

# A Strategy To Prevent Acute Infections In Health Care Associations

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DOI: 10.29322/IJSRP.13.01.2023.p13312

<http://dx.doi.org/10.29322/IJSRP.13.01.2023.p13312>

Paper Received Date: 18th November 2022

Paper Acceptance Date: 27<sup>th</sup> December 2022

Paper Publication Date: 6<sup>th</sup> January 2023

**Abstract-** Healthcare-associated infections are the most common kind of patient harm in hospitals. Although 5–10% of hospitalized patients in developed countries have similar infections, the burden of disease is much higher in low- and middle-income countries. Preventing the spread of infectious diseases requires widespread, systematic use of hygiene practices by healthcare workers, but only around 40% of those who should comply actually do so. There are several reasons why hand cleaning is so important in a healthcare setting. It prevents patients from catching infectious diseases that originate inside their bodies as well as those brought in from outside, as well as the spread of germs from one person to another. When combined with other safety measures, it protects medical personnel from the hazards of occupational infections. Reports show that for every 100 hospitalized patients, 10 in emerging and low-income countries and 7 in high-income economies contract at least one HCAI. Almost all pathogenic microorganisms are now resistant to antibiotics, and few novel antimicrobials are being developed and released. This narrative review's research was conducted by first searching for the phrases "measures," "prevention," and "healthcare-associated illnesses," and then using the APA citations found in the most influential articles to narrow

down the results. Both Google Scholar and PubMed were used to find relevant articles for this review. We found that although the concept of keeping one's hands clean is centuries old, it is still the most widely used strategy for avoiding HCAs around the world. It's just one of several methods used to maintain hospitals free of harmful microbes like MRSA (multidrug-resistant staph aureus) and to keep patients comfortable. In conclusion, antibiotic stewardship is essential in reducing the impact of HCAs since it helps to preserve the antibiotics that are currently in use.

**Index Terms-** Health care associations, prevention, hand hygiene, environmental hygiene

## I. INTRODUCTION

### Background of the Study

Healthcare-associated infections (HCAI) impact 5 million individuals annually in Europe, leading to an estimated €13–€24 billion in costs and anywhere from 50,000 to 130,000 deaths. It was expected that there would be 1.7 million HCAI cases each year in the United States, with 99,000 deaths and a total annual expenditure

of US\$6.5 billion. Estimates put the global prevalence rate at between 5 and 10 percent of all hospital admissions and 20 and 30 percent of all patients transferred to critical care (Allegranzi et al., 2011).

Health care-associated infection is the worst infectious disease pandemic in human history, claiming the lives of an estimated 250,000 people annually in the U.S.A and Europe at a cost of €30 billion. It is estimated that 2500 lives and €3 billion per year might be saved if HCAI rates were lowered by 10%. The incidence of healthcare-associated infections (HCAIs) is rapidly increasing and is now the second leading cause of death worldwide, after cardiovascular disease. Ten percent of people who have one kind of HCAI in low- and middle-income countries and seven percent of patients in greater nations die from their infection, according to the World Health Organization and other studies (Tartari et al., 2011).

In the United States, for example, it is estimated that 1.7 million persons contract HCAIs year (a higher proportion of 4.5%), leading to 90,000-99,000 deaths. Another study found that each year in the European Economic Area there were 2,609,911 new instances of HCAI, leading to a total of 2,506,091 DALYs (Disability-Adjusted Life Years) lost, or 501 DALYs per 100,000 people. According to the study, the total incidence of HCAIs in LMICs is between 5.7% and 19.1%. However, data on HCAIs is scarce, especially in LMICs due to compromised infrastructure (such as data retention) as well as a lack of resources (Khan, 2017). The World Health Organization (WHO) undertook a multicenter research to assess HCAIs in ICUs. The data showed that 51% of patients who are admitted to ICUs had HCAIs, which lengthened their hospital stays and increased the probability that they would get more infections and other morbidities. Respiratory distress infections, diarrheal disorders, measles, HIV/AIDS, malaria, and tuberculosis account for the vast majority of the 15 million deaths annually attributable to infectious diseases. As a result, HCAIs place a substantial economic burden on individuals, societies, and governments worldwide. More than 1.5 million patients in developed and less developed nations are afflicted with these diseases at the present time, according to estimates. On the other hand, with the right IPC planning and strategy in place, most HCAIs can be avoided. In this article, we'll look at the most current discoveries and developments in hospital infection control around the world (Pittet et al., 2000).

Due to the fact that the vast majority of HCAIs are communicated by direct contact with infected individuals, hand hygiene is viewed as crucial in the battle against such a pandemic. A quick alcohol hand massage has been demonstrated to be an efficient method of cleaning hands thoroughly in very little time. Although the relative risk level of different care tasks and the best technique to designate key moments for handwashing action is still being debated amongst infection control specialists, the "5 times for hand washing" are generally regarded as critical occasions for good hand hygiene. These five situations, however, can be simplified into two basic crucial actions: (1) washing hands before coming into contact with the patient, and (2) washing hands after leaving the contaminating healthcare area (the patient's bedroom). Authorities in public health have decried the alarmingly low rates of adherence among healthcare workers (HCWs). Even though there isn't a standard way to measure how well people follow hand hygiene guidelines, the majority of studies do incorporate such direct

observation (Danasekaran et al., 2014).

In today's world, hand washing is recognized as a vital part of any infection prevention strategy. The increased prevalence of health care-associated infections (HCAIs), the complexity of patients' conditions and treatments, and the emergence of MDR pathogen diseases have prompted a return to fundamentals in infection prevention, such as hand washing. This is because there is solid evidence to support the idea that improved hygiene practices in healthcare settings can significantly reduce the spread of disease (HCFs) (World Health Organization, 2011).

### Normal flora of hands

There are two types of germs that can colonize hands: resident flora, which comprises of microorganisms residing just under the stratum corneum's surface cells, and transitory flora, that colonizes the skin's outer layers and is more easily removed by frequent hand hygiene. Some germs that are only temporary visitors to the skin can stick around. Health care workers (HCWs) often pick them up via contact with patients or their surrounding contaminated environmental surfaces, as these organisms are the most typically connected to HCAIs1-3 (Improta et al., 2018).

### Statement of the Problem

Healthcare-associated infections are gaining the attention of patients, insurers, government, and regulators. This is owing to both the enormity of the problem in terms of the linked morbidity, death, and cost of treatment and also the emerging knowledge that the most of these may be prevented. At the same time that the medical world is witnessing unprecedented changes inside the pathophysiology of contagious diseases, they are also witnessing the global transmission of infection with drug resistance. The primary focus of the research was a strategy for reducing the prevalence of hospital-acquired infections.

## II. REVIEW OF LITERATURE

In the medical field, clean hands are essential for numerous reasons. Endogenous and exogenous illnesses in patients, hospital-wide contamination with possible pathogens, and the spread of microbes from one patient to another are all avoided. When used in combination with other safety measures, it safeguards medical professionals from the risks of occupational infections (Sax et al., 2007).

### Indications

Indications for hand hygiene are explicitly specified by authoritative agencies, along with the Centers of Disease Control and Management and the World Health Organization (WHO) Having an understanding of the fundamentals of microbial pathogenic cross-transmission in a healthcare context is crucial for appreciating these indicators. The skin and surrounding tissues of humans are invaded by numerous microbial species. When hospitalized, patients eventually shed these bacteria onto various objects in their surroundings (e.g., bed linens and bedside furniture) (e.g., bed linens and bedside furniture). As a result, hospitals are home to a diverse collection of microbiomes. "Patient zones" are defined as the space immediately surrounding a single patient. Health care personnel, patients, and sometimes even visitors all contribute to the spread of bacteria in other parts of the hospital, such as the hallways and public areas. Potential germs are most often spread from one location to another by the bare hands of

health care personnel. Medical personnel are required to practice strict hand hygiene whenever they come into contact with a patient or enter a patient care area. When contacting a patient, it is crucial to practice hand hygiene first. Hand hygiene should be administered close to the site of treatment to avoid reinfection if hands come to contact with something remote from the patients, such as a doorknob. Hand washing must be completed between the time a person's hands touch an object outside the patients zone and the time those hands touch something inside the patient zone, ideally right before making contact with the patient. The time between leaving a patient and contacting something outside of the patient zone is also an important time to wash your hands. If you follow these instructions, you can reduce the likelihood of spreading disease in a medical facility. Since the patient's immediate surrounds are also contaminated by the patient's skin flora, contact with things positioned in the patient's environment, including a monitor, side table, or bed rail, must be accompanied by the use of hand hygiene even if there is no direct touch with the patient. It's also important to keep some parts of the body as germ-free as possible. These include mucous membranes, skin breaks (such as those caused by surgery), and locations where invasive devices have been inserted, all of which have a weakened host defensive mechanism (e.g., vascular or urinary catheters and endotracheal tubes).<sup>4</sup> There should be no transfer of microorganisms from a healthcare provider's hands, the patient's skin, or the surrounding environment into these immunocompromised areas. Because of this risk of colonization and eventual illness, it is crucial to practice hand cleanliness before touching nonimpact mucous membranes and skin and before handling intrusive equipment. Last but not least, proper hand washing safeguards medical staff. Workers in the healthcare industry may come into contact with bodily fluids like blood and respiratory secretions during the course of their duties. To avoid infection and transmission, hand hygiene must be undertaken quickly after performing a tasks associated with a possibility of hand exposure to bodily fluids, even in the lack of obvious soiling and yet when gloves have been worn. Before handling a patient, before completing aseptic and clean operations, after being at danger of body fluid exposure after patient contact, and after contacting patient surroundings are the five times the WHO recommends washing your hands (World Health Organization, 2009).

#### **Factors influencing compliance with hand hygiene**

It has long been understood that it is challenging for HCWs to adhere to the different degrees of handwashing recommendations. Compliance rates have been rated as inadequate or severely low, both in developed and developing countries. Reasons for engaging in less-than-ideal behavior vary from one circumstance and set of resources to the next. For instance, there may be cultural barriers, as well as a lack of resources, that make it difficult to maintain proper hand hygiene (Boyce & Pittet, 2002).

#### **Impact of hand hygiene promotion on HCAI**

It has long been understood that it is challenging for HCWs to adhere to the varying levels of hand hygiene recommendations. Compliance rates have been rated as inadequate or severely low, both in developed and developing countries. Reasons for engaging in less-than-ideal behavior vary from one circumstance and set of resources to the next. For instance, there may be cultural barriers, as well as a lack of resources, that make it difficult to maintain proper hand hygiene (Grol & Grimshaw, 2003).

#### **Challenging issues related to the adoption of alcohol-based hand rubs**

In most hospitals and clinics, hand hygiene is performed utilizing alcohol-based hand massages. Data showing enhanced microbiological efficacy, shorter time to accomplish the desired effects, point-of-patient-care accessibility, and great skin tolerance profile back up this advice, which has been endorsed by several national hand hygiene standards and is backed by the CDC and WHO. In order to assess the level of implementation of national IPC programmes, a global survey was conducted in which questions were directed toward national IPC key elements in each participating country. Only 45% of the low-income countries polled reported having a nationwide IPC programme; 20% had organization documents; and 5% tracked IPC standards. In low-resource settings, where the burden of HAIs has been found to be higher, experts have emphasized the importance of having standards such as the World Health Organization's (WHO) IPC programme least requirements in place in the healthcare system in order to effectively manage infectious disease threats (Coia et al., 2006).

The mean prevalence of HAIs in Europe was 7.1 per 100 patients, and the incidence rate in the USA was 4.5 per 100 patient, but the cumulative incidence of HAIs in resource-limited situations was 15.5 per 100 patients among high-quality research, thus there is a significant difference. Since the 2014-2016 Ebola outbreak, regions like the African continent have made strides in IPC and outbreak preparedness. While IPC techniques have the potential to be beneficial and sustainable in the long run, this can only be achieved with increased evidence and sufficient resources (Gandra et al., 2020).

#### **Importance of Hand Hygiene**

Good hand hygiene is the most important, straightforward, and cost-effective strategy of reducing the spread of HAIs and the development of antibiotic resistance. The spread of methicillin-resistant *Staphylococcus aureus* (MRSA) is almost entirely prevented by hand washing, according to numerous studies (ICUs). It has been found that as hand-washing compliance increases, MRSA rates fall. Nine randomized controlled trials were identified by the hand hygiene liaison group, all of which showed a significant reduction in infection-related consequences, even in settings with high rates of infection in patients with severe conditions. An increase in hand hygiene has also been found to reduce the transmission of *Klebsiella* sp. in healthcare settings. Research shows that the incidence of healthcare-associated infections (HAIs) has dropped as a result of better adherence to hand hygiene protocols (Vonberg et al., 2008).

### **III. ENVIRONMENTAL HYGIENE**

Keeping healthcare facilities clean is essential for preventing the spread of infection. Hospital surfaces that aren't properly cleaned increase the spread of bacteria like *Clostridium difficile* and MRSA and VRE, which are resistant to multiple antibiotics (VRE). Exposure must be avoided at all costs, hence it is essential for healthcare providers and patients to maintain a high standard of cleanliness in the facilities they use. Several nosocomial viruses may find a suitable habitat on the hospital's surfaces, medical devices, and water supply, according to the available evidence. It is essential to keep in mind that various crucial nodes exist inside the complex reality which is healthcare. There are several potential



reservoirs for microbial infection within a healthcare facility, including the in-patients themselves, their families, and even the healthcare providers themselves. The purpose of environmental hygiene is to reduce the transmission of illness by lowering the concentration of infectious agents on surface and the probability of transmission from one host to another (Carling, 2016).

Keeping the surroundings sanitary and clean at all times is essential for preventing and controlling infections, including HCAs. Hospital surfaces provide a breeding ground for a wide variety of bacteria and germs, including the fatal clostridium difficile, methicillin-resistant Staphylococcus aureus (MRSA), and vancomycin-resistant enterococci (VRE) (VRE). Bed rails, door knobs, call rings, and light switches are just some of the nonporous hospital surfaces that high-risk germs can quickly colonize. Thus, strict hospital hygiene standards are crucial in reducing HCAs. The goal of environmental hygiene is to reduce the number of pathogenic microorganisms that live on and propagate through a given environment, therefore preventing the transmission of disease. As sputum, urine, blood, secretions, excretions, germs, and dust can all serve as breeding grounds for hazardous bacteria, a thorough cleaning of a hospital is a multi-step operation that requires the use of soaps, chemical disinfectants, and water. No matter the size of the organization or the scope of the care provided, the CDC's Healthcare Infection Control Practices Advisory Committee believes that infection control and prevention is of utmost importance in any set - up where medical attention is delivered to individuals or communities. An essential preventative measure in the fight against the spread of infectious diseases is the regular and thorough deep cleaning of all patient and public areas of the hospital. Hospitals employ antimicrobials to destroy or prevent the growth of disease-causing germs such bacteria, viruses, and fungi. Sprays, liquids, strong powders, and gases are just some of the numerous forms that hospital cleaning products can take, and they may contain anything at all from a few hundred to as many as different components. The level and kind of cleaning, its purpose, and constraints can only be understood by users if they are familiar with the vocabulary, definitions, and classifications used (e.g. sterilization, disinfection, cleaning) and the classification of devices and surfaces that require particular processes. To kill out any and all bacteria, ethylene oxide gas is used in the sterilisation process. Disinfection is capable of killing nearly all organisms with a physiological life cycle, except for the microbial spores (Cholapranee, 2016).

#### IV. STRATEGIES FOR PREVENTION OF HEALTHCARE ASSOCIATED INFECTIONS

Everyone from healthcare workers to patients to the general public is worried about the prevalence of health care-associated infections (HCAs) and how to best prevent and treat them. Rapid expansion of the power of drug-resistant organisms has occurred since their initial appearance. The vast majority of antibiotics on the market today are resistant, and very few new antibiotics are being developed for widespread use. Because of its prevalence, especially in the intensive care unit settings, Klebsiella pneumoniae is a major cause for alarm (Bebell & Muiru, 2014).

Thus, HCAI control and prevention is complex, necessitating a

range of strategies to address this urgent public health concern. Healthcare providers often use the following methods to limit the spread of HAIs: Hand washing is the most efficient, affordable, and simple strategy to reduce HAI levels and slow the spread of antibiotic-resistant microorganisms (AMR). As antibiotic resistance rises, it is more important than ever for healthcare professionals to practice frequent hand washing to prevent the spread of bacteria and viruses (Hookman, 2009).

The World Health Organization (WHO) suggests following the "5 Moments for (WHO) hand hygiene plan" to ensure clean hands when working in healthcare.

- before you approach the patient.
- before doing any sterile or aseptic operations.
- after coming into contact with a patient.
- after handling any bodily fluids.
- after touching anything the patient has touched.

The necessity of hand hygiene in limiting the transmission of infectious diseases is widely acknowledged, although hand hygiene compliance is generally substandard in healthcare facilities worldwide. Still, far too few people in hospitals and clinics follow protocol and wash their hands after using the bathroom. The degree to which one takes care to avoid spreading germs reflects one's knowledge, outlook, and actions about infection control. Nosocomial HCAs (healthcare-associated infections) have been a major health concern since the middle of the nineteenth century, when researchers in Europe and the United States first began looking into strategies to lower their incidence. Researchers came to the same result independently: HCWs communicate disease-causing bacteria from one patient to another through touching their hands. Vulnerable persons were especially at risk for getting infections after coming into touch with HCWs who had been infected. In the century that followed, a mountain of data collected showing that HCWs regularly acted as vectors for the spread of harmful microbes. Few persons can match Dr. Ignaz Semmelweis, who is generally acknowledged as the man who first realized the crucial function that HH plays in limiting the transmission of illness (Nicol et al., 2009).

The woman widely credited with launching modern nursing, Florence Nightingale, wrote that "every nurse ought to be careful to wash her hands very frequently during the day... with soap and soft water" after implementing hand washing and other hygiene practices in the war hospitals during the Crimean War (1853–1856). The CDC has recognized HH as a crucial approach to prevent the spread of infection, even if it did not become regular practice until much later, such as during the outbreak of foodborne infections in the United States in the 1980s. Therefore, the Centers for Disease Control and Prevention (CDC) created and disseminated guidelines for hospital hand washing practices, with an emphasis on the use of non-antimicrobial soaps before and after procedures that could spread pathogens, especially those involving high-risk patients who could die quickly if exposed. Alcohol-based solutions were suggested when soap and water were unavailable. Cleaning hands with antimicrobial soap or a waterless antiseptic solution after coming into touch with patients infected with MDR bacteria was also recommended in a 1995 study (Barrett & Randle, 2008).

## Follow patient safety guidelines

Patient safety is defined as the absence of preventable injury to a patient during the duration of health treatment and the reduction of risk of unnecessary harm associated with health care to an appropriate standard. Today's hospitals need a worldwide effort to reduce healthcare-associated infections (HAIs) and antibiotic resistance if they want to keep their patients safe (AMR). Together, they make up an inseparable whole. Catheter-associated UTIs, bloodstream infections, surgical site infections, hospital-acquired/ventilator-associated pneumonia, and Clostridium difficile infection are just a few examples of the HAIs that have shown a worrying rise in incidence. Acquired infections during treatment are linked to more patient harm, longer hospital stays, and higher medical costs. Due to the fact that many HAIs are preventable, they are considered as an indicator of care quality, an inconvenience, and a patient safety risk.

However, patient safety can be compromised when policies, guidelines, and checklists are interpreted and implemented inconsistently among individuals, departments, and organizations, often without taking behavioral science into account.

According to studies examining the causes of HCAs failure, medical professionals aren't doing their bit to adhere to the guidelines. It has been found that even when regulations, standards, and procedures have been successfully implemented in a hospital, the practices of doctors and other medical personnel degrade after roughly a year. There was too much data to handle, the recommendations were too complicated to implement, there was a conflict between several rulesets, and there was not enough evidence to support the suggestions, to name a few of the reasons given.

As such, HCAI prevention and control should be prioritized in all healthcare policies and plans aimed at ensuring the safety of patients.

It was previously mentioned that multi-sector collaboration is key to successfully controlling and preventing HCAs. Everyone from medical facilities to government agencies to insurance firms to academic institutions to pet veterinarians is part of this broader group. Another study on the subject of patient safety found that the following increased a program's efficacy: introduction and credentialing of the educational program; public reporting of program outcomes; design of healthcare settings with patient safety in mind; advancement of an informed, clear managerial approach; provision of clear guidance and role modeling; and facilitation of collaboration among healthcare programs. Staff involved in effective infection prevention programs should keep up with the most recent findings in this field. In the context of infection control, developing techniques to decrease the risk of infection is as crucial as applying therapies to decrease the rate of transmission of organisms. In order to reduce the risk of infection at surgical sites, both the World Health Organization and the Centers for Disease Control and Prevention have issued recommendations (SSIs). However, there is a substantial knowledge, attitude, and awareness gap between the best research and clinical practice when it comes to SSI prevention. Although they have been proved to be effective, evidence-based procedures and techniques that reduce SSIs are generally underutilized in

routine practice

## V. CONCLUSION

Everyone from doctors and nurses to therapists and patients has voiced their worries about healthcare-associated infections. The spread of bacteria that are resistant to many antibiotics has made the control and prevention of HCAs an urgent international issue. This study demonstrates that the most effective strategies for lowering the prevalence of HCAs and improving the quality of medical care are antibiotic stewardship and attentiveness to hand and environmental hygiene.

## VI. RECOMMENDATIONS

Urgent action is required to reduce healthcare-associated infections and improve patient safety. Thorough hand washing and the measured use of antimicrobials are two of the most effective approaches to curb the spread of HCAs. The most efficient method of preventing the spread of bacteria that causes HCAs and render antibiotics ineffective is thorough hand washing. Proper hand hygiene has the potential to greatly reduce the frequency of healthcare-associated infections (HCAs) because healthcare workers' hands are the most prevalent vector for the transfer of healthcare-associated pathogens from person - to - person and within the healthcare environment. The available evidence suggests that a range of interventions working together is the most effective strategy to boost handwashing and reduce the spread of healthcare-associated illnesses. Implementing alcohol-based hand rubs and maintaining instructional programs are crucial to overcoming infrastructure constraints and building robust knowledge improvement. Antimicrobial stewardship is a crucial part of any antimicrobial treatment plan, since it helps to reduce the antibiotic resistance epidemic and improve patients' health outcomes. Collaboration amongst all system actors is needed to effectively prevent antimicrobial resistance and environmental hygiene.

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<http://dx.doi.org/10.29322/IJSRP.13.01.2023.p13312>

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