

An Evaluation Study of Hospital Acquired Infections in Thi-Qar province, Iraq

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دراسة تقييمية للعدوى المكتسبة من المستشفيات في محافظة ذي قار- العراق

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المستخلص

اجريت هذه الدراسة لمدة 6 اشهر (الاول من تشرين الاول 2014 لغاية الثلاثون من اذار 2015) اذ تمت دراسة وتقدير نسبة انتشار العدوى في مستشفى الإمام الحسين (ع) التعليمي في مدينة الناصرية بين موظفي المستشفى وإيجاد علاقة بين المتغيرات (العمر , الجنس , السكن , الأقسام الطبية والحالة الاجتماعية) واختلاف توزيع الحالات المرضية بين أفراد المستشفى كذلك وجود تباين في نسب حدوث تسجيل الحالات المرضية بين أقسام المستشفى والحالات الاجتماعية والفئات العمرية بين الموظفين. العزلات البكتيرية الأكثر شيوعاً والتي عزلت بهذه الدراسة هي المكورات العنقودية الذهبية والزوائف الزنجارية وعصيات القولونية والكلبيسيلا على التوالي. لهذا نستنتج ان تحسين وسائل تقييم معدل العدوى المكتسبة هو مؤشر على جودة وسلامة الرعاية الطبية. وبالتالي تطوير عملية التقييم هو خطوة أساسية لتحديد المشاكل والأولويات ولتقييم فعالية نشاط مكافحة عدوى.

Abstract

The present study was evaluated for the six months (1st October 2014 to 30th March 2015), the proportion of acquired infection in the Al-Imam Hussain Teaching Hospital at Al-Nasiriya province south of Iraq has studied. The relationship also estimated between employments and their variables such as age, gender, residence, medical department, social status and different distribution infections among staff in the hospital. The result showed discrepancy rate of occurrence and recording the incidence of cases. Common causes of hospital-acquired infections include urinary bladder catheterization, respiratory procedures, surgery and wounds and intravenous procedures. The most common bacterial isolates were *Staphylococcus* spp., *Pseudomonas* spp., *Escherichia coli* and *Klebseilla* spp. respectively. In conclusion, the acquired infection rate is an indicator of quality and safety of care. The development of a surveillance process to monitor this rate is an essential step to identify local problems and priorities, and evaluate the effectiveness of infection control activity.

Key words: hospital acquired infections, bacteria, evaluation

Introduction

Hospital-acquired infections can be caused by bacteria, viruses, fungi, or parasites. These microorganisms may already be present in the patient's body or may come from the environment, contaminated hospital equipment, healthcare workers, or other patients. Depending on the causal agents involved, an infection may start in any part of the body [1]. A localized infection is limited to a specific part of the body and has local symptoms, for example, if a surgical wound in the abdomen becomes infected, the area of the wound becomes red, hot, and painful. A generalized infection is one that enters the bloodstream and causes general systemic symptoms such as fever, chills, low blood pressure, or mental confusion [2,3].

Hospital-acquired infections may develop from surgical procedures, catheters placed in the urinary tract or blood vessels, or from material from the nose or mouth that is inhaled into the lungs. The most common types of hospital-acquired infections are urinary tract infections (UTIs), pneumonia, and surgical wound infections [4]. Many hospitalized patients need a steady supply of medications or nutrients delivered to their bloodstream [5]. Bacteria transmitted from the surroundings, contaminated equipment, or healthcare workers hands can invade the site where the catheter is inserted. A local infection may develop in the skin around the catheter. The bacteria can also enter the blood [6].

Some patients are at greater risk than others young children, the elderly and

persons with compromised immune systems are more likely to get an infection. Other risk factors for getting a hospital-acquired infection are a long hospital stay, the use of indwelling catheters, failure of healthcare workers to wash their hands, and overuse of antibiotics [7,8]. Any type of invasive procedure can expose a patient to the possibility of infection. Common causes of hospital-acquired infections include urinary bladder catheterization, respiratory procedures, surgery and wounds and intravenous procedures [9,10].

Bacteria and other microorganisms are easily brought into the throat by respiratory procedures commonly done in the hospital. The microorganisms come from contaminated equipment or the hands of health care workers. Some of these procedures are respiratory intubation, suctioning of material from the throat and mouth, and mechanical ventilation [11,12,13,14,15]. The aims of this study were to evaluate a hospital acquired infection among hospital staff and patients, and to early diagnose and treat them to avoid serious complication of hospital acquired infections.

Materials and Methods

The study was conducted at the largest hospital in Thi-Qar province south of Iraq, which is named Al-Imam Hussain Teaching Hospital at Al-Nasiriyah city to study the hospital acquired infections. The data was collected with constructed questionnaire, through an application of direct interview as mean of data collection. Data analyzed through application of two different approaches such as descriptive statistical data analysis which include (frequency, percentage). In addition, bacteriological study of this prospective study was conducted hospital environment. Swabs

were taken from beds, gowns, trolleys and surgical instruments in the different hospital departments. The swabs were inoculated onto MacConky agar and blood agar (Oxoid, UK), and incubated in aerobic condition; other swabs were streaked onto the same media in anaerobic candle jar to supply anaerobic condition and incubated overnight at 37 °C. Classification and identification of aerobic and anaerobic bacterial types were performed according to standard routine techniques such as biochemical reactions. The commercial biochemical test kit (BioMerieux API 20E) was used to identify Gram-negative bacteria, while catalase and oxidase tests were used for the identification of the Gram-positive bacteria [16]. The results were statistically analyzed using the SigmaPlot programme version 11. A p value of 0.05 or less was considered significant.

Results

A total of 182 cases were studied, questionnaire interview which includes the demographic data, residence, gender, age, occupational, educational levels and departments. The samples were distributed according to age and gender. Table 1 shows that the percentage of patients with infections acquired in the hospital increased in the duration of employment males (53.84 %) that affected more than females (46.16 %). The mainly affected age group was 16-24 (18.3 %), 25-34 (10.2 %), 35-44 (15.0 %) and 55-64 (13.2 %). Table 2 shows that the highest percentage of hospital acquired infections that occurred in washing department (17 %), followed by emergency, medicine, laboratory, X-ray and surgical departments (15.9 %, 15.3 %, 12.7 %, 13.1 % and 10.9 % respectively).

Table 1: Distribution of acquired infections according to age and gender

Age group	Gender				Total	
	Males		Females			
	No	%	No	%	No	%
< 15	16	8.79	10	5.49	26	14.28
16-24	18	9.89	8	4.39	26	14.28
25-34	10	5.49	12	6.59	22	12.08
35-44	14	7.69	14	7.69	28	15.38
45-54	12	6.59	16	8.79	28	15.38
55-64	13	7.14	15	8.24	28	15.38
> 65	15	8.24	9	4.94	24	13.18
Total	98	53.84	84	46.16	182	100

P < 0.05

Table 2: Distribution of samples according to the employed departments

Hospital Departments	Females		Males		Total	
	No	%	No	%	No	%
Surgical	8	4.39	12	6.59	20	10.98
Medicine	13	7.14	15	8.24	28	15.38
Emergency	12	6.59	17	9.34	29	15.93
Washing	18	9.89	16	8.79	34	18.68
Lab	11	6.04	13	7.14	24	13.18
X-ray	9	4.94	14	7.69	23	12.63
Pharmacy	13	7.14	11	6.04	24	13.18
Total	84	46.16	98	53.84	182	100

P < 0.05

Table 3: Distribution of samples according to the occupational education.

Education level	Males	Females	Total	
			No	%
Illiterate	24	22	46	25.57
Read and write	16	26	42	23.07
Primary	22	16	38	20.87
Secondary	21	8	29	15.93
University	15	12	27	14.83
Total	98	84	182	100

P < 0.05

Table 3 shows that the highest percentage of infection acquired in the hospital according of occupational education, illiterate 25.57 % followed by read and write, primary, secondary, university (23.07 %, 20.87 %, 15.93 % and 14.83 %).

Table 4 shows that the highest percentage of infection acquired in the hospital according to residence (58.79 %) were observed in the rural. While

the lowest percentage of infection acquired in the hospital (41.20 %) was observed in urban.

Table 4: Rural and urban distribution of infection acquired in the hospital

Residence	Males		Females		Total	
	No	%	No	%	No	%
Rural	55	30.21	52	28.57	107	58.79
Urban	43	23.62	32	17.58	75	41.20
Total	98	53.84	84	46.16	182	100

P > 0.05

Table 5 shows that the total bacteria which were isolated (n=134) from some hospital departments such as

Staphylococcus aureus (31.34 %), *Pseudomonas* spp. (27.61%), *E. coli* (24.62 %) and *Klebsilla* spp. (16.41 %) respectively.

Table 5: Bacterial types isolated from some hospital departments

Bacterial species	Washing departments	Emergency departments	Surgical departments	Medicine departments	Total
	N (%)	N (%)	N (%)	N (%)	N(%)
<i>Staphylococci</i>	15(11.19)	11(8.20)	9(6.71)	7(5.22)	42(31.34)
<i>Escherichia coli</i>	10(7.46)	8(5.97)	7(5.22)	8(5.97)	33(24.62)
<i>Klebsilla</i> spp.	6(4.47)	5(3.73)	6(4.47)	5(3.73)	22(16.41)
<i>Pseudomonas</i> spp.	14(10.43)	9(6.71)	8(5.97)	6(4.47)	37(27.61)
Total	45 (33.85)	33 (24.62)	30 (22.28)	26 (19.40)	134(100)

P < 0.05

Discussion

A hospital acquired infection is usually one that first appears three days after a

patient is admitted to a hospital or other health care facility. Infections acquired in hospital are also called nosocomial infections [8, 17]. About 5-10 % of patients admitted to hospitals in the United States develop a nosocomial infection. Hospital acquired infection are usually related to a procedure or treatment used to diagnose or that the patient's illness or injury [9, 18]. About 25 % of these infections can be prevented by health care workers taking proper precaution when caring for patients [19, 20]. The most of infections acquired in hospital cases occur in males which were affected more than females. The study showed that they are working in washing, emergency, medicine, laboratory and surgical departments representing. From the results, high frequencies of the employees in this study were at illiterate group. The highest percentage of infection acquired in hospital according of place was observed in rural, while the lowest percentage of infection acquired in the hospital was noticed in urban. The microorganisms come from contaminated equipment or the hands of health care workers. Some of these procedures are respiratory intubation suctioning of material from the throat angel mouth and mechanical ventilation [20].

Positive growth of bacteria was obtained from hospital departments, there is a high rate, and this will suggest that the hospital environment could be the sources of bacterial contamination. This agreement with several studies were carried out, who found that the Gram-negative and Gram positive bacteria are major pathogens associated with hospital acquired infections [15,18,21].

In conclusion, infection acquired in the hospital is a medical problem. One of the possible causes is for staph infection quire in hospital. The finding provides impetus for further research and action by public health professions, which priorities infection acquired on the public health agenda. The chain of infections should be broken which including isolation of infected or susceptible patient, aseptic operations, avoiding touching of dressing and practically wearing gloves, masks, caps and handing washing. Further intervention strategies need to be developed for effective control prevention of infection acquired in the hospital.

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