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A Review of Global Epidemiology of Nosocomial Infections

Richards K, Hoxha H, Ketata N, Rosenthal VD, Gozel M *

Polytechnic University of Bobo-Dioulasso. Burkina.

***Corresponding Author**: Gozel M, Polytechnic University of Bobo-Dioulasso. Burkina.

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Abstract

Nosocomial infections or healthcare associated infections occur in patients under medical care. These infections occur worldwide both in developed and developing countries. Nosocomial infections accounts for 7% in developed and 10% in developing countries. As these infections occur during hospital stay, they cause prolonged stay, disability, and economic burden. Frequently prevalent infections include central line-associated bloodstream infections, catheter-associated urinary tract infections, surgical site infections and ventilator-associated pneumonia.

Keywords: Nosocomial infections; control strategies; pathogens; healthcare

Introduction

'Nosocomial' or 'healthcare associated infections' (HCAI) appear in a patient under medical care in the hospital or other health care facility which was absent at the time of admission. These infections can occur during healthcare delivery for other diseases and even after the discharge of the patients. Additionally, they comprise occupational infections among the medical staff. The following measures can be suggested to prevent nosocomial infection : isolation, hand washing, aseptic operation, vaccination of hospital personnel and education of nosocomial infection for patients and hospital personnel. But the most important and effective one seems to be an establishment of nosocomial infection control committee and monitoring nosocomial infection by full time nurse epidemiologist.

Epidemiology

In 2014, the CDC published a multistate point prevalence survey of healthcare-associated infections involving 11,282 patients from 183 US hospitals. According to this report, about 4% of hospitalized patients suffered from at least one of the HAI. In absolute numbers, in 2011, an estimated 648,000 hospitalized patients suffered from 721,800 infections. The dominant infections (in descending order) include Pneumonia (21.8%), surgical site infections (21.8%), gastrointestinal infections (17.1%), urinary tract infections or UTIs (12.9%), and primary bloodstream infection (9.9%, and include Catheter-associated bloodstream infections).

Due to greater awareness and robust preventative measures undertaken in the hospital settings, there has been some reduction in the incidence of certain HAI. The implementation of robust infection surveillance and prevention practices has resulted in some success in the prevention of HAI. According to the CDC, the rates of CLABSI have decreased by 46% between 2008 to 2013.

Types of nosocomial infections

The most frequent types of infections include central line-associated bloodstream infections, catheter-associated urinary tract infections, surgical site infections and ventilator-associated pneumonia.

Central line-associated bloodstream infections

CLABSIs are deadly nosocomial infections with the death incidence rate of 12%–25% [8]. Catheters are placed in central line to provide fluid and medicines but prolonged use can cause serious bloodstream infections resulting in compromised health and increase in care cost.

Surgical site infections

SSIs are nosocomial infections be fall in 2%–5% of patients subjected to surgery. These are the second most common type of nosocomial infections mainly caused by *Staphylococcus aureus* resulting in prolonged hospitalization and risk of death.

Ventilator associated pneumonia

VAP is nosocomial pneumonia found in 9–27% of patients on mechanically assisted ventilator. It usually occurs within 48 h after tracheal incubation.

Nosocomial pathogens

Pathogens responsible for nosocomial infections are bacteria, viruses and fungal parasites. These microorganisms vary depending upon different patient populations, medical facilities and even difference in the environment in which the care is given

Reservoirs and transmission

Unhygienic environment serves as the best source for the pathogenic organism to prevail. Air, water and food can get contaminated and transmitted to the patients under healthcare delivery. There must be policies to ensure the cleaning and use of cleaning agents on walls, floor, windows, beds, baths, toilets and other medical devices. Proper ventilated and fresh filtered air can eliminate airborne bacterial contamination. Regular check of filters and ventilation systems of general wards, operating theatres and ICUs must be maintained and documented.

Control of nosocomial infections

Despite of significant efforts made to prevent nosocomial infections, there is more work required to control these infections.

Infection control programs

Healthcare Institutes should devise control programs against these infections. Administration, workers and individuals admitted or visiting hospital must take into account such programs to play their role in prevention of infections.

Antibiotic resistance

Antibiotic resistance is responsible for the death of a child every five minutes in South-East Asia region. Drugs that were used to treat deadly diseases are now losing their impact due to emerging drug resistant microorganisms.

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Antibiotic control policy

The worldwide pandemic of antibiotic resistance shows that it is driven by overuse and misuse of antibiotics, which is a threat to prevent and cure the diseases. WHO's global report on antibiotic resistance, preventing the infection from happening by better hygiene, clean water, and vaccination to reduce the need of antibiotics.

Conclusion

This systematic and meta-analysis review was conducted to determine the rate of HAIs worldwide. However, by practicing sound and healthy ways for care delivery designed by infection control committees, controlling transmission of these infections using appropriate methods for antimicrobial use, the resistance in emerging pathogens against antimicrobials can be reduced easily. An efficient surveillance method guided by WHO can help healthcare institutes to devise infection control programs. Proper training of hospital staff for biosafety, proper waste management and healthcare reforms and making general public aware of these endemic infections can also help in reduction of nosocomial infections.

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