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The Role of Nursing Interventions in Reducing Hospital-Acquired Infections

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ABSTRACT

Nurse staffing is essential because nurses may provide direct patient care at their bedsides, minimize adverse outcomes, boost patients' health, and increase their satisfaction with healthcare services. The caliber of patient care and the shortage of registered nurses (RNs) are among the issues raised by the restriction of rising health spending on nurse staffing. Maintaining high-quality patient care while reducing the number of nurses on staff is challenging. (American Nurses Association, 2018).

Minimum ratios of nurses to patients in acute care facilities were authorized by California law in 1999, and in general medical-surgical units, in 2005, the ratio was increased to five patients per nurse. Nursing hours per patient day (NHPPD), or the minimal nurse-to-patient ratio, is legislated in other nations as well, including Australia, Japan, Taiwan, and Germany. (Simon, M., & Mehmecke, S., 2017).

KEYWORDS: nursing staff,infections.

1. Introduction

Nurse staffing is essential because nurses may provide direct patient care at their bedsides, minimize adverse outcomes, boost patients' health, and increase their satisfaction with healthcare services. The caliber of patient care and the shortage of registered nurses (RNs) are among the issues raised by the restriction of rising health spending on nurse staffing. Maintaining high-quality patient care while reducing the number of nurses on staff is challenging. (American Nurses Association, 2018).

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minimal nurse-to-patient ratio, is legislated in other nations as well, including Australia, Japan, Taiwan, and Germany. (Simon, M., & Mehmecke, S., 2017).

Higher nurse staffing levels are associated with better patient outcomes., according to numerous research. We also discovered a connection between hospital staffing levels and nurses readmissions in our most recent review research. In 2008, roughly 134,000 older adults, or one in seven Medicare enrollees, experienced at least one hospital-acquired ailment during each hospital stay. Of One of the main causes of death for patients is hospital-acquired diseases, which are believed to be avoidable with current evidence-based management. The nonpayment policy of the Centers for Medicare and Medicaid Services (CMS) is one of the measures that have been implemented to reduce conditions acquired in hospitals. In order to prevent hospital-acquired conditions, CMS required hospitals to conduct efforts for quality improvement and the care process modifications. (Bae & Yoder, 2015).

2. Aims and Objectives

to thoroughly examine and compile original research on the connection between hospital-acquired illnesses and nurse staffing.

3. Literature Review

Numerous studies have looked at the relationships between hospital-acquired conditions and nurse staffing and discovered that higher nurse staffing levels are associated with fewer falls and different infections. According to a systematic evaluation of studies, between 1990 and 2006, there was a relationship between greater proportion of registered nurses to patients and lower rates of sepsis, pneumonia, and nosocomial bloodstream infections. The association between hospital-acquired illnesses and nurse staffing, such as pressure ulcers and falls, was less constant, according to a recent analysis that offered a thorough analysis of the connection between patient outcomes and nurse staffing. (Shin et al., 2019).

One of the main causes of morbidity and mortality in the United States is nosocomial or hospital-acquired infections (HAI). Over the years, numerous research have been carried out to describe and measure this constantly expanding public health issue. A 2002 study that was released in 2007 indicated that there were 1.7 million HAIs in US hospitals, including federal facilities, and that the illness was directly responsible for about 99,000 deaths. Intensive care units (ICUs) had the highest infection rates per 1000 patient-days, followed by high-risk nurseries. (McFee, 2009).

A sizable portion of infections were related to surgical sites. Urinary tract infections accounted for 36% of HAI in this study, followed by surgical site infections (20%), pneumonia (11%), and bloodstream infections (11%). 1.9 million, according to the Centers for Disease Control and Prevention's projection. HAI in 1995. The following infections were linked to the deaths: 11,062 other infections, 13,088 urinary tract infections, 8,205 surgical site infections, 30,665 bloodstream infections, and 35,967 pneumonia. These data roughly match other national estimates. (McFee, 2009).

Risk factors for hospital-acquired infections

Invasive technologies used, for instance, to treat and monitor patients in intensive care units (ICUs) raised the risk of hospital-acquired infections. The International Nosocomial Infection Control Consortium (INICC) reports a greater rate of device-associated infections (DAIs) than the US National Healthcare Safety Network (NHSN). 5.3% of Chinese patients, 12.2% of Colombian patients, and 13% of Peruvian intensive care unit patients had DAI. There was evidence that hospital-acquired illnesses linked to devices lengthened hospital stays and raised mortality rates. DAIs in critical care units were high and caused additional expenses for patients, according to research conducted in underdeveloped nations. (Yallew et al., 2017).

Hospital ward patients are vulnerable to healthcare-associated infections (HAIs). Due to the complexity of hospital surroundings, risk factors for these infections range amongst individual site infections. Longer hospital stays, gender, intravascular catheter, surgery since admission, intubation, mechanical ventilation, patient age, hospital type, and urine catheter were all identified as risk factors for hospital acquired infections in earlier studies. (Yallew et al., 2017).

Types of HCAIs

Many healthcare-associated infections (HCAIs) are caused by implants and prostheses, in addition to infections that result from cross-contamination between patients and healthcare providers, infections at surgery sites (SSIs), and patients' susceptibility to common infections as a result of weakened immune systems. These include ventilator-associated pneumonia (VAP), catheter-associated UTIs, and central line-associated bloodstream infections (CLABSIs). (Taylor & Francis, 2018).

CLABSIs: Much focus has been placed on tackling the significant increases in morbidity, mortality, and health care expenditures caused by CLABSIs. As a result, there were 25,000 fewer CLABSIs in US hospital intensive care units in 2009 compared to 2001, a 58% decrease. This resulted in the preservation of almost 6,000 lives and an estimated $414 million in potential savings on unnecessary medical expenses, despite the high costs of preventing such infections. There are still a lot of CLABSIs, particularly in inpatient wards and outpatient hemodialysis facilities. Although reported infection rates in emerging nations vary widely (ranging from 20% to 62.5%), another study likewise found a significant correlation between morbidity and mortality with CLABSIs. Candida species, Gram-positive (33.2%), and Gram-negative (39.2%). bacteria (27.6%) were the most frequent causal pathogens. Eight days after the central line catheter was inserted, the patients had CLABSIs. Higher fatality rates were linked to a longer time with a higher Pitt bacteremia score (OR 1.41; 95% Cl=1.18–1.68) and the beginning of CLABSIs and catheter removal (OR 1.10; 95% CI=1.02–1.20)., according to multivariate analysis. (Taylor & Francis, 2018).

SSIs: Despite advancements in preventive measures, surgical site infections (SSIs), historically known as "wound infections," remain one of the most common side effects that hospitalized patients experience during surgery or during outpatient

procedures. The most frequent complication in postoperative surgical patients is SSI, which is linked to high mortality rates, substantial morbidity, and costly strain on both individual patients and national budgets. Infections that occur up to 30 to 90 days following surgery in individuals who receive an organ, cell group, or technology and impact deeper tissues as well as the site of the incision surrounding the surgical site are known as surgical site infections (SSIs). (Taylor & Francis, 2018).

CAUTIS

Around 40% of HCAIs worldwide are UTIs, making them the most prevalent microbial infection and the most common HCAI globally. They have a huge financial impact in addition to serious morbidity and death repercussions. Even though CAUTIs are usually benign, some people contain virulent bacteria that could be harmful but do not exhibit any symptoms. These patients had a threefold increased mortality rate compared to those who did not have a bacteriuria. Longer catheter stays, A rupture in the closed system of catheter drainage, female sex, advanced age, diabetes mellitus, absence of systemic antibiotics, and catheter implantation outside of the operating room are among the risk variables for CAUTIs that are revealed by multivariate analysis. According to reports, the rate of CAUTIs is approximately 5%, regardless of the length of the indwelling catheter. each day. The primary pathogenic bacteria that cause infections is E. coli, while a variety of other microbes, including eukaryotic fungi, have also been found. Increased bacterial resistance is frequently the result of repeated, improper antibiotic administration. (Taylor & Francis, 2018).

VAP

In addition to their initial sickness, patients in the intensive care unit are at danger of dying from healthcare-associated infections (HCAIs). More than 25% of patients in intensive care units get pneumonia, the second most prevalent healthcare-associated infection. VAP and motorized automated ventilation are linked to about 86% of HCAIs. This type of pneumonia affects 9% to 27% of people on assisted breathing, and VAP has been recognized globally as a possible leading reason for dying. After mechanical breathing and endotracheal intubation, the typical amount of time needed to develop VAP was two to three days. Patients typically experience fever, alterations in sputum, decreased white blood cell counts, changed bronchial sounds, and the presence of pathogenic organisms. (Taylor & Francis, 2018).

What Does an Infection Control Nurse Do?

An infection control nurse is a registered nurse (RN) who provides patients with infectious disease with the best care possible while putting best practices for stopping the spread of bacteria and viruses into practice. Strong attention to detail, the capacity to perform well under pressure, and outstanding communication skills are essential in this line of employment. To safeguard the public's and individuals' health, infection control nurses collaborate with government organizations, scientists, and public health specialists in addition to patients and doctors. In the US, there are almost two million healthcare-associated infections annually, which lead to almost 100,000 fatalities. (Mozafaripour, 2020).

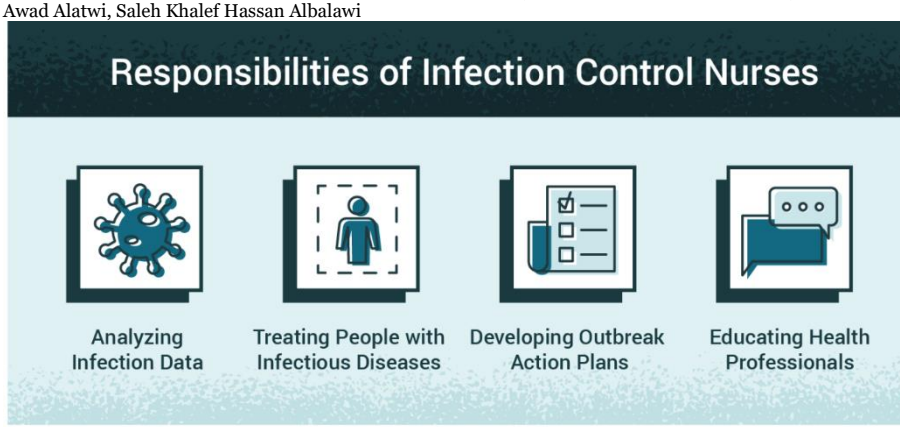

Figure 1. The duties of nurses in infection control. (Mozafaripour, 2020).

Among the duties of infection control nurses are:

- Collecting and evaluating infection data to make decisions based on facts
- Teaching public health and medical personnel infection prevention techniques to help in emergency preparedness
- To stop the spread of infectious diseases, afflicted people should be isolated and treated.
- helping to create plans of action in the event of a hospital or community outbreak in order to reduce the potentially disastrous effects
- Working together with governmental organizations like the CDC to guarantee the implementation and enforcement of infection control procedures
- Investigating viruses to identify their source in order to stop epidemics in the future
- helping doctors and scientists create medications and vaccinations to protect patients' and the public's health and safety. (Mozafaripour, 2020).

Evidence-Based Practice Implications

- The frequency of infections linked to healthcare can be significantly reduced by putting evidence-based practices into practice, such as the ones listed below:
- A key element of guaranteeing a secure healthcare environment for hospitalized patients is preventing infections linked to medical care.
- A key component of hospital-associated infection-reduction initiatives is hand cleanliness.
- Sepsis, urinary tract infections, central line infections, and antibiotic-resistant infections can all be avoided with nursing care practices.

- In individuals who are particularly vulnerable because of their advanced age, condition following surgery, or need for artificial ventilation, nursing care can directly help avoid hospital-associated pneumonia. The research indicates that Nursing care is provided in four areas: patient posture, respiratory care, hand hygiene, and staff education. most significantly contributes to the prevention of hospital-associated pneumonia.

- A comprehensive evaluation to ascertain whether aseptic insertion technique, indwelling catheter management to lower infection risk, and intelligent patient monitoring are necessary. for infection symptoms are all examples of nursing-related care intended to prevent urinary tract infections.

- Preventing central line port infection during blood collection and sterile dressing changes, maintaining the central line site to reduce the risk of infection, and ensuring maximal barrier precautions during line insertion are all nursing-related tactics to reduce the prevalence of infections linked to central lines.

- Preventing nosocomial infections (oral care and proper preparing to avoid nosocomial pneumonia, care of invasive catheters, skin care, wound healing, and so on), identifying patients at risk for infection, giving priority to cultures for patients with suspected infections, and offering shrewd clinical evaluation for the early recognition of sepsis are all examples of infection-prevention strategies for sepsis.

- Controlling antibiotic use, choosing the appropriate drug, and preventing patient-to-patient transmission are the primary areas of focus for the prevention of illnesses resistant to antibiotics.

- The best way to stop the spread of resistant organisms is to prevent infections from spreading from patient to patient by practicing good hand hygiene and general infection control procedures. (Kleinpell et al., 2008).

A crucial component of nursing care is staying current with research and evidence-based strategies for reducing infections linked to medical care.

According to reports, healthcare personnel do not strictly follow the various infection control measures. This could be because they do not recognize these measures, they do not know enough about them, or they have a negative attitude toward infection control measures, such as not having the necessary supplies and equipment. Amoran and Onwobe discovered that one of the most important concerns requiring immediate attention is the lack of awareness among employees regarding infection control and environmental hazards. Adly et al. discovered that because of the knowledge nurses acquired during the intervention or training program, the intervention had an impact on their adherence to infection control measures. (Nwozichi et al., 2018).

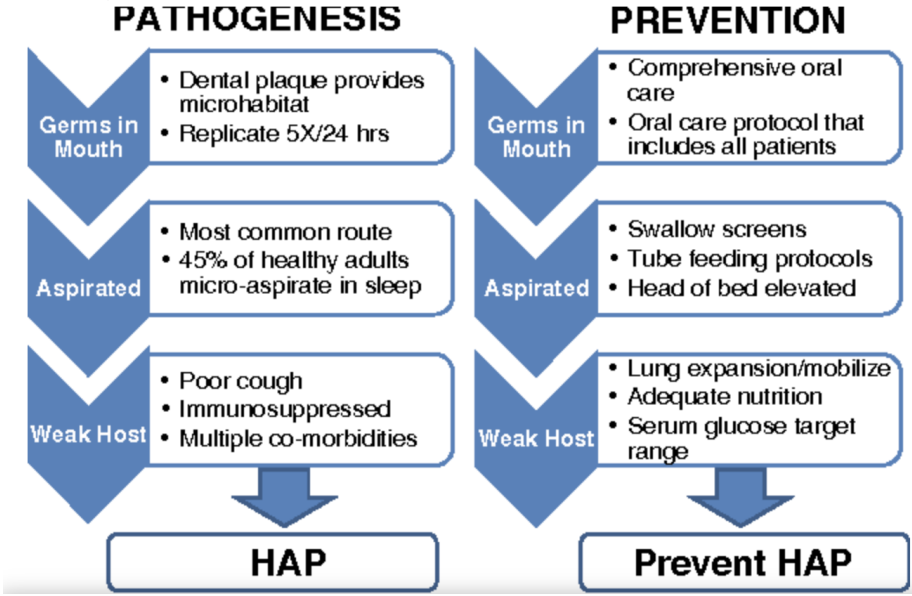

Figure 2. Hospital-acquired pneumonia: pathogenesis and prevention (HAP). (Quinn et al., 2014).

Implementing of an infection control link nurse program

Leadership, dedication, and resources are needed to implement strategies that increase adherence to hand hygiene and basic precautions. As an organizational goal, the leadership should encourage adherence to conventional precautions and hand hygiene. They should also model and reinforce hand hygiene behavior. (Ghorbanmovahhed et al., 2023).

Using a variety of strategies, putting the WHO's Multimodal Hand Hygiene Improvement Strategy into practice, hand hygiene role modeling, providing in-service training on hand hygiene, and putting infection control link nurse (ICLN) programs into place are some ways to improve healthcare workers' adherence to standard precautions and hand hygiene. The goals of the ICLN programs are to improve the knowledge of infection prevention among healthcare professionals, establish communication between hospital wards and the IPC team, and encourage ICLN as a resource for their colleagues. (Ghorbanmovahhed et al., 2023).

A variety of advantages of putting ICLN programs into place to boost compliance and fortify IPC measures have been investigated in early study. According to Sopirala et al. (2014), the ICLN program was successful in lowering methicillin-resistant Staphylococcus aureus infections and other HCAIs. However, there is a dearth of solid data regarding how well these programs work to increase adherence to hand cleanliness and recommended precautions. (Ghorbanmovahhed et al., 2023).

Collaboration between nurses and other healthcare professionals

The interprofessional team may include of hospital managers, doctors, nurses, and infection preventionists when it comes to infection prevention procedures. In this situation, doctors create and manage the patient's treatment plan. With the assistance of nursing staff members including patient care associates and nurse assistants, nurses are responsible for implementing these plans. By doing surveillance and offering suggestions for infection control and prevention procedures, infection preventionists try to stop HAIs. Overseeing all of these responsibilities and making sure that suitable infection prevention procedures and policies are created and applied correctly are the duties of hospital administrators. Physicians and nurses may have specific difficulties when collaborating at the point of care to avoid HAIs at the "sharp end," even though all of these roles must cooperate to meet infection prevention goals. For instance, while deciding whether to remove Foley catheters, nurses and doctors frequently work together. Additionally, when a doctor inserts a central line, nurses frequently help and supervise sterile technique. (Gregory et al., 2022).

Challenges to Interprofessional Teamwork

Interprofessional teamwork has historically been difficult in the healthcare industry, despite its benefits for patient safety. For instance, nurses and doctors typically operate in a formal or informal hierarchy where the nurse must submit to the doctor. This structure is still in place, but it has started to change, and nurses are becoming more independent. For example, many hospitals have adopted a nurse-driven Foley catheter removal policy to prevent CAUTIs. In order to lower the risk of infection from prolonged device insertion, this approach often permits a bedside nurse to remove a patient's Foley catheter without a doctor's approval when there is no longer a medical reason to keep the catheter in place. (Gregory et al., 2022).

However, because nurse deference to physicians, physician pushback, and miscommunication regarding device removal may affect protocol implementation, interprofessional coordination is important to the effectiveness of nurse-driven procedures for Foley removal. These obstacles to implementation allude to broader issues that hinder successful interprofessional teamwork, including responsibility, professional cultures (autonomous vs. collaborative), hierarchy, and attitudes toward interprofessional collaboration. However, studies show that when there is power distance, team member views like psychological safety can act as a mediator to increase team effectiveness. (Gregory et al., 2022).

4. Conclusions

Since it is challenging to gather data on these metrics, future research is required to investigate the variations in the association between nurse staffing and hospital-acquired conditions as well as to employ precise data collection on registered nurses' hours per patient day and total hours per patient day. According to the study's findings, having enough nurses on staff is a reliable sign that patients are receiving superior care. Nonetheless, ongoing it is recommended to conduct study to determine more certain links between hospital-acquired conditions and nurse staffing, as well

as to develop recommendations for nurse staffing tactics.

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