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The function of nursing in hospital infection prevention

by:

Jassim abdulmageed aljassim

SALEH RADHI ALHAZOOM

TAHER ALI ALSALEM

AYAAT SALEH ALSALEM

Basmah Hussain ALKhalifah

MOHAMMED ALI ALSALEM

Fadi Naji Alhaidar

Abdullah ali alqurayn

ALZAIN AYMAN ABDULLAH A

Azhar Abdullah Buamer

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Abstract

Hospital-acquired infections (HAIs) are a global concern, posing significant challenges to patient safety and healthcare systems. Nurses play a crucial role in infection control within hospitals, serving as frontline warriors in the battle against HAIs. This paper explores the multifaceted role of nursing in infection prevention and control, highlighting strategies and interventions employed by nurses to mitigate risks, enhance patient safety, and uphold healthcare excellence. Nurses' responsibilities encompass leadership support, patient education, healthcare worker training, implementation of transmission-based precautions, and adherence to standard precautions. Challenges facing nursing in hospital infection control include staffing shortages, compliance with protocols, resource constraints, patient factors, and emerging pathogens. Addressing these challenges requires collaborative efforts, ongoing education, and proactive measures to strengthen nursing's role in preventing the spread of infections within hospitals.

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Introduction:

Atalla et al. (2016) state that infection control is a critical component of any health care delivery system whose objective is the prevention of healthcare-associated infections (HCAIs). Shakravarthy et al. (2015) define infection prevention and control as the application of systematic procedures, measures, and protocols to reduce the risk of healthcare-associated infections (HCAIs). The objective of these measures is to establish a secure healthcare setting by implementing procedures that reduce the likelihood of infectious agent transmission. A global issue, infection in healthcare facilities is a significant contributor to hospital-acquired morbidity and mortality (Allegranzi et al., 2011). According to the World Health Organisation (WHO), between 7 and 10% of hospitalized patients will contract at least one health care-associated infection at any given time. This results in substantial mortality rates ranging from 5% to 10% and causes financial losses for health systems (WHO, 2015). Fortunately, according to Bagheri et al. (2014), HCAIs are avoidable complications that can be prevented with adherence to effective infection prevention and control (IPC) practices. Despite significant advancements in health care technologies and scientific discoveries, people have been afflicted with healthcare-associated infections in health care settings since their inception as institutions for curing the ill. As a result, IPC has emerged as an ongoing and fundamental safety concern in the majority of healthcare facilities across developed nations (Storr et al., 2017).

Universal safe IPC practices have been established in clinical settings by the majority of patient safety programmes in order to reduce the risks posed by such HCAIs. In the majority of African nations, reports of HCAI prevalence rates are insufficient; hospital-wide prevalence surveys and

literature on the incidence of HCAI outbreaks indicate rates ranging from 2.5% to 14.8% (Mbim et al., 2016); in Egypt, the documented prevalence is 16%, with intensive care unit rates reaching as high as 26%; and in India, the prevalence ranges from 6% to 18% (WHO, 2013). Surgical site infections (SSIs) affect an average of 5.7% to 30% of the population in African nations, according to some systematic reviews; in Kenya, 19%, Tanzania, 10%, Uganda, and Benin, 22.3%, respectively (Nejad et al., 2011). These instances effectively demonstrate the urgent requirement to identify and implement feasible and sustainable strategies to enhance HCAI prevention, surveillance, and control beyond the African continent. Regarding the effective prevention of HCAIs in hospitals, isolation precautions are advised by the Centers for Disease Control and Prevention (CDC). There are two tiers to these precautions: transmission-based precautions (TBP) and standard precautions (SP). A standard comprises a collection of infection prevention practices that are universally applicable to all healthcare settings and patients, irrespective of confirmed or suspected infection status (Siegel et al., 2007). SP primarily encompasses the following: hand hygiene; utilization of personal protective equipment (e.g., face shield, gown, mask, or eye protection) in accordance with the expected level of exposure; and secure injection procedures. In addition, refuse management and equipment or item maintenance in the patient environment. The principal IPC strategy for averting healthcare-associated infections is the implementation of these SP practices (Reid, 2013; Aiken et al., 2013). The implementation of "safe and sound" patient care practices has been shown to decrease the incidence of postoperative infections by 20% to 34%, according to scientific evidence (Koros et al., 2018). Systematic evaluations of evidence indicate that increased risk for HCAIs is attributable to health care workers' noncompliance with these IPC

practices and procedures (15). The compliance rate of health care personnel with IPC practices in primary health care facilities was estimated to be 31% by Storr et al. (2017). Compliance was 61%, according to a self-reported study conducted in a different hospital (Gichuhi et al., 2015). Notwithstanding the prevalence of healthcare-associated infections (HCAIs) in hospitals, where strict adherence to IPC practices is imperative, this remains the case. These results indicate that health professionals engage in selective and suboptimal compliance, thereby subjecting themselves to preventable hazards (Zachariah et al., 2014). The majority of the health care workers (HCWs) team consists of nurses, who are also the primary providers of health care (Koros et al., 2018). IPC practices are intricately intertwined with routine nursing services and procedures due to the close proximity and interaction that nurses maintain with patients who are afflicted with various infections. Thus, by adhering rigorously to IPC practice indications, nurses play a crucial role in breaking the chain of infection (Kim et al., 2015).

- ✓ **Hospital-acquired infections:**

Hospital-acquired infections, also known as healthcare-associated infections (HAIs), are infections that patients develop during the course of receiving medical care in a healthcare facility, such as a hospital or clinic. These infections can be caused by bacteria, viruses, fungi, or parasites and can manifest in various ways, ranging from mild to severe. Common types of hospital-acquired infections include surgical site infections (SSIs), which occur at the site of a surgical incision or wound; urinary tract infections (UTIs), often associated with the use of urinary catheters; central line-associated bloodstream infections (CLABSIs), which occur in patients with central venous catheters; ventilator-associated pneumonia (VAP), a type of pneumonia that develops in patients

on mechanical ventilation; Clostridium difficile infection (CDI), a bacterial infection of the colon; bloodstream infections, often associated with intravenous catheters; and skin and soft tissue infections, which can result from surgical procedures or breaks in the skin (Khan, H. A. et al.2017).

✓ **Common symptoms of hospital-acquired infections (HAIs):**

1. **Fever:** Fever is a common symptom of infection, including HAIs. It may indicate the body's immune response to an invading pathogen.
2. **Localized Pain or Swelling:** Infections at the site of a surgical wound, catheter insertion site, or other medical devices may cause localized pain, tenderness, redness, or swelling.
3. **Increased Heart Rate (Tachycardia) or Breathing Rate (Tachypnea):** Infections can lead to an increased heart rate or breathing rate as the body attempts to fight off the infection and deliver oxygen to tissues. According to (Mehta, Y., et al.2014).
4. **Malaise:** Patients with HAIs may experience a general feeling of discomfort or unease, often described as malaise.
5. **Respiratory Symptoms:** Infections such as pneumonia acquired in the hospital may present with symptoms such as cough, shortness of breath, chest pain, and difficulty breathing.
6. **Urinary Symptoms:** Urinary tract infections (UTIs) acquired in the hospital may cause symptoms such as burning with urination, frequent urination, urgency, and cloudy or foul-smelling urine. According to (Mehta, Y., et al.2014).
7. **Gastrointestinal Symptoms:** Infections such as Clostridium difficile (C. difficile) colitis may cause symptoms such as diarrhea, abdominal pain, cramping, and fever.

Patients and healthcare providers should remain vigilant for any signs or symptoms suggestive of infection, particularly in individuals with risk factors for acquiring HAIs, such as prolonged hospitalization, recent surgery, or compromised immune function (Khan, H. A. et al.2017).

- ✓ **The Nurse's Function in Preventing Infections**

Nurses serve as the primary and most frequent line of defense against hospital-acquired infections (HAIs) within the healthcare ecosystem. Their distinctive role, characterized by ongoing and direct patient care, situates them at the vanguard of endeavors to prevent infections. The delivery of secure and effective care is ensured due to the multifaceted nature of their responsibilities, which also serves to reduce the potential transmission of infectious agents.

Hand hygiene is fundamental to the prevention of infections. Although seemingly straightforward in concept, consistent and appropriate hand hygiene has been demonstrated to significantly impact the containment of pathogens in healthcare settings. Adherence to recommended hand hygiene practices has been shown in numerous studies to substantially reduce the transmission of infectious agents and, as a result, the occurrence of healthcare-associated infections (HAIs) (Erasmus et al., 2010). Nurses, being the most frequently exposed healthcare professionals to patients, set an exemplary standard through their consistent adherence to thorough hand sanitation procedures. This ensures that no infections are acquired or transmitted during interactions with patients. The utilization and administration of Personal Protective Equipment (PPE) are equally as crucial as hand hygiene.

When utilized appropriately, face shields, masks, mittens, and gowns prevent the transmission of infectious agents. It is vital to ensure that PPE is worn, replaced, and discarded in an appropriate manner. In order to reduce the likelihood of contamination, nurses are instructed to adhere to stringent procedures when donning and doffing PPE (Siegel et al., 2007). Particularly when inserting catheters or treating incisions, aseptic procedures are vital for preventing infections. Given that numerous HAIs are attributable to invasive procedures, it is impossible to overstate the significance of maintaining a sterilized environment. Nurses rigorously adhere to aseptic protocols in order to maintain the cleanliness of instruments, equipment, and the surrounding environment, thereby minimizing the likelihood of infection significantly (Loveday et al., 2014).

Nevertheless, nurses play a broader role in infection prevention than simply providing direct care. Patient educators play a critical role in imparting knowledge to patients and their families regarding the significance of implementing infection prevention measures. Nurses assist patients in becoming informed contributors to their own care and recovery by providing guidance on indwelling medical device maintenance, instructing them on wound care after discharge, and elucidating the importance of hand hygiene (Mitchell et al., 2019).

In addition, nurses frequently engage in collaborative efforts with infection perfectionists and other healthcare team members. By engaging in consistent training sessions, discussions, and meetings, they remain informed about the most recent evidence-based practices in the field of infection control. The input provided by individuals, grounded in personal experiences and observations, is of immense value when it comes to influencing and perfecting approaches to infection control within healthcare environments.

The increasing prevalence of antibiotic-resistant bacteria has further emphasized the criticality of nurses' responsibilities in infection prevention. Nurses employ various strategies to address the concern of antibiotic resistance, including the precise administration of antibiotics, patient education regarding the significance of completing antibiotic courses, and ensuring that patients receive the appropriate dosage at the prescribed intervals (Goff et al., 2012).

In summary, although cutting-edge medical procedures and technologies are fundamental components of contemporary healthcare, human interaction continues to be indispensable. As a result of their commitment, proficiency, and scrupulous focus on particulars, nurses form the cornerstone of hospital infection prevention. In their capacity as defenders of patient well-being, they guarantee that healthcare establishments continue to be secure havens for recuperation and restoration.

- ✓ **Training and Education for the Prevention of Infections**

The healthcare environment is ever-changing and dynamic, as new pathogens emerge and established ones acquire resistance. It is of the utmost importance that healthcare professionals, especially nurses who are in direct contact with patients, remain current on the most effective infection prevention methods. This requirement highlights the significance of continuous education and training, which guarantees that every healthcare professional possesses the necessary expertise and abilities to safeguard both themselves and their patients.
In the domain of healthcare, the importance of education cannot be overstated. Stone et al. (2014) discovered that the implementation of ongoing educational interventions resulted in increased adherence to preventive measures, which subsequently contributed to a decline in healthcare-

associated infections. This finding emphasizes that healthcare personnel are more inclined to apply the knowledge they acquire in practice when they are equipped with the appropriate information. Simulation-based training is currently being integrated by numerous institutions alongside conventional classroom-based learning. This type of instruction provides an opportunity for hands-on learning by allowing nurses and other healthcare personnel to practice infection control techniques in a controlled environment. According to the findings of Paige and Morin (2013), the implementation of simulation exercises can significantly aid in the improvement of practical skills necessary for infection prevention and the retention of information.

The advent of online learning modules and platforms provides an additional pathway for education. Digital platforms offer a high degree of flexibility, allowing healthcare professionals to engage in self-paced learning and review the material whenever necessary. According to Muralidhar and Muralidhar (2016), there has been a surge in the adoption of e-learning modules pertaining to infection prevention. Research has demonstrated that these modules enhance healthcare professionals' understanding and compliance with infection control protocols. The significance of interdisciplinary training sessions is expanding beyond individual education. These sessions facilitate the convergence of experts from diverse fields, encouraging cooperation and the exchange of knowledge. According to Ward (2011), an examination of these interactions can facilitate the closure of knowledge gaps and guarantee that every member of the healthcare team has the same perspective regarding infection prevention. In addition, audit and continuous feedback systems are indispensable in the field of education. Consistent evaluations and feedback mechanisms enable academic establishments to assess the efficacy of their instructional initiatives,

pinpoint areas that require enhancement, and implement essential adjustments. According to Gould et al. (2017), the implementation of iterative feedback mechanisms in infection prevention education has the potential to greatly improve its quality and effectiveness.

In the dynamic realm of medicine, it is evident that current, evidence-based education is indispensable. In light of evolving healthcare dynamics and the emergence of novel challenges, it may be necessary to modify the instruments and strategies utilized in infection prevention. By remaining current with these developments, healthcare professionals, particularly nurses, can guarantee they are providing their patients with the safest and most effective care possible through ongoing education and training.

- ✓ **The Role of Teamwork and Dialogue in the Prevention of Infections**

Within the complex realm of healthcare, collaboration and communication are fundamental pillars. Effective infection prevention is a collaborative endeavor that necessitates the participation of professionals and departments from various fields; it cannot be attributed to a single entity. Due to the interdependent nature of the healthcare sector, information must transfer effortlessly between specialists to ensure that all personnel possess the requisite understanding to safeguard patients. Infection prevention collaboration is crucial, as demonstrated by a multitude of studies. A seminal study by Dingle et al. (2015) established that healthcare facilities characterized by robust interdisciplinary collaboration exhibited notably reduced incidences of healthcare-associated infections in contrast to those that maintained departmental silos. The convergence of expertise from various fields in order to deliberate, plan, and execute infection control measures results in more comprehensive and efficacious resolutions.

In a similar fashion, effective communication is indispensable. Inadequate communication or miscommunication may result in errors, neglected interventions, or insufficient implementation of infection control measures. Nearly sixty percent of medical errors were attributed to disruptions in communication, according to a study by Leonard et al. (2004), underscoring the critical need for transparent and unobstructed channels of communication in healthcare.

Furthermore, the communication practices of healthcare professionals have been revolutionized by electronic health records (EHRs), which were made possible by the development of health information technology. Electronic health records (EHRs) provide real-time updates on patient conditions, facilitating access to the most recent patient data by physicians, nurses, and other personnel. This enables informed decision-making with regard to infection control (Menachemi and Collum, 2011). The ability to promptly respond to emergent infection threats is enabled by this immediate access, which guarantees timely interventions.

Furthermore, collaboration and communication transcend the boundaries of specific institutions. Hospitals, research institutions, public health agencies, and even nations must exchange information, strategies, and insights due to the global nature of health threats. Heymann and Shindo (2013) delineate that global communication networks facilitated prompt reactions amidst the HIN1 pandemic, thereby mitigating the disease's transmission and ramifications.

Nonetheless, in order for these endeavors to be successful, it is critical to cultivate a culture that places a premium on communication and collaboration. In this context, leadership is crucial. Leaders can optimize the utilization of their teams' collective intellect in combating infections by

fostering an atmosphere that promotes open dialogue, standardizes interdisciplinary collaboration, and attributes value to all contributions.

In summary, although technologies and methodologies do contribute substantially to infection prevention, the human element, particularly the capacity for efficient collaboration and communication, continues to be of utmost importance. Victory in the fight against healthcare-associated infections will be secured by this coordinated, collective effort.

- ✓ **Obstacles and Remedies in the Field of Infection Prevention**

While striving to provide the highest quality of patient care, healthcare practitioners encounter a multitude of obstacles in the realm of infection prevention. In addition to a plethora of healthcare practices, patient populations, and technologies, the contemporary healthcare environment presents novel challenges and inventive approaches to preventing healthcare-associated infections (HAIs).

A significant obstacle that has arisen is the proliferation and advent of multidrug-resistant organisms (MDROs). The growing resistance of specific pathogens to conventional antibiotics presents a challenge in terms of treatment complexity and an elevated risk to patients. In their 2018 study, Tacconelli et al. (2018) drew attention to the correlation between MDROs and escalating rates of morbidity, mortality, and hospital expenditures. One potential resolution to this issue is the strict enforcement of antimicrobial stewardship programmes, which promote the prudent administration of antibiotics and thereby hinder the development of resistance (Baur et al., 2017).

An additional obstacle pertains to the uniformity of infection control protocols when implemented in various healthcare environments. Although guidelines may be in place, their practical

implementation may differ due to factors such as the expertise of the staff, the availability of resources, and the culture of the institution. Consistent feedback to healthcare teams and the standardization of care processes significantly decreased HAIs, according to Pronovost et al. (2006). This methodology emphasizes the significance of consistent procedures and the benefit of oversight and input in guaranteeing adherence.

Resource constraints, especially in contexts with lower incomes, present an additional substantial obstacle. Inadequate availability of critical infection control supplies, including sanitation materials and personal protective equipment, impedes the efficacy of infection prevention measures. Many institutions are turning to innovative, low-cost solutions to combat this. An investigation conducted by Allegranzi et al. (2013) recorded the triumph of a multimodal hand hygiene campaign in settings with limited resources, illustrating that effective infection prevention remains feasible despite difficult conditions, through the application of ingenuity and dedication.

The swift progression of technological innovations in the healthcare sector, although providing manifold advantages, also introduces novel complexities. Irregularly managed invasive medical devices, including ventilators and catheters, which are vital for sustaining life, may serve as potential reservoirs of infection. Sustained technological advancements and ongoing training are crucial in order to ensure that the necessary skills and knowledge to utilize medical technologies safely progress in tandem with their development (Salgado et al., 2017).

In summary, achieving effective infection prevention in the healthcare sector is fraught with numerous obstacles. However, each challenge presents itself as a chance to develop inventive resolutions. By means of research, collaboration, and a steadfast dedication to patient safety,

healthcare practitioners are capable of and will discover strategies to overcome these obstacles, thereby guaranteeing that patients are attended to in the most secure setting feasible.

Conclusion:

In conclusion, nurses are indispensable in the fight against hospital-acquired infections, leveraging their expertise, compassion, and dedication to safeguard patient health. Despite facing various challenges, nurses continue to demonstrate resilience and commitment to infection prevention and control. To further strengthen nursing's role in this vital area, healthcare organizations must prioritize leadership support, invest in education and training, provide adequate resources, and foster a culture of safety and collaboration. By empowering nurses and enhancing infection control practices, hospitals can effectively reduce the incidence of HAIs, improve patient outcomes, and ensure a safer healthcare environment for all.

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