene practices, correct utilization of personal protective equipment, and prompt identification and isolation of infected individuals are pivotal practices in reducing the incidence of HAIs. Nevertheless, studies indicate potential disparities between nurses' knowledge of infection control measures and their actual practices in clinical settings.

Factors such as heavy workloads, time constraints, inadequate resources, lack of support, and competing priorities can impede nurses' ability to consistently implement best practices for infection prevention and control [9]. Additionally, individual factors like attitudes, beliefs, motivation, and perceived self-efficacy can also impact nurses' infection control practices. Research underscores that enhancing nurses' knowledge, attitudes, and practices concerning HAIs management can yield improved patient outcomes, reduced healthcare costs, and enhanced overall quality of care.

Educational interventions, training programs, continuous professional development, leadership support, and a safety-oriented culture are pivotal strategies for bolstering nurses' competencies in infection control. By addressing knowledge gaps, reshaping attitudes, and advocating evidence-based practices, healthcare establishments can cultivate a safer environment for patients, staff, and visitors [10]. Collaborative efforts among nurses, infection control teams, healthcare providers, administrators, and policymakers are imperative for formulating and implementing comprehensive infection control programs that effectively prevent and manage HAIs within healthcare settings.

A study evaluating the knowledge of 324 nurses concerning infection control practices revealed that 65% exhibited high compliance with infection control measures such as hand hygiene, infected individual isolation, and minimizing the risk of airborne pathogen transmission [11]. However, the same study highlighted deficiencies in nurses' understanding of the causes, spread, and prevention of HAIs, with less than 37% able to identify direct transfer, comorbidity, and invasive procedures as the etiology of HAIs. Similar inadequacies in knowledge regarding HAIs and their prevention have been documented in various other studies [12].

Education and staff development initiatives have been shown to enhance nursing care by curbing the emergence and dissemination of HAIs. Insufficient equipment and supervision systems for HAIs have been identified as factors contributing to the rise of these infections [13]. Furthermore, the elevated workload of employees, stemming from inadequate staffing levels, not only impacts staff fatigue but also detrimentally affects patients' recovery outcomes, thereby amplifying the incidence of HAIs and mortality rates.

The role of nurses in preventing hospital acquired infections:

Nurses play a critical and indispensable role in the prevention of hospital-acquired infections (HAIs) by diligently implementing infection control

measures, educating patients, and collaborating with multidisciplinary teams. The threat posed by HAIs to patient safety, hospital stays, and healthcare costs underscores the importance of nurses in mitigating these risks. By adhering to evidence-based practices and maintaining a hygienic environment, nurses can effectively reduce the incidence of HAIs [14].

One of the key responsibilities of nurses is to ensure strict adherence to hand hygiene protocols, proper utilization of personal protective equipment, and meticulous implementation of aseptic techniques during invasive procedures. Moreover, they play a vital role in educating patients and their families on infection prevention strategies, such as vaccination, wound care, and the appropriate use of antimicrobial agents. Collaborating with infection control specialists, physicians, and other healthcare professionals, nurses help develop and implement tailored infection prevention protocols [15].

Through vigilant monitoring and timely intervention, nurses not only safeguard patients from HAIs but also foster a culture of safety within healthcare facilities. Their expertise in surveillance and early detection of potential outbreaks enables them to recognize subtle changes in patients' conditions, facilitating prompt intervention and preventing the spread of infections. Additionally, nurses are instrumental in implementing isolation precautions to prevent the transmission of contagious infections [16].

Nurses also play a crucial role in promoting a culture of infection prevention and control within healthcare settings. Through their leadership, advocacy, and role modeling, nurses inspire their colleagues to uphold the highest standards of infection control. By actively participating in quality improvement initiatives, nurses contribute their frontline perspectives to refine infection prevention protocols, ensuring their effectiveness and alignment with the latest evidence-based guidelines [17, 18].

In conclusion, nurses' dedication to infection prevention, surveillance, and collaboration with healthcare teams significantly contributes to reducing HAIs, enhancing patient safety, and improving overall healthcare quality.

Challenges and barriers faced by nurses in effectively preventing hospital acquired infections:

Nurses are pivotal in the prevention of hospital-acquired infections (HAIs) by implementing various infection control measures and protocols. However, they face numerous challenges that hinder their ability to effectively mitigate the risk of HAIs. The workload of medical and paraclinical staff is crucial in the implementation of HAIs control and prevention programs. One of the key issues in the HAIs surveillance system is the high workload of staff dealing with HAIs and the low motivation of infection control nurses (ICNs) due to insufficient support, lack of specific organizational position, and inadequate financial benefits [19]. Additionally, the limited availability of essential resources like personal protective equipment (PPE), disinfectants, and hand hygiene products can obstruct nurses in maintaining a clean and sterile environment necessary for preventing HAIs.

Moreover, the lack of proper training and education on infection control practices presents a significant hurdle for nurses in effectively preventing HAIs. While many healthcare facilities offer basic training on infection prevention, continuous education and reinforcement of best practices are vital to equip nurses with the knowledge and skills required to combat infections effectively. Furthermore, the absence of standardized protocols and inconsistent adherence to infection control guidelines across various healthcare settings can lead to confusion and make it difficult for nurses to consistently implement preventive measures [20].

Another substantial challenge faced by nurses in HAI prevention is the rise of antibiotic-resistant pathogens, such as methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant enterococci (VRE). These resistant bacteria pose a severe threat to patient safety and can complicate treatment regimens, emphasizing the importance of nurses remaining vigilant in implementing infection control measures to curb their spread. Additionally, the growing prevalence of multidrug-resistant organisms in healthcare settings underscores the significance of nurses staying updated on the latest trends in antimicrobial resistance and adjusting their practices accordingly [21].

Inadequate communication and collaboration among members of the healthcare team can also hinder nurses' efforts in preventing HAIs effectively. Effective teamwork and clear communication are essential for executing comprehensive infection control strategies, such as appropriate isolation protocols, prompt reporting of suspected infections, and care coordination to minimize the risk of cross-contamination. Communication breakdowns can lead to errors in infection control practices, potentially resulting in a higher incidence of HAIs [22].

Furthermore, environmental factors within healthcare facilities, such as overcrowding, inadequate ventilation, and contaminated surfaces, present additional challenges for nurses in

preventing HAIs. Poorly designed healthcare spaces and inadequate infection control infrastructure can contribute to pathogen transmission and compromise patient safety. Nurses must address these environmental challenges while implementing preventive measures to effectively reduce the risk of HAIs [23].

The impact of nurse-led interventions on reducing the incidence of hospital acquired infections:

Nurse-led interventions are vital in decreasing the occurrence of hospital-acquired infections, a significant concern in healthcare facilities globally. These infections can lead to extended hospital stays, heightened healthcare expenses, and in severe cases, can even result in fatalities [24]. Nurses, being at the forefront of healthcare provision, are uniquely positioned to execute interventions that effectively curb the transmission of infections within healthcare environments. Apart from adhering to infection control protocols, nurses can also implement strategies aimed at lowering the likelihood of specific types of hospital-acquired infections. For instance, they can ensure the proper insertion and maintenance of indwelling catheters to minimize the risk of catheter-associated urinary tract infections. Additionally, nurses can vigilantly monitor patients for indications of surgical site infections and enforce preventive measures to mitigate their occurrence [25].

Moreover, nurses can play a role in the timely detection and management of infections by routinely observing patients for signs and symptoms of infection. By promptly identifying and treating infections, nurses can help prevent their dissemination to other patients and alleviate the overall burden of hospital-acquired infections within healthcare facilities [26]. Furthermore, nurse-led interventions can extend to enhancing the overall cleanliness and hygiene of healthcare establishments. Nurses can collaborate with environmental services personnel to ensure that patient rooms and communal areas receive regular and thorough cleaning and disinfection. By upholding a clean and hygienic environment, nurses can aid in reducing the risk of infection transmission within healthcare facilities [27].

Another crucial facet of nurse-led interventions in the reduction of hospital-acquired infections involves the implementation of antimicrobial stewardship programs. Nurses can engage in collaborative efforts with other healthcare professionals to ensure the prudent prescription of antibiotics in line with evidence-based guidelines. By curbing the overuse and misuse of antibiotics, nurses can help diminish the emergence of antibiotic-resistant infections and constrain the proliferation of multidrug-resistant organisms within healthcare settings [28].

Conclusion:

In conclusion, hospital-acquired infections (HAIs) pose a significant threat to patient safety, with various factors influencing their occurrence, including infection control practices, patient immune status, and pathogen prevalence. Nurses play a crucial role in preventing HAIs through their knowledge, attitudes, and practices. However, they face challenges such as workload, limited resources, inadequate training, antibiotic resistance, communication barriers, and environmental factors. Nurse-led interventions are instrumental in reducing the incidence of HAIs by implementing infection control measures, monitoring patients, ensuring cleanliness, and promoting antimicrobial stewardship. By addressing these challenges and implementing effective interventions, nurses can contribute to creating a safer healthcare environment and improving patient outcomes.

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