



HEALTHCARE-ASSOCIATED INFECTIONS (NOSOCOMIAL INFECTIONS) / REVIEW ARTICLE

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Article history:	Abstract:
Received: 8 th December 2023 Accepted: 7 th January 2024 Published: 10 th February 2024	We must answer some questions: What is gene expression? How does that happen? How is it diagnosed when talking about gene expression there is certainly a lot of information that may be missing or missed, were not able to reach it, as the rate of gene expression is linked to the rate of metabolic processes and the extent of the flow of all metabolites through certain pathways by regulating the formation or synthesis of specific enzymes for each gene, the rate of change in the activities of enzymes is present when essential substances are available. In contrast, enzymes required for biosynthesis are generally catabolic enzymes that are stimulated, catabolic enzymes are inhibited when metabolic products are present in the pathway in which they function.

Keywords: Gene expression, Functional Gene, Gene Regulation

Abstract: Hospital infections are a serious problem around the world, particularly in Iraq, because they cause a high number of diseases and deaths among patients and health-care personnel, but they can be prevented by creating low-cost techniques. People become infected while receiving medical care because their sickness or the treatment they are receiving can reduce their natural response to infection in an unexpected way. The majority of patients will not be infected, but they may develop health-care-related infections throughout their treatment. However, it is impossible to avoid all dangers during health care delivery. This is because drugs, diseases, conditions, and procedures can all lower your natural immunity against infection.

Keywords: Human Healthcare, Pathogenic, Nosocomial Infections

A review Article Problem: It is an infection that afflicts a patient while he is in the hospital resulting from a weakness in his immunity as a result of his concern about his health due to his underlying illness and his frequent use of antibiotics or due to his contact with other patients infected with the infection.

A review Article Objective: Infection has a significant impact on human health worldwide, and despite extensive efforts to produce simple therapies that might prevent harmful behavior modification, it remains a difficult undertaking. Information, education, and advice can assist people in recognizing symptoms of infection and seeking treatment more quickly. Factors such as a lack of general knowledge and training among healthcare professionals continue to impede the widespread and successful implementation of these therapies.

The method of the article: An approach to assessing knowledge and practices regarding nosocomial infection prevention and control is described.

INTRODUCTION

It is an illness that the patient develops after being admitted to the hospital, which means that the person was not infected with it at the time of admission and that it does not emerge until 72 hours or more after admission [1]. A patient admitted to a hospital in the United States has a 5-to-10% risk of contracting a nosocomial infection. These infections cause major diseases and have a high fatality rate. Health care-associated infections lead to hazard diseases with highly mortality rates, and the expense of diagnosing and caring for certain type of sickness surpasses many million dollars annually. in the United States of America alone. The causes of infections in health care facilities are distinctions with their high pathogenesis and extraordinary ability to resist many types of antibiotics multiple times and simultaneously, implying that a single type of bacteria that resisting to a highly percentage of antibiotics, and some isolates are resistant to

many kind of antibiotics. As a result, treating infections "that were previously considered simple" becomes difficult, if not impossible. It must be emphasized that the nature of patients in health care centers is generally of the immune impaired group, either owing to age or illness with other diseases, making it easy for them to become infected with hospital infections [3].

Infections are spread at health care facilities in a variety of paths via a range of ways, including water, air, insects, rodents, food and maybe animals such as dogs, cats, patients, cleaners, surfaces, instruments, medical staff and sharps devices. A modern study published recently in the Fifth Internal Medicine Conference in Palestine, Gaza City, found that a high percentage of the mobile device of health sector workers had pathogenic bacteria on edges of their mobile device (96%), and the percentage of *staphylococci* resistant to methicillin, diagnosed as MRSA, was high, reaching 28.3%. Other studies have found that the pens of doctors and health-care workers contain a high percentage of germs. Medical device keyboards, touch screen displays, and many other equipment that cannot be quickly cleansed provide an ideal environment for bacteria to attach and potentially multiply[4].

These surfaces are a source of microbe transmission, but they must pass via a process before reaching patients. One of the most prominent sources of infection in hospitals is the failure of health staff, such as nurses, doctors, and cleaners, to follow infection prevention protocols. The types of bacteria found in health care facilities differ based on the nature of their activity, the level of adherence to infection prevention standards, and the sanitation and disinfection methods utilized most types of bacterial infections Infections that affect patients in hospitals include urinary and respiratory system infections, blood poisoning, surgical wound infections, and other illnesses[5]. More than one-third of these incidents can be avoided by adhering to the proper guidelines. Here are some specific reasons for hospital infections[6].

Such as an increase in the number of patients with contact between carriers of the infection and those at risk of infection, such as (newborn children - the elderly - diabetics - patients with malnutrition - surgical illness - burns and intensive care - patients treated with antibiotics and those who spend a long period of time in the hospital, as well as a long period of time. The use of antibiotics [7]. The lack of proportionality between architectural designs and health facility efficiency, such as a lack of water in patient rooms, dust, maintenance and construction work, failure to follow procedures to ensure the quality of services provided to patients, and failure to follow the regulating and correct rules for proper waste disposal[8].

The increase in the movement of patients within the hospital is one of the most important reasons that lead to the transmission of infection, with the health team lacking sufficient awareness of the infection, how it is transmitted, ways and means of controlling it, and the use of some medications that weaken the body's immunity [9].

1-1 Types of hospital-acquired infections according [10]

1- Catheter-associated urinary tract infections (CaUTIs): Urinary tract infections are caused by bacteria in the urinary system. 75% of urinary tract infections that are acquired in the hospital occur as a result of the use of urinary catheters, or tubes to drain urine from the bladder, which is the most common type of infection. Hospital infections. Extensive use of urinary catheters is the biggest risk factor for developing a urinary tract infection, so it is important to remove them as soon as they are no longer needed. Symptoms of a urinary tract infection include fever, pain or a burning sensation in the bladder, and frequent urination.

2- Infections transmitted during surgery: Surgical infections occur after the operation is performed at the site where the surgery was performed. This infection may affect the skin around the wound or stitches, or it may be more severe and affect the internal parts of the body. 22% of infections transmitted from Hospitalizations occur during surgery, and symptoms include: fever, redness, pain and swelling around the area where surgery was performed, fluid draining from the surgical wound, and delayed healing.

3- Bloodstream infection. This infection occurs through germs that enter the bloodstream through a catheter, which is a tube connected to a large vein in the neck, groin, or chest, through which medicine or fluids are transmitted or blood samples are collected for testing. The symptoms of this infection are fever and ulceration redness of the skin around the point where the tube is inserted.

4- Ventilator-associated pneumonia: This type of lung infection can occur in a patient connected to a ventilator to assist breathing, through a tube attached to the nose or mouth, or through a hole in the front of the neck. Ventilator-associated pneumonia infections occur when Germs on the breathing tube travel to the lungs, and using a respirator for a long time can be a risk factor for pneumonia.

5- An infection transmitted from one patient to another, MRSA, and is spread from person-to-person contact as well as from contaminated medical equipment (such as stethoscopes).

1-2 Types of germs responsible for hospital infections:

Four types of germs responsible for hospital infections were identified and were arranged according to importance and prevalence into bacteria, fungi, viruses, and parasites in special circumstances[11,12].

Patients who are admitted to the hospital are at risk of developing nosocomial infections. In the United

States, 4 to 5% of hospitalizations result in nosocomial infections. Infants, the elderly, and those who are ill are most vulnerable to infection. People with impaired immune systems and those with invasive medical devices such as intravenous catheters, urinary drainage catheters, and respiratory tubes (to aid breathing with a ventilator [13]). Bacteria or fungus can cause nosocomial infections, and both can be severe and fatal. Bacteria acquired in hospitals are frequently resistant to many basic antibiotics, and the widespread use of antibiotics in hospitals fosters the evolution of resistance. Hospital-acquired illnesses include pneumonia, urinary tract infection, infection from surgical wounds, and blood infection, according [14,15].

A-Lung infection: People who are confined to bed may not use their lungs as frequently, and the muscles that govern breathing may weaken, making it difficult to breathe deeply. If mucus builds up in the airways, people may be unable to cough vigorously enough to evacuate it. When mucus accumulates, it cannot be cleaned. The airways are very free of bacteria, and the patient may develop pneumonia and the risk of lung infection increases due to the use of a respirator, which greatly increases this risk, or previously undergoing antibiotic treatment in the presence of other disorders, such as heart, lung, liver, or kidney disorders. Certain drugs, such as proton pump inhibitors, can reduce stomach acid levels. Deep breathing and coughing exercises can help you avoid lung infections. These exercises can help to maintain the lungs open and the respiratory muscles from deteriorating.

B-Urinary tract infection: In some cases, a drainage tube (urinary catheter) is put in the bladder of hospitalized patients. The catheter may be implanted when doctors need to closely monitor urine levels, such as in critical patients. In the past, doctors used to insert a urinary catheter in persons with urine incontinence, but a catheter dramatically raises the risk of a urinary tract infection because it allows bacteria to enter the bladder more easily. To avoid a urinary tract infection, doctors strive to use the catheter as few times as possible. When a catheter is used, it should be carefully cleansed and checked on a frequent basis. If people suffer from urine incontinence, diapers that are changed as frequently as needed may be a better option than a urinary catheter [16].

1-3 Procedures to end the danger and eliminate the damage it caused:

The danger cannot be eliminated except that immediate action upon becoming aware of the danger is the appropriate solution, including sanitary isolation, in order to thwart the spread of infection while ensuring the existence of special rules for using antibiotics and following up on the patient's condition through clinical results [17]. Vaccination of healthcare workers: Surveillance of emerging infectious diseases, infection surveillance and infection control training establishing infection surveillance systems to identify places that suffer from some problems with develop policies for the rational use of antibiotics.. Advanced algorithms and real-time point-of-care analytics work unified with advanced respiratory monitoring and care solutions to help reduce the odds of infection. Clinical decision support tools help define criteria for severe sepsis follow-up random bedside screening provides biometrics automated message communications help provide early warning signals to clinicians non-invasive ventilation (NIV) solutions can be used to avoid endotracheal tube placement and reduce the possibility of ventilator-associated pneumonia (VAP) with all these advanced technologies and tools, you can now work smarter with tools to support initiatives to control the spread of infections, remove the patient from ventilators, and speed recovery[18,19].

2- CONCLUSIONS AND RECOMMENDATIONS

Infections acquired by patients in hospitals are among the most serious types of infections, particularly if the sickness is chronic or causes weakened immunity. This sort of infection affects hospital workers, including doctors, nurses, support personnel, and laboratory technicians, either directly or indirectly. Many people are unaware of the nature of this infection, how it is spread, and how to prevent it. Hospital infections are caused by the arrival of any bacterial species and other harmful microorganisms from various settings in the hospital to patients or hospital workers. Infection control systems in hospitals try to stop the transmission of. The spread of infection within to limit germ transmission among patients, personnel, and visitors. As a result, the approved programs must be comprehensive for all of these populations. The approved programs include various policies and procedures that affect the patient, hospital employees, and even visitors by determining the source and mechanism of infection spread within the hospital. It was necessary to point out that the hands are the primary source of transmission of germs, so any doctor or nurse is prohibited from touching the patient without washing the hands in the correct manner, which is recommended by the World Health Organization, which is washing the hands with soap and water for at least 40 seconds, Inside and out, for example. Use paper tissues to dry between the fingers, or wash your hands with alcohol gel in the same way. Note that it is not permissible to use alcohol gel if the hands are unclean or wet and if gloves are worn (medical gloves) after washing the hands, especially if the doctor or nurse needs to examine the patient in areas inside the body or areas of wounds, their responsibility is to preserve the patient's health and their own by avoiding shaking his hand or kissing, and their commitment to washing their hands before visiting

another patient to avoid transmitting the infection from one patient to another, While wearing masks or covering one's face and head, isolating the patient when necessary, and monitoring the cleanliness and sterilization of all hospital facilities, such as the kitchen. The laundry, sterilizing unit, and emphasis on medical waste separation are essentially the responsibility of the medical staff; garbage is dispersed in designated bags based on the danger of transmitting different forms of infection, such as the AIDS virus and the hepatitis C virus

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REFERENCES:

- 1-Ashokka B, Chakraborty A. Reconfiguring the scope and practice of regional anesthesia in a pandemic: the COVID-19 perspective. 2020, 45(7):536–43.
- 2-Li Y, Gong Z, Lu Y, Hu G, Cai R, Chen Z. Impact of nosocomial infections surveillance on nosocomial infection rates: a systematic review. *Int J Surg.* 2017;42:164–9.
- 3-Raooofi S, Pashazadeh Kan F, Rafiei S, Hosseinipalangi Z, Noorani Mejareh Z, Khani S, Abdollahi B, Seyghalani Talab F, Sanaei M, Zarabi F, et al. Global prevalence of nosocomial infection: a systematic review and meta-analysis. *PLoS ONE.* 2023;18(1):e0274248.
- 4-Haque M, Sartelli M, McKimm J, Abu Bakar M. Health care-associated infections - an overview. *Infect Drug Resist.* 2018;11:2321–33.
- 5-Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases, Division of Healthcare Quality Promotion. Healthcare-Associated Infections (HAIs). 2018. <https://www.cdc.gov/hai/data/index.html> (accessed February 7 2023).
- 6-Liu JY, Dickter JK. Nosocomial infections: a history of hospital-acquired infections. *Gastrointest Endosc Clin N Am.* 2020;30(4):637–52.
- 7-Baviskar AS, Khatib KI, Rajpal D, Dongare HC. Nosocomial infections in surgical intensive care unit: a retrospective single-center study. *Int J Crit Illn Inj Sci.* 2019;9(1):16–20.
- 8-Alexiou K, Drikos I, Terzopoulou M, Sikalias N, Ioannidis A, Economou N. A prospective randomised trial of isolated pathogens of surgical site infections (SSI). *Ann Med Surg (Lond).* 2017;21:25–9.
- 9-Ott E, Saathoff S, Graf K, Schwab F, Chaberny IF. The prevalence of nosocomial and community acquired infections in a university hospital: an observational study. *Dtsch Arztebl Int.* 2013;110(31–32):533–40.
- 10-Dasgupta S, Das S, Chawan NS, Hazra A. Nosocomial infections in the intensive care unit: incidence, risk factors, outcome and associated pathogens in a public tertiary teaching hospital of Eastern India. *Indian J Crit Care Med.* 2015;19(1):14–20.
- 11-Etemad M, Khani Y, Hashemi-Nazari SS, Izadi N, Eshrati B, Mehrabi Y. Survival rate in patients with ICU-acquired infections and its related factors in Iran's hospitals. *BMC Public Health.* 2021;21(1):787.
- 12-Becerra MR, Tantaleán JA, Suárez VJ, Alvarado MC, Candela JL, Urcia FC. Epidemiologic surveillance of nosocomial infections in a Pediatric Intensive Care Unit of a developing country. *BMC Pediatr.* 2010;10:66.
- 13-Olaechea PM, Palomar M, Álvarez-Lerma F, Otal JJ, Insausti J, López-Pueyo MJ. Morbidity and mortality associated with primary and catheter-related bloodstream infections in critically ill patients. *Rev Esp Quimioter.* 2013;26(1):21–9.
- 14-Mylonakis E, Ziakas PD. How should economic analyses inform nosocomial infection control? *AMA J Ethics.* 2021;23(8):E631–638.
- 15-Custovic A, Smajlovic J, Hadzic S, Ahmetagic S, Tihic N, Hadzagic H. Epidemiological surveillance of bacterial nosocomial infections in the surgical intensive care unit. *Mater Sociomed.* 2014;26(1):7–11.
- 16-Ghashghaee A, Behzadifar M, Azari S, Farhadi Z, Luigi Bragazzi N, Behzadifar M, Saeedi Shahri SS, Ghaemhamadi MS, Ebadi F, Mohammadibakhsh R, et al. Prevalence of nosocomial infections in Iran: a systematic review and meta-analysis. *Med J Islam Repub Iran.* 2018;32:48.

17. 17-Nazzal F. The incidence and risk factors of nosocomial infections in Intensive Care Unit at Jenin Governmental Hospital. Palestine: An-Najah National University; 2021.
18. 18-Izadi N, Eshrati B, Mehrabi Y, Etemad K, Hashemi-Nazari SS. The national rate of intensive care units-acquired infections, one-year retrospective study in Iran. BMC Public Health. 2021;21(1):609.
19. 19-Zorgani A, Abofayed A, Glia A, Albarbar A, Hanish S. Prevalence of device-associated nosocomial infections caused by Gram-negative Bacteria in a Trauma Intensive Care Unit in Libya. Oman Med J. 2015;30(4):270–5.