

Original Research

Evaluation of Hospital Acquired Infections Among Patients Admitted in Wards: An Institutional Based Study

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Abstract:

Background: Health care-associated infections (HCAIs) are those infections that patients acquire while receiving health care. Around 8.7% of the patients in the hospitals fall under the risk of exposure to the nosocomial infections which multiply the complicated conditions such as cancer, surgery, or any cases of organ transplant, thereby surging the mortality rate. The present study was conducted for the Evaluation of hospital acquired infections among patients admitted in wards.

Material and methods: A total of 500 patients admitted to medicine and surgery ward were enrolled in the current research. Inclusion criteria for the present study included patients that were admitted in the department for various procedures, without evidence of initial infection. Pus, blood, urine, sputum and swabs from various lesions if present among study patients was taken after 48 hour of admission and followed till discharge from the hospital. Identification of bacterial strain was done with help of various biochemical tests. All the results were recorded and analysed using SPSS software.

Results: A total of 500 subjects were screened. Mean age of the patients was 51.8 years. Out of these 500 patients, nosocomial infection was seen in 19 percent of the patients. Enterococcus faecalis was seen in 80 percent of the cases with NI while Acinetobacter spp. was seen in 75.79 % of the cases with NI. Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus and Klebsiella species were identified in 45.26 %, 40 %, 32.63 % and 26.32 % of the cases with HCAIs.

Conclusion: Because of the rising prevalence of HCAIs in hospitals, greater attention needs to be paid to cleaning the wards.

Keywords: Hospital acquired, Infections

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INTRODUCTION

Health care-associated infections (HCAIs) are those infections that patients acquire while receiving health care.¹ The term HCAIs initially referred to those infections linked with admission to an acute-care hospital (earlier called nosocomial infections), but the term now includes infections developed in various settings where patients obtain health care (eg, long-term care, family medicine clinics, home care, and ambulatory care). HCAIs are infections that first appear 48 hours or more after hospitalization or within 30 days after having received health care.² Multiple studies

indicate that the most common types of adverse events affecting hospitalized patients are adverse drug events, HCAIs, and surgical complications.³⁻⁷

Around 8.7% of the patients in the hospitals fall under the risk of exposure to the nosocomial infections which multiply the complicated conditions such as cancer, surgery, or any cases of organ transplant, thereby surging the mortality rate.⁸ In an epidemiological study conducted by WHO in 14 countries across the world, 8.7% cases of nosocomial infection cases were reported. This data ranged from 5.0% cases in North American region to 40% in the Asian subcontinent,

Latin America, and Sahara regions of Africa.⁹ This study was conducted for the Evaluation of hospital acquired infections among patients admitted in wards.

MATERIAL AND METHODS

The present study was conducted for evaluating hospital acquired infections among patients admitted in wards. A total of 500 patients admitted to medicine and surgery ward were enrolled in the current research. Inclusion criteria for the present study included patients that were admitted in the department for various procedures, without evidence of initial infection. Patients were categorized as having nosocomial infection if, at the time of admission, they did not exhibit any symptoms or illness, and if, after three days of admission, their culture came back positive. Pus, blood, urine, sputum and swabs from various lesions if present among study patients was taken after 48 hour of admission and followed till discharge from the hospital. Identification of bacterial strain was done with help of various biochemical tests. All the results were recorded and analysed using SPSS software.

RESULTS

A total of 500 subjects were screened. Mean age of the patients was 51.8 years. Out of these 500 patients, nosocomial infection was seen in 19 percent of the patients. Enterococcus faecalis was seen in 80 percent of the cases with NI while Acinetobacter spp. was seen in 75.79 percent of the cases with NI. Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus and Klebsiella species were identified in 45.26 percent, 40 percent, 32.63 percent and 26.32 percent of the cases with NI.

Table 1: Prevalence of hospital-based infection

Nosocomial infection	Number	Percentage
Present	95	19
Absent	405	81
Total	500	100

Table 2: Microorganism isolated

Microorganism isolated	Number	Percentage
Enterococcus faecalis	76	80
Acinetobacter spp.	72	75.79
Escherichia coli	43	45.26
Pseudomonas aeruginosa	38	40
Staphylococcus aureus	31	32.63
Klebsiella species	25	26.32

DISCUSSION

Hospital-acquired Infections (HAIs) or nosocomial infections are defined as infections which are not present or not incubating when the patient is hospitalized and are acquired after 48 hours of hospital stay.¹⁰

In developing countries large proportion of people are dying on daily preventable and curable diseases due to inadequate health care services in which postoperative HAIs constitute a large proportion of this burden in which increasing its risk by nine times more than the developed countries.^{11,12}

Studies in Ethiopia focusing only on surgical and gynecologic/obstetrics wards showed prevalence of HAIs as high as 27.6%. The risk of HAIs in relation to surgery is high, since about 77% of death of patients with HAIs was reported to be related with postoperative infections.¹³ The Centers for Disease Control and Prevention (CDC) developed baseline definitions for HAIs that were republished in 2004.¹⁴ HAIs were defined as those that develop during hospitalization but are neither present nor incubating upon the patient's admission to the hospital; generally for those infections that occur more than 48 to 72 hours after admission and within 10 days after hospital discharge.¹³⁻¹⁵ This study was conducted for the evaluation of hospital acquired infections among patients admitted in wards.

A total of 500 subjects were screened. Mean age of the patients was 51.8 years. Out of these 500 patients, nosocomial infection was seen in 19 percent of the patients. Enterococcus faecalis was seen in 80 percent of the cases with HCAIs while Acinetobacter spp. was seen in 75.79 percent of the cases with HCAIs. Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus and Klebsiella species were identified in 45.26 percent, 40 percent, 32.63 percent and 26.32 percent of the cases with HCAIs.

In a similar study conducted by Ginawi I et al, authors investigated the incidence of Nosocomial Infection (NI) and type of bacteriological isolates among the patients admitted in the medical and surgical wards of a non-teaching secondary care hospital in north India. A total of 176 patients were included in the study of which 82 were from Medical and 94 from Surgical ward. Overall incidence of NI was found to be 26.1% (Medical ward=28%, Surgical ward=24.5%, p=0.58). The isolation rate of Acinetobacter baumannii was (p=0.15) higher among the patients of medical ward (95.7%) than surgical ward (82.6). Escherichia coli was isolated in 89.1% and no significant difference was observed between medical and surgical wards. Klebsiella pneumoniae was isolated in 50% patients and was almost similar (p=0.37) in medical surgical wards. The isolation rate of Pseudomonas aeruginosa, Enterococcus faecalis, Staphylococcus aureus and Coagulase negative staphylococci were 43.5%, 73.9%, 34.8% and 17.4%

respectively. A significant difference was observed in the isolation rate of *Enterococcus faecalis* ($p=0.007$) and Coagulase negative staphylococci ($p=0.002$) between medical and surgical wards. Overall, among the patients who developed NI, 27.2% patient's bacterial isolates were Gram positive (Surgical=64.1, Medical=80%). The incidence of NI is increasing in the hospitals, so extensive that more care has to be taken in cleaning the wards of the hospitals.¹⁵

Tassew SG et al¹⁶ assessed the prevalence and management of HAIs among patients admitted at Zewditu Memorial Hospital. A multivariate logistic regression was used to identify factors associated with HAIs. The prevalence of HAIs was 19.8%. Surgical Site Infection (SSI) and pneumonia accounted for 20 (24.7%) of the infections. Culture and sensitivity was done for 24 (29.6%) patients. Of the 81 patients who developed HAIs, 54 (66.67%) of them were treated inappropriately. Physicians' response for this variation was information gap, forgetfulness, affordability and availability issue of first line medications. Younger age (AOR (Adjusted odds ratio) = 8.53, 95% CI: 2.67–27.30); male gender (AOR = 2.06, 95% CI: 1.01–4.22); longer hospital stay (AOR = 0.17, 95% CI: 0.06–0.51); and previous hospital admission (AOR = 3.22, 95% CI: 1.76–5.89); were independent predictors of HAIs. Prevalence of HAIs and inappropriate management were substantially high in this study. Pneumonia and SSI were the common types of HAIs. Locally conformable guidelines could help to correct such problems.¹⁶

Melaku S et al assessed the prevalence and risk factors of hospital-acquired infections and the antibiotic susceptibility pattern of bacterial isolates. Of the 1383 patients assessed 961 surgical, 333 obstetrics and 89 gynaecology patients assessed, 17.1% 21.0% and 13.5% developed infections, respectively. The over all incidence of hospital acquired infections was 246 (17.8%) with 251 (18.1%) episodes of bacterial infections. Urinary tract and surgical site infections were detected in 118 (48%) and 112 (45.6%) of the cases, respectively. Of the bacterial isolates, 132 (52.6%) were gram negative and 119 (47.4%) gram positive. *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, were the dominant gram negative isolates accounting for 49 (19.5%), 36 (14.3%) and 26 (10.4%), respectively. On the other hand, *Staphylococcus aureus*, coagulase negative staphylococci, and *Enterococcus* species were isolated in 91 (36.3%), 18 (7.2%) and 10 (4.0%), respectively. Surgery, catheterization, underlying diseases, antibiotics prophylaxis and length of hospital stay were risk factors for infection ($P<0.0001$). Most, >80% of isolates showed high rate of resistance to ampicillin, chloramphenicol, and amoxicillin-clavulanic acid.¹⁷

CONCLUSION

Because of the rising prevalence of HCAs in hospitals, greater attention needs to be paid to cleaning the wards.

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