

Epidemiology of Hospital Acquired Infections among Patients Admitted in a Tertiary Care Hospital, Bangalore

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Abstract

Background: Hospital-acquired infection also called “nosocomial infection” is infection acquired during hospital care which is not present or incubating at admission. Objective of this research was to estimate the proportion of hospital acquired infection and study the distribution & determinants of hospital acquired infection. The data relevant to the study was accessed from in patient files at medical records department. Information pertaining to age of the patient, diagnosis for which the patient was admitted, type of ward admitted, associated co-morbidities, type of hospital acquired infection, microorganism associated with HAI, duration of stay, invasive device were collected. Infections occurring more than 48 hours after admission were considered as hospital acquired infection. The proportion of hospital acquired infection in the present study was 0.0017% (17 of the 9779 patients admitted). Most common organism isolated was acinetobacter (6 of the 17 patients admitted). Major hospital acquired infection as revealed by the present study was pneumonia. (7 of the 17 patients admitted)

Key Words: Hospital-Acquired Infection, Nosocomial Infection, Pneumonia

1. INTRODUCTION

Hospital-acquired infection also called “nosocomial infection” is infection acquired during hospital care which is not present or incubating at admission. Infection occurring more than 48 hours after admission is usually considered nosocomial.

Studies throughout the world document that nosocomial infections are a major cause of morbidity and mortality. A high frequency of nosocomial infections is evidence of a poor quality of health service delivery, and leads to avoidable costs. Many factors contribute to the frequency of nosocomial infections: hospitalized patients are often immunocompromised, they undergo invasive examinations and treatments, and patient care practices and the hospital environment may facilitate the transmission of microorganisms among patients. The selective pressure of intense antibiotic use promotes antibiotic resistance. While progress in the prevention of nosocomial infections has been made, changes in medical practice continually present new opportunities for development of infection.

2 REVIEW OF LITERATURE:

A study conducted by Disha et al in Ahmedabad revealed that, the overall prevalence rate of hospital acquired infections in surgical wards was about 21.9% comprising of 10.9% surgical site infection, 8% local blood stream infection (i.e. thrombophlebitis) 2% urinary tract infection (UTI) and 1% the other infection (like bed sore). Incidence rate of surgical site infections was 12.72 %. *Klebsiella* spp. was the most common isolate responsible for SSI.

A study conducted by Patwardhan et al in Pune revealed the following findings, major infections found in ICU were due to *Acinetobacterbaumannii*, *Escherichia coli*, *Klebsiellapneumoniae*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Streptococcus pyogenes*. The infection rate was maximum in urinary tract (44.4%) followed by wound infections (29.4%), pneumonia (10.7%) and bronchitis (7.4%).

A study conducted by Kamat et al in Goa revealed the following findings:

The overall infection rate was 8.03/100 admissions, 33.6% of the catheterized patients developed hospital acquired urinary tract infection. Effect of gender was found to remain restricted to the development of hospital acquired UTI among females at an earlier age and earlier in time series compared to males, but no overall difference in incidence in the two sexes. The factor significantly associated with HAUTI included: duration of hospitalization, per urethral catheterization and the duration of catheterization. *E.coli*, *pseudomonas*, *Klebsiella*, and *candida* accounted for over 90% of the isolates, and 73.5% of these were resistant to all the antibiotics for which sensitivity was tested.

A study conducted by Baghaei et al revealed the following findings, the most common type of infections were pneumonia 59.5%, UTI 21.3%, and both 19.1% respectively. The most common microorganisms in pulmonary infections were *Pseudomonas aeruginosa*, in UTI *E. coli*, respectively. Incidence of pneumonia significantly is more than of other ($p < 0.01$). Also the correlation of ICU stay time, endotracheal tube, central venous catheter and

incidence of nosocomial infection is significant ($p < 0.001$).

3. OBJECTIVES

- To estimate the proportion of hospital acquired infection.
- To study the distribution and determinants of hospital acquired infection.

4. MATERIALS AND METHODOLOGY

The data relevant to the study was accessed from in patient files at medical records department.

This record based analysis was conducted at a tertiary care hospital in Bangalore during October to November 2013. Complete enumeration of the patients admitted to hospital from April 2012 to September 2012 was done. The inclusion criterion was in-patients with hospital acquired infection. Patients for which records were not available were excluded.

Prior permission was obtained from concerned authorities (Chief Administrator, M S Ramaiah hospital) to conduct the study in tertiary care hospital. Information pertaining to age of the patient, diagnosis for which the patient was admitted, type of ward admitted, associated co-morbidities, type of hospital acquired infection, microorganism associated with HAI, duration of stay, invasive device were collected. Infections occurring more than 48 hours after admission were considered as hospital acquired infection.

5 RESULTS

A total of 21 patients were enrolled for the present study. The data was available in case of 17 patients. It was revealed that, the proportion of hospital acquired infection was 0.0017% (17/9779). It was observed that, 52.9% of the study participants were males and remaining of them were females. It was observed in the present study that, majority i.e., 41.2% of them developed pneumonia and 17.6% of them developed pleural effusion (Table 1). Majority (6 of the 17) of the patients were infected with acinetobacter followed by klebsiella (Table 2). Majority (41.2%) of the patients infected with hospital acquired infection were on ventilator.(Table 3) It was observed from the present study that, the major co-morbidity associated among patients with hospital acquired infection was diabetes mellitus (29.4%) followed by low birth weight (23.5%).(Table 4). It was observed that, the mode of treatment was medical among 70.6% of the patients admitted with hospital acquired infection.(Table 5) It was observed in the present study that majority (29.4%) of the patients with hospital acquired infection were admitted in MICU and wards.(Table 6)

5.1 Abbreviations

HAI- Hospital Acquired Infection
 UTI- Urinary Tract Infection
 HAUTI- Hospital Acquired Urinary Tract Infection
 ICU- Intensive Care Unit
 MICU- Medical Intensive Care Unit

Table 1. Distribution of study participants according to type of HAI

HAI	No.(%)
Pneumonia	7(41.2)
Pleural effusion	3(17.6)
SSI	2(11.8)
Sepsis	1(5.9)
Meningitis	1(5.9)
UTI	1(5.9)
Liver abscess	1(5.9)
More than 1	1(5.9)
Total	100.0

Table 2. Distribution of study participants according to type of microorganism isolated

Microorganism	No.(%)
Acinetobacter	4(23.5)
Candida	1(5.9)
Candida and Acinetobacter	1(5.9)
E coli	2(11.8)
Enterococcus	1(5.9)
Klebsiella	1(5.9)
Klebsiella and Acinobacter	1(5.9)
Klebsiella and Staphylococcus aureus	1(5.9)
MRSA and Pseudomonas	1(5.9)
Not isolated	3(17.6)
Staphylococcus	1(5.9)
Total	100.0

Table 3. Distribution of study participants according to type of invasive device

Invasive device	No.(%)
Catheter	3(17.6)
Ventilator	7(41.2)
Arterio-venous fistula	1(5.9)
Intravenous line	2(11.8)
Central venous line	3(17.6)
Intubation	2(11.8)
Drain	1(5.9)

Table 4. Distribution of study participants according to associated co-morbidity

Associated co morbidity	No. (%)
Chronic kidney disease	1(5.9)
DM	5(29.4)
Low birth weight	4(23.5)
NIL	6(35.3)
RHD	1(5.9)
Total	100.0

Table 5. Distribution of study participants according to mode of treatment

Mode of treatment	No. (%)
Medical	12(70.6)
Surgical	5(29.4)
Total	100.0

Table 6. Distribution of study participants according to type of ward admitted

Type of ward admitted	No.(%)
MICU	5(29.4)
NICU	2(11.8)
PICU	3(17.6)
SICU	2(11.8)
Ward	5(29.4)
Total	100.0

6. CONCLUSION

- The proportion of hospital acquired infection in the present study was 0.0017% (17 of the 9779 patients admitted).
- Most common organism isolated was acinetobacter (6 of the 17 patients admitted).
- Major hospital acquired infection as revealed by the present study was pneumonia (7 of the 17 patients admitted)

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