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POINT PREVALENCE OF NOSOCOMIAL INFECTION IN THE THREE MAIN PUBLIC HOSPITALS IN JORDAN

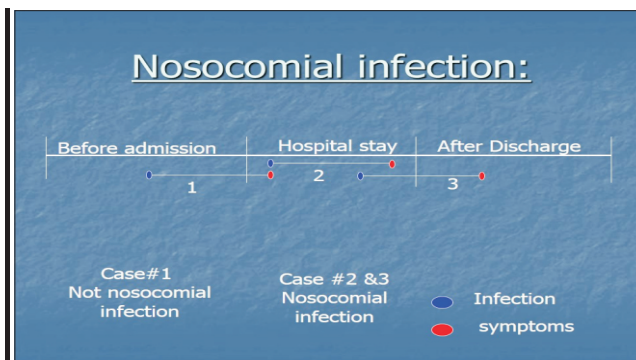
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ABSTRACT :

This descriptive study was carried out within the biggest three public hospitals in Kingdom of Jordan, i.e. Bashir, Prince Hamzah hospitals in Amman and Zarqa hospital. The obtained data were collected from the infection control committees in each hospital. The study is focusing on both patients and health workers in the concerned hospitals, the data were collected from the departments/wards of surgical and wounds, acute surgical and orthopedic, urinary tract infections and ENT, ICU, CCU, internal medicine, catheterization lab and chemotherapy in the period from May 1st to May 30th. The prevalence and exposure-associated rates of Infection is reported according to age and sex including the occupational breakdowns in Jordan. the results show that three members of



ESKAPE group; Pseudomonas aeruginosa, Klebsiella pneumonia in addition to Acinetobacter baumannii are the main causes of nosocomial acquired infections in the public hospitals in Jordan and the ICUs departments are the main infected departments distributed; device associated infections at participating ICUs; ventilator associated pneumonia (VAP), central line associated blood stream infection (CLABSI), catheter associated urinary tract infection (CAUTI), wound acquired infections, community acquired infections and surgical site infection.

KEY WORDS: Jordan, Nosocomial Infection, Public Hospitals.

INTRODUCTION:

Jordan is ranked as being the top medical tourism destination in the Middle East and North Africa, followed by Dubai and Abu Dhabi. More than 250,000 patients from 84 countries were treated there in 2008 according to a recent study by Jordan's Private Hospitals Association (PHA). The weather in Jordan truly consists of 4 seasons: Autumn, winter, spring, and summer. Most of Jordan's tourist attractions lie in the mountain heights Plateau, strip which runs along the western edge

of the country, and the Jordan Valley which lies next to the Dead Sea; the lowest point on the surface of earth. Jordan is a very sunny country, with over 310 days of sunshine a year. The weather is almost exclusively dry and sunny from May to October, the average of temperature is about 32°C, but in May and October the average is approximate 20.0°C (Medical Tourism Magazine, 2009). Nosocomial infections are acquired by patients during an admission to a hospital or other health care facility. This infection can be bacterial, viral, parasitic or fungal. Nosocomial infections occur worldwide and affect both developed and resource-poor countries. Infections acquired in health care workers are among the major causes of death and increased morbidity among hospitalized patients (WHO, 2012 and Rice, 2008). They

may cause increased functional disability, emotional stress and may lead to conditions that reduce quality of life. Nosocomial infections not only affect the general health of patients, but they have also a huge financial burden (Gordis, 2004). They are a significant burden for both the patient and public health. As per World Health Organization (WHO) surveys in Europe, Eastern Mediterranean, South-East Asia and Western Pacific showed an average of 8.7% of hospital patients had nosocomial infections. At any time, over 1.4 million people worldwide suffer from infectious complications acquired in hospital. In patients, the highest frequencies of nosocomial infections were reported from hospitals in the Eastern Mediterranean and South-East Asia Regions (11.8 and 10.0%, respectively), with a prevalence of 7.7 and 9.0% respectively in the European and Western Pacific Regions. This is a dangerous indicator about health care quality and the followed policies, standards, the role of infection control committees in these countries (WHO, 2012). Actually common nosocomial bacteria: Methicillin Resistant *Staphylococcus Aureus* (MRSA) and Vancomycin Resistant Enterococcus (VRE), VRE is a Gram positive bacterium that can cause serious infections in hospitalized patients. In the past, virtually all *Enterococcus* organisms were sensitive to vancomycin. However, resistance to this antibiotic has been increasing, and VRE has become a major nosocomial organism. VRE is less common than MRSA and usually colonizes the intestines (gut) without causing any disease. Commonly found in stool, VRE is spread in a similar way to MRSA through direct contact via the unwashed hands of health care workers. VRE can also be spread by contact with contaminated surfaces or medical equipment. Rarely, VRE can be found in other bodily fluids such as urine and wounds, VRE can cause life-threatening infections in patients who are already ill from other diseases. These infections are notoriously difficult to treat. Certain new and very expensive antibiotics, such as quinupristin/dalfopristin (Synercid™) and linezolid (Zyvox™) have been used with some success (WHO, 2012). Hospital staff and all other human or health care workers, including diagnostic laboratory, maintenance service, and cleaning personnel are exposed to the risk of occupational infection following accidental exposure to blood or body fluids (BBF) contaminated by microbes (Gordis, 2004). The hands of healthcare workers are a major source of transmission of nosocomial pathogens as well. In addition to activities that involve direct contact with patients or body fluid secretions, touching contaminated surfaces may result in the acquisition of pathogens on hands (Kent and Leon, 2012 and Arnaud *et al.*, 2005). In developed countries, a growing number of workers are referred to clinicians responsible for the evaluation of occupational infection risks following accidental exposure to blood or body fluids (Gordis, 2004). In recent years, the Infectious Diseases Society of America has highlighted a faction of antibiotic-resistant bacteria; *Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and *Enterobacter spp.* (ESKAPE). The ESKAPE pathogens' bacteria - capable of 'escaping' the biocidal action to antibiotics and mutually representing new paradigms in pathogenesis, transmission and resistance (Arnaud *et al.*, 2005; Sean and Brendan, 2013; Ducelet *et al.*, 2002 and Huskins and Soule, 1998). Some hospitals in developed countries made extra miles in order to develop effective programs and extending these achievements to other hospitals that presently lack effective programs is an organizational and logistic challenge for the future. Actually considerable progress has been made in the development of effective hospital infection control programs in countries with limited resource (Kent & Leon, 2012 and Medical Tourism Magazine, 2009). The most frequent nosocomial infections are infections of surgical wounds, urinary tract infections and lower respiratory tract infections. The WHO studies, and others, have also shown that the highest prevalence of nosocomial infections occurs in intensive care units and in acute surgical and orthopaedic wards. Infection rates are higher among patients with increased susceptibility because of old age, underlying disease, or chemotherapy (WHO 2002).

This point prevalence study has been done to show the incidence, and exposure-associated rates of in specific period; the first week of May 2015 according to the age and sex, inpatient or out patient, department, source of infection, the route of infection, type of microbe, number of infections in the following wards: surgical and wounds, acute surgical and orthopedic, urinary tract infections and ENT (Ear, Nose & Throat), intensive care unit (ICU), critical care unit (CCU), internal medicine and chemotherapy among the main three public hospitals in Jordan.

MATERIALS AND METHODS

This descriptive study includes the following criteria:

Protocol of study:

This study is done within the biggest three public hospitals in Kingdom of Jordan; Bashir hospital, Prince Hamzah hospital in Amman, and Zarqa. The data were collected from the infection control committees in each hospital, not from the patients or volunteers directly.

Inclusion criteria:

This study is focusing on both patients and health workers in the concerned hospitals, the data were collected from the following departments/wards: surgical and wounds, acute surgical and orthopedic, urinary tract infections and ENT, ICU, CCU, internal medicine, catheterization lab and chemotherapy, in the period between 1st of May up to 30th of May, the prevalence, and exposure-associated rates of Infection is reported according to age and sex including the occupational breakdowns in Jordan.

Questionnaires (data collection):

The collected data from the infection control committees, the route of infection, the source of infection, the department, specialty of the infected person, bacterial, fungal or original, type of microbe, number of infections were according to age and sex.

RESULTS AND DISCUSSION

The collected data in the period between 1st and 30th of May 2015 from infection control committees in the main three public hospitals in Jordan (Table 1), i.e. Bashir, Prince Hamzah and Zarqa hospitals. These hospitals constitute more than 60% of the total hospital beds capacity in the public hospitals, the results show that three members of ESKAPE group; *Pseudomonas aeruginosa*, *Klebsiella pneumonia* in addition to *Acinetobacter baumannii* are the main causes of nosocomial acquired infections in the public hospitals in Jordan and the ICUs departments are the main infected departments distributed; device associated infections at participating ICUs; ventilator associated pneumonia, (VAP), central line associated blood stream infection (CLABSI), catheter associated urinary tract infection (CAUTI), wound acquired infections, community acquired infections and surgical site infection. The health worker accidental breakdowns was three in Zarqa hospital, one Prince Hamzah hospital in less than 2 per 1000 in average, device associated infecting in Bashir hospital ICU's was 11 (per 1000 devices days). There was no parasitic, or fungal infections reported. The viral infections could not be reported due to the several viral crises of Corona, and Swine, which may complicate the record. ICU-acquired bacterial infection incidence percentage were Zarqa Hospital due to Ventilator associated pneumonia (VAP) 19.2 per 1000 and due to Catheter Associated Urinary Infections (CAUTI) 18.4 per 1000, and due to Clinical Laboratory Blood Stream Infections (CLBSI) 32.0 per 1000, in Prince Hamzah Hospital due to Ventilator associated pneumonia (VAP) 37.7 per 1000 and due to Clinical Laboratory Blood Stream Infections (CLBSI) 18.8 per 1000 while Bashir hospital due to Lower respiratory tract infections (LRTI) 2.1 per 1000 and due to Clinical Laboratory Blood Stream Infections (CLBSI) 1 per 1000 and due to Catheter Associated Urinary Infections (CAUTI) 0.8 per 1000.

Table 1: ICU-acquired bacterial infection incidence per1000 in each hospital.

| Hospital | Route Of Infection | Number of infections | Infections per 1000 |
|---------------|---|----------------------|---------------------|
| Zarqa | Ventilator associated pneumonia (VAP) | 3 | 19.2 |
| | Catheter Associated Urinary Infections(CAUTI) | 6 | 18.4 |
| | Clinical Laboratory Blood Stream Infections (CLBSI) | 1 | 32.0 |
| Prince Hamzah | Ventilator associated pneumonia (VAP) | 2 | 37.7 |
| | Clinical Laboratory Blood Stream Infections (CLBSI) | 1 | 18.8 |
| Bashir | Lower respiratory tract infections (LRTI) | 8 | 2.1 |
| | Clinical Laboratory Blood Stream Infections (CLBSI) | 4 | 1 |
| | Catheter Associated Urinary Infections(CAUTI) | 3 | 0.8 |

Since the highest prevalence of nosocomial infections occurs in intensive care units as per WHO reports, and the Infection rates are higher among patients with increased susceptibility because of old age, underlying disease, or chemotherapy (WHO, 2002). also the main causes of nosocomial infections as per the Infectious Diseases Society of America records recently, the most aggressive antibiotic-resistant bacteria group; *Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and *Enterobacter* spp. (ESKAPE) (Arnaud et al., 2005; Sean and Brendan, 2013; Ducelet et al., 2002 and Huskins and Soule, 1998). The stable politic status of Jordan among the unstable Neighboring countries which is leads to increase the Tourists/visitors and Medical Tourism, which has a clear impact to the health status and quality, especially the infections which came from Iraq and Syria in addition to Yemen and Libya in the last 10 years, *Acinetobacter* actually is very little risk to healthy people and was considered as very little risk to healthy people, but now in Jordan is one of the biggest challenging for infection control committees It becomes one of a group of pathogens with a high rate of antibiotic resistance (ESKAPE), that are responsible for the majority of nosocomial infections (Rice, 2008), *A. baumannii* is called to as 'Iraqibacter' due to its seemingly sudden emergence in military treatment facilities during the Iraq War (Drummond, 2013). It has continued to be an issue for veterans and soldiers who served in Iraq and Afghanistan. Multidrug-resistant *A. baumannii* has spread to civilian hospitals in part due to the transport of infected soldiers through multiple medical facilities (McQueary et al., 2012).

CONCLUSION

In conclusion, the main cause of nosocomial infection in Jordan is similar to most countries, but the unstable politic status of the neighboring countries of Jordan and medical tourism induced a clear impact indirectly on public hospitals, and *Acinetobacter baumannii* infections, while the multidrug resistance pathogens are available in both of private and public hospitals, so more studies to be done in order to investigate these infection causes, and more studies should be done in order to indentify the subtypes of these pathogens and the genotype of each compared with other countries.

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