Preventing Nosocomial Infections Through Effective Hospital Hygiene

BESSOUH Nadira[1]
Professor
Superior School of Management.Tlemcen - MECAS laboratory
bessouh_nadira@yahoo.fr

KARA TERKI Assia
Professor
Faculty of Economics and Management, LARMHO laboratory, University of Tlemcen, Algeria
assiaterkikara@yahoo.fr

KARA TERKI Ibtissem
University of Djilali Liabes Sidi Bel Abbes- . LAMAABE aboratory
ibti.kara@gmail.com

Received date:30 .09.2020 Accepted date:04 .11.2020/ Publication date:11.12.2020

Abstract:
Nosocomial or hospital-acquired infections are a real public health problem because of their frequency and severity, but also due to their socio-economic costs, which may be a considerable burden for patients as well as for the health system. Currently, their prevalence in hospitals is a real priority, both for patients and health care providers, as well as for the state. Identifying them and knowing their transmission modes are an urgent requirement. It is with this in mind that the present study attempts to sensitize all staff and hospital managers to the urgency of taking charge of this serious infectious phenomenon.
Keywords: Nosocomial infections, Hospital acquired infection, Healthcare.
Jel Classification Codes: I11, I18

Introduction:

The hospital is an institution that is supposed to provide medical care. However, it sometimes happens sometimes that an individual may catch within this establishment serious healthcare associated infections (HAIs), generally referred to as nosocomial infections or hospital-associated infections. Over the last few years, hospital-acquired infections have been recognized as a major public health problem due to their frequency, cost and severity. These problems affect patients and their families as well as all healthcare professionals. They are addressed with high priority in all countries around the world. Therefore, nosocomial infections should be considered as a major clinical outcome as they are the direct cause of increased

[1]**Corresponding Author:** BESSOUH Nadira , **E-Mail:** bessouh_nadira@yahoo.fr

mortality and high treatment costs. For this, the issue of improving the working conditions is seriously raised. Several reports, drawn up by a number of medical associations and organizations around the world, have revealed that hospital hygiene is the primary concern that exposes, not only the practitioners to serious professional risks, but also the patients who are threatened by new pathologies that are difficult to treat and require large amounts of money from the community.

It is worth mentioning that healthcare-related infections can easily be caught during a medical procedure. They can generate considerable economic, social and human costs.

It is widely admitted that these infections are responsible for the excess mortality and for the elevated costs linked in particular to the increased length of stay in the hospital establishment.

1- Definition of a nosocomial infection:

The term "nosocomial" comes from the Latin Nosocomium, which means hospital or a care establishment for the sick people (Ellenberg, 2004). Nosocomial infections are hospital-related infections. They are caused by opportunistic pathogens and affect a population known to be at risk. It is commonly known that they can originate from two major sources, namely the carriers (symptomatic or asymptomatic) and the surrounding environment (Rebiahi, 2011). Pathogens are sufficiently known worldwide and affect both developed and poor countries.

2- The different types of nosocomial infections:

The following list, which is not exhaustive, groups together the main nosocomial infections linked to the presence of biofilms (Hassain, 2008):

• Sutures,
• Contact lenses,
• Wearing medical implants such as:
- Urinary catheter,
-Central venous catheter,
- Endotracheal tube,
- Gastrostomy tube,
- Artificial heart valve,
- Orthopedic prosthesis,
- Pins (osteomyelitis)

3- Frequency and incidence:

According to several international studies, the overall frequency of nosocomial infections varies between 5 and 10% in hospitalized patients. Currently, the World Health Organization (WHO) estimates that more than 1.4 million people worldwide suffer from nosocomial infections, permanently. In developed countries, which have modern hospitals, between 5 and 10% of patients admitted to hospitals can catch one or more infections. This percentage can sometimes go beyond 25%, even in developing countries. The European Center for Disease Prevention and Control (ECDC) suggests that 4,131,000 patients in Europe developed a nosocomial infection in 2016, for a total of 954,410 infectious episodes.

In the United States of America (USA), 2.7 million patients were affected by these infections in 2012. In developing countries, the prevalence of nosocomial infections is even higher, since between 10 to 15% of hospital patients are affected. Note that the fight against these infections is better organized in developed

countries, but unfortunately, it is much less in countries with lower socioeconomic status.

4- Risk factors:

The categories of individuals that are most at risk of developing infections due to the presence of biofilms are the immunocompromised patients or those who wear medical devices. The most frequently encountered bacterial agents are part of the body's commensal flora and are organized into biofilms (Costerton, 1999). Certain diseases favor the invasion of bacteria and the formation of biofilms. This may be the case with *cystic fibrosis*, which is a hereditary disease that affects the deep respiratory system as well as the digestive system. It is characterized by the presence of very viscous mucus in the lungs. Attachment to surfaces covered with this viscous mucus is faster and more massive, which gives rise to greater bacterial aggregates on these surfaces than on glass or actin filaments (Kahn and Mahbob, 2015).

5- Biofilms and medical implants:

Implant materials are increasingly used in many areas of modern medicine for diagnostic and/or therapeutic purposes (Rosenthal et al, 2005; Kahn et Mahbob, 2015). Biofilms can form on the surface or inside medical devices implanted in the body. These devices can be contact lenses, central venous catheters, endotracheal tubes, intrauterine devices, artificial heart valves, peritoneal dialysis catheters, urinary catheters, etc. It turned out that 82% of nosocomial infections are due to the presence of contaminated medical implants (Kara Terki et al, 2012). Today, it is widely accepted that any foreign material introduced into the body can attract bacteria that come to adhere to its surface.

6- Hospital information on nosocomial diseases in Algeria:

In Algeria, it is very easy to check that, in public or private hospital care establishments, the systems for combating nosocomial diseases are not generalized. Furthermore, it should be noted that there is not a system that allows any individual to have the least information on infected patients, risk services, hygiene rules, emergency measures to be taken or even the possible complications that patients may be exposed to after their admission to the medical establishment (Hassaine, 2008).

The medical samples, which are the basis for the collection of information, are taken as soon as signs of infection appear in certain patients with a view to identifying certain germs responsible for the pathology (Parneix et Stingre, 2010). In general, the antibiotic therapy is automatically started immediately afterwards without looking for the real causes of the pathology (Rebiahi, 2011). Medical and microbiological research has revealed a large number of germs responsible for the disease. Researchers in the field have always insisted on the need for stricter hospital hygiene because they indicated that very simple hygiene rules, such as regular hand washing, are slow to establish themselves in the daily lives of practitioners. This should certainly engender a significant reduction in the risks of transmission of germs (Hassaine, 2008).

6.1. Measuring the quality of health care:

The intangible nature of health care constitutes a major obstacle to the quality of the hospital product; however, in Algerian hospital establishments, there is another significant and urgent problem related to information asymmetry which makes it

almost impossible for patients to have accurate information on his health status with regard to the related pathology (Kara Terki, 2011).

Note that it is easy to verify that hospital information does not include in its medical reports the presence of germs responsible for the pathology, for the simple reason that there is no information system capable of providing accurate information on the declaration of the disease, its evolution or even the required medical treatments (Kara Terki et al., 2012).

6.2. Exploratory study on the costs of hospital stays at CHU Tlemcen:

This section attempts to assess the costs of hospital stays, through an exploratory study which was carried out at the University Hospital Center of Tlemcen (Centre Hospitalo-Universitaire de Tlemcen - CHUT), a city located in Western Algeria. The information retained relates to the first quarter of 2018 and comes from the hospital's cost calculation unit.

Table 1: Presentation of hospital costs per day

SERVICES	Number of beds	Number of patients	Hospital days	Costs per day
Surgery A	60	609	2 430	24 622.07
Surgery B	25	101	557	493 368.56
Urologic surgery	8	159	646	20 733.20
Traumatology	45	332	3 305	6
Neurosurgery	6	149	1 629	42 626.50
Ophthalmology	36	144	1 499	19 225.61
Otorhinolaryngology	20	179	1 447	19 365.20
Internal medicine	30	136	2 061	15 663.66
Neurology	18	156	2 803	12 530.75
Gastrology	26	119	972	41 979.27
Infectious diseases	33	55	573	46 621.10
Pneumonology	24	123	1 804	13 049.25
Cardiology	34	561	6 233	6 899.05
Blood-Clinic	27	182	1 668	109372.32
Intensive care	9	33	423	115 149.21
Dermatology	16	64	658	26 780.55
Nuclear medicine	6	120	674	75.82
Functional	3	87	87	316 454.18

rehabilitation				
Psychiatry	47	110	1 764	21 188.98
Nephrology	8	78	402	139 699.16
Hemodialysis	0	/	/	1 265.13
Oncology	14	1 111	1 111	110 643.38
Medical and Surgical Emergencies	33	2 001	2 023	4 297.91
Forensic medecine	10	4	14	22 307.63
TOTAL	538	6 613	34 783	

Source: University Hospital Center of Tlemcen (CHUT), 2018.

The costs recorded are very little used in hospital management because the hospital is still financed according to the budgeting method, which is based on previous data. It should be noted that for better rationality of expenditures, prevention turns out to be essential. Indeed, prevention can become a reality by demanding strict hygiene measures and by developing strict communication and information measures.

Conclusion:

The present study allowed for a better understanding of the relationship between nosocomial infections and hospital hygiene. The issue of nosocomial infections is viewed as a revealing tool for a good mastery of a set of elements relating to the quality of health care, patient safety, responsibility, ethics and medical deontology. The World Health Organization considers that increased risks of infection exist, and the responsibility is to be shared between all actors of the healthcare system, but more particularly between the hospital, which must guarantee good hygiene measures, and the health practitioners whose duty is to develop a culture of prevention, safety and awareness in patients. Therefore, the implementation of hygiene rules remains essential in preventing communicable diseases. Good food, material, linen and body hygiene practices, including hand washing, can help stop the spread of infectious agents.

It should also be remembered that recently our country has ratified the UN Guidelines for the protection against nosocomial diseases. As the average costs of treating nosocomial infections in Algerian hospitals are poorly determined, this paper attempts to highlight the need to set up an effective training system in hospital hygiene which is seen today as an essential element in the strategy of preventing nosocomial infections and promoting the quality of healthcare .

Finally, it is highly important to state that it is more urgent today than ever to create specialized structures with trained personnel and endowed with adequate equipment for efficient protection against nosocomial diseases.

References :

Costerton, J.W., Stewart, P.S., Greenberg, E.P. (1999). « Bacterial biofilms: a common cause of persistent infections », Science 284, 1318–1322.

Ellenberg Eytan. (2004). «Nosocomial infection: a terminological clarification. The Lancet Infections Disease», Reflexion and Reaction, Volume 4, Issue12, P721, December 01.

Hassaine H. (2008). « Écologie bactérienne et lutte contre l'infection nosocomiale », Thèse de Doctorat Université de Tlemcen, Algérie.

Kahn H, Ahmed A, Mahbob R. (2015). « Nosocomial infections and their control strategies », Asian Pacific Journal of Tropical Biomedecine :5(7) :509-14.

Kara Terki Assia, la régulation de l'offre dans le nouveau système de soins publics Algérien, thèse de doctorat en sciences économiques. Université de Tlemcen, Janvier 2011.

Kara Terki Ibtissem. **Hassaine Hafida, Bellifa Samia, M'hamedi Imène, Lachachi Meriem**. (2012). Infection urinaire nosocomiale : Eude prospective dans une unité de. Réanimation médicale à l'ouest Algérien, Rev. Microbiol. Ind. San et Environn. Vol 6, N°1, p : 118-130.

Parneix Pierre, Stingre Didier. (2010). Le**s** infections nosocomiales. 3eme édition. Les Etudes Hospitalières.

Rebiahi S.A. (2011). « Caractérisation de souches de Staphylococcus aureus et étude de leurs antibiorésistance au niveau du centre hospitalo universitaire de Tlemcen », Thèse de doctorat : Université de Tlemcen, Option Microbiologie.168Pages.

Rosenthal VD, Gruzman S, Safdar N. (2005). Reduction in Nosocomial Infection with Improved Hand Hygiene in Intensive Care Units of Tertiary Care Hospital in Argentina. Am J Infect Control ; 33(7) :392-7.

Rosenthal VD, Guzman S, Safdar N. Reduction in nosocomial infection with improved hand hygiene in intensive care units of a tertiary care hospital in Argentina. Am J Infect Control 2005; 33(7):
Rosenthal VD, Guzman S, Safdar N. Reduction in nosocomial infection with improved hand hygiene in intensive care units of a tertiary care hospital in Argentina. Am J Infect Control 2005; 33(7):