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**Research Article**

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# Investigating the occurrence rate of reported hospital infections and determining their microbic factor in Kerman, South-East Iran

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**ABSTRACT**

*Life-threatening nosocomial infections have become a major problem, medical interventions, immune diseases and antibiotic resistant organisms, increased mortality, morbidity, longer hospital stays and higher health care costs were. This study aimed to investigate the incidence of nosocomial infections was hospitalized. In this cross - sectional study of all patients admitted with standard definitions, as determined nosocomial infection were enrolled Information required by Form 1 and 2 During the first six months, 92 were collected, they were analyzed using a cost of INIS.Results : In this period 10 653 patients, 59 patients (19 men, 40 women), most aged 65-15 (81.35%) were nosocomial infections10,653 patient days in the hospital have spent a total length of 24,130Average rate of 0.66%, the incidence rate was 4.1 cases per 1,000 people - was hospitalized for days. Highest incidence of surgical site infection in 28 (0.31%), the lowest levels in 2 cases (0.02%), respectively36 patients on clinical symptoms (61.01%), 23 cases with regard to positive culture (38.98%) were identified. The most common organism Escherichia coli, Staphylococcus negative Kvakvlaz .The results showed that the average total infections compared with statistics from the World Health Organization (15-5%) is very low Can policy, Developing educational programs and applied research priorities at the national level to be used Problems in a consistent and regular reporting can be seen that recommended adopting the necessary measures to review and eliminate factors that contribute have the lack of reporting hospital infections acting be.*

**Keywords**: Nosocomial infections, antimicrobial agent

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## INTRODUCTION

Hospital infections refer to those infections which follow the provision of healthcare services in medical centers only if the patient is not already afflicted with them upon entering the hospital and is not in the latent phase as well. These infections can show up during the hospitalization period or after the patient is discharged (1). Today, hospital infections have undoubtedly become one of the key crises of medical centers and are threatening the lives of patients around the world. They are highly prevalent and can possibly occur even in the most modern and equipped hospitals in developed countries (2). The prevalence of these infections varies across different centers. In the U.S., 2 million people are annually infected and that cost over 11 billion dollars of damage (3). As mentioned previously, the prevalence of these infections varies across countries and has been reported to range between 5 to 15%. These

statistics have been obtained from centers equipped with surveillance system. Therefore, such statistics are expected to be higher in the hospitals of our country. The occurrence rate of these infections in Iran has been reported to range from 9.1 to over 25% (4). Hospital infections are not exclusive to particular individuals and can target any hospitalized patient (5). A myriad of factors are involved in its development the most important of which are: age (more prevalent among infants and the elderly), surgeries, problems of the immune system, consumption of immune system suppressive drugs, chronic diseases such as diabetes, cirrhosis, kidney failure, cancers, consumption of a wide range of antibiotics, some medical interventions such as intubation, venipuncture, endoscopy, etc. (6). The key pathogens of hospital infections are microorganisms in a patient's body. These microorganisms are transmitted in a hospital environment through multiple ways the most prevalent of which is patient's contact with other patients or medical team, coming into touch with body fluids, transmission through air, eating materials in the hospital and medical equipment (7). The problems associated with hospital infections and the costs they impose on medical units are too high. Such infections can lengthen the duration of hospitalization, increase the consumption of drugs and the duration of disability, cause discomfort and even death (8). Healthcare-associated infections are a major public health problem. According to the Centers for Disease Control and Prevention (CDC), there were an estimated 1.7 million healthcare-associated infections and 99,000 deaths from those infections in 2002[1]. A recent CDC report estimated the annual medical costs of healthcare-associated infections to U.S. hospitals to be between $28 and $45 billion, adjusted to 2007 dollars (9). In recent years multiple approaches have been adopted to encounter this issue. One of them is the establishment of the National Nosocomial Infections Surveillance (NNIS) system. Reporting method, collection of healthcare information with common definitions along with an examination of its process in different sections and at different times can provide a precise knowledge of the risk factors of hospital infections (10). Considering the clinical significance of this problem and the lack of precise statistics concerning hospital infections in Iran especially in Kerman County, the present research aimed to investigate the occurrence of such infections in Kerman in 2013. The results of this study can not only provide a national basis to be compared with international statistics, but can also help to provide services, suggest a logical solution to cut down on the issue at hand.

## EXPERIMENTAL SECTION

The present descriptive, cross-sectional research lasted for six months from March 2013 to August 2013 and its participants were all the patients who had been hospitalized during this period in different sections of Ayatollah Kashani Hospital of Kerman. The diagnosis criterion of infections was based on the definitions provided by the U.S. Centers for Disease Control (CDC).They included: Urinary Tract Infection (UTI), Surgical Site Infection (SSI) which can be of two types, superficial and deep, Blood Stream Infection (BSI) which is of two types, the one identified in a lab and the one identified through clinical symptoms, respiratory infections or pneumonia (PNEUT). From among the patients hospitalized in the above-mentioned centers, those who did not show any sign of infection and were not in the latency period (incubation) within the first two days entered the study. In order to spot infections, the subjects were examined for clinical and paraclinical symptoms of hospital infections every day. The required data were gathered with the help of forms 1 (screening) and 2 (linear list of hospital infection cases) of the national healthcare plan regarding hospital infections. In these forms, the required healthcare data are merely obtained without any unnecessary details. The first part of form 1 was concerned with the patient's biographical data, background diseases, invasive procedures such as surgery, use of different vascular or urinary counters, ventilators, etc.. The second part of the same form covered all the symptoms of the 4 infections along with their dates, location and the outcome of implant with also the name of the bacteria. The second form would be sent to the province healthcare center through the completion of the first screening form and the analysis of its data by INIS software. INIS is a software which examines hospital infections and was designed by the ministry of medical healthcare and instructions. It helps to determine hospital infections and their types once the data are entered and analyzed. The occurrence rate of hospital infections was estimated based on 1000 patient/day. Descriptive statistics (percentage, frequency …) were used to analyze the data.

## RESULTS

Within 6 months, 10,653 patients who were hospitalized in different sections of hospitals were investigated. The age of participants varied from a minimum of 10 months to maximum 80 years. The most common age group ranged from 15 to 65 years (81.35%). From among the whole participants, 59 individuals suffered from hospital infections (19 men and 40 women) (Table 1).

**Table 1- frequency of infections in terms of sex in the time span: March-2013 to Auguest-2013**

| | Urinary | Surgical | Blood | Respiratory | 0ther | Total | (%) |
|---|---|---|---|---|---|---|---|
| Male | 6 | 8 | 1 | 3 | 1 | 19 | 32.2 |
| Female | 5 | 20 | 1 | 2 | 12 | 40 | 67.79 |
| Total | 11 | 28 | 2 | 5 | 13 | 59 | 100 |

All the patients spent an overall 24,130 days in hospital. The occurrence rate was 4.1 cases per thousand patient/day. The mean prevalence of infection was .55% in sections and the total mean prevalence of infection was .66%. The highest prevalence belonged to surgical site (28 cases) and the lowest prevalence related to blood infection (2 cases). The site with the highest frequency of infections was women surgery section (12 cases). The places with the lowest prevalence of infections were pediatric section (0 case) and infants section (1 case) (Table 2).

**Table 2- occurrence of hospital infections in different sections in the time span: March-2013-August-2013**

| | Urinary | Surgical | Blood | Respiratory | 0ther | Total | Total hospitalization | Occurrence (%) |
|---|---|---|---|---|---|---|---|---|
| CCU | 1 | 2 | 0 | 0 | 1 | 4 | 627 | 0.63 |
| ICU | 0 | 3 | 0 | 1 | 1 | 5 | 53 | 9.43 |
| Pediatric | 0 | 0 | 0 | 0 | 0 | 0 | 825 | 0 |
| Infants | 0 | 0 | 1 | 0 | 0 | 1 | 511 | 0.19 |
| Male | | | | | | | | |
| Surgery | 3 | 3 | 1 | 0 | 0 | 7 | 1681 | 0.41 |
| Female | | | | | | | | |
| Surgery | 0 | 9 | 0 | 1 | 2 | 12 | 1075 | 1.11 |
| Interior | 3 | 3 | 0 | 2 | 3 | 11 | 1689 | 0.65 |
| Obstetrics | 1 | 8 | 0 | 1 | 1 | 11 | 1298 | 0.84 |
| Childbirth | 3 | 0 | 0 | 0 | 5 | 8 | 2235 | 0.35 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 542 | 0 |
| Total | 11 | 28 | 2 | 5 | 13 | 59 | 10653 | 0.55 |

The highest prevalence of infections within the six months was in July (30.5), whilst the lowest belonged to March-April (0). From among 59 patients who had infections, 36 individuals were diagnosed through clinical symptoms

(61.01%) and 23 cases with the help of the positive implant results (38.98%). The most prevalent microorganism recognized through the above clinical implants were respectively: Escherichia coli, negative Staphylococcus, Pseudomonas and Klebsiella (Table 3).

**Table 3- frequency of microorganisms in the main infected groups in the time span: March-2013-August-2013**

| | Urinary | Surgical | Blood | Respiratory | 0ther | Total | (%) |
|---|---|---|---|---|---|---|---|
| Escherichia coli | 9 | 0 | 0 | 0 | 2 | 11 | 47.82 |
| Negative Staphylococcus | 1 | 5 | 0 | 0 | 1 | 7 | 30 |
| Pseudomonas | 0 | 0 | 2 | 1 | 0 | 3 | 13.04 |
| Klebsiella | 0 | 1 | 0 | 0 | 1 | 2 | 8.69 |
| Total | 10 | 6 | 2 | 1 | 4 | 23 | 100 |

## DISCUSSION

The prevalence rate of hospital infections varies across medical centers and is dependent on a myriad of factors including: medical interventions, hospital factors and personal characteristics (10, 11). In a body of research carried out in Iran, the rate of hospital infection ranged from 8.5 to 39% (12). The prevalence rate of hospital infections is closely correlated with the hygiene level of the hospital. This rate was Health care-associated infections, or HAIs, less than 5% in those equipped with advanced healthcare systems (13).Are infections that people acquire while they are receiving treatment for another condition in a health care setting. HAIs can be acquired anywhere health care is delivered, including inpatient acute care hospitals, outpatient settings such as ambulatory surgical centers and end-stage renal disease facilities, and long-term care facilities such as nursing homes and rehabilitation centers. HAIs may be caused by any infectious agent, including bacteria, fungi, and viruses, as well as other less common types of pathogens (14).

These infections are associated with a variety of risk factors, including: Use of indwelling medical devices such as bloodstream, endotracheal, and urinary catheters. Surgical procedures. Injections. Contamination of the health care environment. Transmission of communicable diseases between patients and healthcare workers. Overuse or improper use of antibiotics.

The U.S. Department of Health and Human Services (HHS) has identified the reduction of HAIs as an Agency Priority Goal for the Department. By September 30, 2013, HHS is committed to reducing the national rate of HAIs by demonstrating significant, quantitative, and measurable reductions in hospital-acquired central line-associated bloodstream infections and catheter-associated urinary tract infections(9). A comparison of the statistics obtained and the pre-existing ones showed that the prevalence of infections in this hospital was low (less than .7%). One of the main reasons is the serious attempts of the staff and authorities at such preliminary steps as the foundation of an infection control committee, recurrent implants from different sections of hospital, instructing the medical staff, separating infectious garbage, using safety boxes, washing hands before medical treatments and so on. Among the limitations of this study mention can be made of limited reports from the sections, outpatients or patients visiting clinics or doctor’s offices, consumption of a wide range of antibiotics during hospitalization or considering the symptoms of hospital infection as the symptoms of the main disease. To examine the use of infection prevention practices by U.S. hospitals and trends in use between 2005 and 2009, suggesting that despite its perceived importance, the non-payment rule may not be the primary driver (15).

As revealed by the findings of this research, the total mean occurrence of the infections was low as compared to the statistics offered by the world health organization in developed countries (5-15%). This could be included in policy makings, devisal of instructional programs and prioritizing applied research in our country. There were a number of limitations in the regular reporting process of hospital infections which are suggested to be removed by contriving the required plans.

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**REFFRENCES**

[1] Putter PA, perry AG . Fundamental of Nursing, Philadelphia: Mos by com, 7 th eds, **2009**, pp:612-614.
[2] Rosenthal VD. **2008**, *Am J Infect Control*; 36(10): S171.e7-12.
[3] Walaszek M, Wolak Z, Pobros W. *Przegl Epidemiol*, **2012**, 60(4): 617-21.
[4] Rabie N, Rezaie SH, Tamizi Z, Abedi S.Incidence of nosocomial infections reported from Tehran University of Medical Sciences hospital in 2009. *Kerman University of Medical Sciences* **2010**.
[5] Burkm JP. *N Engly Med*, **2003**,348(7):651-60.
[6] The analysis of hospital infection surverllance data in 2009 year.Tehran: Ministry of Health and Medical Education, **2009**.
[7] Murfy PM, Hanchett M, Olmsted RN, Farber MR, Lee TB, Haas JP, etal. Am *Infect control*. **2012**,40(4):296-303.
[8] Javadi A, Mobasheri S, Seroshnia M, Ziadi F,Shahrokhi S, translators. World Health Organization. Prevention of hospital infections. Tehran: *Salman publisher*, **2003**: 1-3.
[9] Klevens RM, Edwards JR, Horan TC, Gaynes RP, Pollack DA, Cardo DM. *Public Health Reports* **2007**;122:160-166.
[10] National Nosocomial Infections Surveillance(NNIS) system Reports data summary from January 1992. Through June 2004, issue October 2004. *An j Infect control*, **2004**, 32(8): 470-85.
[11] Schulman J, Wirtschafter DD, Kurtin P. *Pediatr Clin North Am*: **2009**, 56(4): 865-892.
[12] Yousefi Mashouf R, Heidari Z. *Journal of Zahedan University of Medical Sciences and Health Services*: **2001**, 2(3): 93-99.
[13] Sego K, DuliU G, Ugljen R, Leksan I, IvanoviU M, Sego T, etal. *Coll Antropol*: **2009**, 33(2): 593-597.
[14] Scott RD. The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention, **2009**. URL,http://www.cdc.gov/hai/pdfs/hai/scott_costpaper.pdf
[15] Sarah L, Christine P, Timothy P, Sanjay Saint.. *Journal of General Internal Medicine*, July **2012**, 27(7):pp. 773-779.