

## Roles of Health Informatics in Infection Control and Prevention, as well as Nursing Roles in Droplet Precaution Adherence

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### Abstract

Microorganisms can be transmitted through direct or indirect contact, respiratory droplets, and airborne transmission. These are the three main modes of transmission. When it comes to preventing infections in hospitals, having knowledge of standard measures and always following them is absolutely necessary. Because of the fact that they are responsible for a significant share of the treatment and care that patients get, nurses and informatics teams play an important part in the prevention and management of hospital infections. Consequently, there should be an effort made to improve the perspectives that nurses have of the fundamental components of standard precautions. However, the findings indicated that the level of compliance with standard safeguards was somewhere in the middle. It is clear from this that it is required to take the necessary steps in order to increase the level of compliance. However, the findings indicated that the level of compliance with standard safeguards was somewhere in the middle. It is clear from this that it is required to take the necessary steps in order to increase the level of compliance.

**Keywords:** *Infection control, Microorganisms, nurse.*

### Introduction

Occupational Safety and Health Administration (OSHA) and the Centers for Disease Control and Prevention (CDC) are the regulatory

authorities that are responsible for spreading awareness, preventing infections, and controlling infections. In order to stop the transmission of illnesses, it is necessary for members of healthcare teams and staff working

in healthcare facilities to take precautions, which are preventative measures known as precautions [1].

For the sake of their own personal safety as well as the safety of their patients, members of the healthcare team, such as physicians, nurses, and nursing assistants, should pay special attention to the correct use of personal protective equipment (PPE) and isolation precautions. In addition, it is essential for members of the team to implement isolation procedures on visitors and other members who do not comply with normal standards in order to minimize the spread of infections within the workplace [2]. The members of the nursing staff and other members of the healthcare team should make every effort to deliver high-quality care on a consistent basis and to assist in the enforcement of infection control regulations and guidelines established by the CDC, OSHA, and the organization itself. In situations where the quality of treatment is compromised or there is a potential for infection transmission, it is imperative that the situation be brought to the attention of supervisors and controlled in such a way that patient care is prioritized [3].

According to the findings of a retrospective cohort research conducted by Tran K. and Bell C. et al., due to a lack of attention by healthcare professionals, patients who were on isolation precautions experienced an average increase of 17% in the length of their hospital stays and a 23% rise in the cost of their healthcare. Regardless of the patient's social or health situation, professionals of the healthcare workforce are obligated to offer care and attention of a consistently high quality to all patients. It is important for members of any healthcare organization's team to be aware of the length of stay increase as well as the lack of quality treatment that is provided to patient populations that are isolated for precautionary reasons [4].

The application of informatics has the potential to enhance the outcomes of infection control in three primary areas: surveillance, prevention, and links with public health. Electronic storage of patient information that is pertinent to the

infection control department (including the results of microbiology and laboratory tests, the location of the patient, the presence of invasive devices, and the status of infection precautions) enables computers to automate processes that were previously carried out manually. Infection control has become more efficient as a result of automation, which has made it possible for a single infection preventionist to carry out a greater number of monitoring tasks than was before feasible. Since the beginning of time, the intensive care unit was the primary location for monitoring hospital-acquired bloodstream infections. This was mostly due to the fact that it was the most feasible location. However, with the implementation of automated surveillance, bloodstream infection monitoring is now carried out throughout the whole hospital. There is a lack of clarity on whether or not the implementation of informatics leads to a net reduction in the amount of time spent; the trade-off for the efficiency of surveillance is the generation of more data to examine, which competes with the time spent on the hospital floor talking with hospital staff. Finally, the most important question to ask is whether or whether the utilization of informatics results in an increase in the level of patient safety [5].

### **Review:**

Infections that are acquired during the course of medical treatment and are not present at the time of admission to a hospital are known as healthcare-associated infections (HAIs), and they are the most major worldwide health problem. HAIs have both financial and medical repercussions. It is estimated that approximately one in every thirty-one inpatients is suffering from an infection that is associated with their stay [6].

A lack of proper infection control methods in health care settings has been brought to light as a result of the morbidity and fatality rates that have been documented among health care professionals who have caught MERS-CoV. This prompted the Ministry of Health to re-emphasize the importance of rigorous compliance with infection control rules

recommended by the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) in health care institutions. This was accomplished by raising awareness among those who work in the health care industry. When it came to dealing with cases of MERS-CoV that were suspected or infected, these instructions included normal precautions, droplet and airborne precautions, and eye protection. A recent survey that was carried out among healthcare personnel in the Kingdom of Saudi Arabia revealed that they have a positive attitude and a good awareness of MERS [7].

When a dental clinic performs a variety of treatment procedures, it is a common type of health care facility in which aerosol particles, also known as airborne or droplet particles, are formed. Scaling using an ultrasonic scaler, air polishing, tooth preparation with high and low speed rotary instruments, the use of an air-water syringe, and air abrasion are some of the therapeutic procedures that are included in this category. Aerosol is a mixture of particles and fluid that contains pathogenic virus. This mixture is created as a result of the process. The dentist, the dental staff, and the patient are all aware of the fact that patients undergo dental operations that result in the formation of airborne material [8].

The computer surveillance of viruses that are related with health care can, in general, be either fully automated or semiautomated respectively. The occurrence of fully automated surveillance is possible in situations when the surveillance definition is entirely computable, such as the *C. difficile* LabID event occurring. On the other hand, semiautomated surveillance is when a computer is used to carry out a portion of the surveillance (for example, case-finding based on predetermined criteria), while a human being is responsible for carrying out the remaining tasks. For instance, a computer may identify a candidate central line-associated blood-stream infection (CLABSI) based on a positive blood culture and the presence of a central line. The infection preventionist then reviews the chart to determine whether the bloodstream pathogen originated from a central

line or an extravascular source or whether it was a combination of the two [9].

In order to determine whether an organism recovered from a positive blood culture originated from a central line or an extravascular source, infection preventionists are required to exercise their judgment; this is because the definition of CLABSI provided by the NHSN compels them to make this determination. Therefore, there is a lack of consensus among infection preventionists, even when they are examining the same case.<sup>7</sup> This makes it difficult to compare hospitals based on the rates of CLABSI. Over the course of time, the National Health Service Network (NHSN) has made the CLABSI definition more objective. For example, the definition of a secondary bacteremia has become more stringent. Because there are some subjective aspects that require human judgment, the majority of surveillance software programs offer a semiautomated approach to bloodstream infection surveillance. This means that candidate positive blood cultures that occur in the presence of a central line are presented by the software to the infection preventionist for review. It is most effective for semiautomated methods to be utilized in situations when the computer algorithm possesses a strong negative predictive value for infection. This allows the infection preventionist to avoid the need to analyze positive blood cultures that are not likely to be genuine CLABSIs [10,11].

In order to provide an alternative to the conventional method of surveillance, certain investigators have devised fully automated CLABSI investigations. These kinds of approaches are helpful when it comes to conducting surveillance in hospital units where there might not be sufficient resources to carry out traditional surveillance (for example, in regions of the hospital that are adjacent to intensive care units). Additionally, as compared to traditional surveillance methods, entirely automated procedures are expected to be more reliable when it comes to doing comparisons between different facilities [11].

There has been a high correlation between the rigorous adherence of healthcare workers

(HCWs) to infection prevention measures and their exposure to infection prevention training, as revealed by a number of studies. Indeed, there are publications that go much further than this, identifying knowledge and attitude as the primary determinants of HCWs' adherence to IPC. As per the findings of this research, it is evident that the familiarity of workers with standardized infection prevention and control training can have a favorable impact on the prevention of infections in the health-care setting [12]. It has been stated in other places that pandemics like COVID-19 have a multifaceted nature, which necessitates periodic training that is updated on how to improve the prevention of nosocomial transmission of the virus. This is necessary because the science and care of diseases are constantly evolving, and workers' familiarity with the development of new knowledge and practices can greatly benefit the improvement of workers' knowledge, attitude, and practice. It is important to keep in mind that taking into account the audience when developing and delivering IPC training can significantly improve the effectiveness of the training. According to a previous study [13], during the beginning of the pandemic, the training that was provided to developing countries in accordance with the World Health Organization's guidance for infection prevention and emergency response was primarily directed. For example, in Ethiopia, the training was only intended to accommodate 4293 clinical practitioners, which excluded the nonclinical workforce. It appears that there is a bigger gap in effective compliance with IPC procedures among porters, runners, and hospital cleaners working in health institutions in Addis Ababa. This gap appears to be related to the deficiencies that have been mentioned. It was discovered that the type of health facility in which the workers provide their services was another independent factor that was found to be strongly connected with the compliance of healthcare professionals with IPC standards. The individuals who were responsible for delivering patient care in COVID-19 treatment facilities were shown to be three times more likely to adhere to all conventional

precautionary measures compared to those who were employed in isolation centers [13].

### Conclusion:

It was expected that during the early stages of the pandemic, healthcare workers will behave in a manner that is in complete accordance with appropriate infection prevention and control procedures. This is because their level of caution with regard to acts that will disrupt the transmission of SARS-COV-2 will increase. The discovery, on the other hand, contradicts the assumption, as it reveals that a little less than a quarter of the healthcare workers were in compliance with the protocol of normal safety preventative measures. The state and extent of the pandemic did not bring about any changes in the level of adherence to IPC protocols. Furthermore, the level of adherence does not correspond to the level of vigilance that is required to stop the transmission of the virus inside the health-care environment. The vast majority of healthcare workers were characterized by the bad practice of washing their hands during and after contact with patients and their surroundings, an incorrect or inadequate use of personal protective equipment (PPE), and an inadequate or poor cleaning of surfaces that were regularly handled.

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