

## Analysing the Nosocomial Infections in Patients Admitted to Wards at a Tertiary Care Hospital in South India

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### ABSTRACT

**Background:** This study was conducted to assess the incidence of nosocomial infections among patients admitted in wards.

**Materials and Methods:** This study comprised of total 100 subjects. For analytical purposes, patients who were infected at the time of admission were included in the noninfected group. However, when these individuals contracted a new infection at a different anatomical site while they were in the intensive care unit, they were added to the group of patients with ICU-acquired infections.

**Results:** This study comprised of 100 subjects out of which 50 were males and 50 were females. Among 100 subjects, nosocomial infections were prevalent in 43% of the cases. Nosocomial pneumonia was the nosocomial infection that was diagnosed the most frequently. Of the 43 patients with pneumonia, 21 had nosocomial pneumonia, which combined ventilator associated pneumonia (VAP) and non-VAP. When considered independently, 18 subjects received a diagnosis of VAP, while 3 patients with infection received a diagnosis of non-ventilator related nosocomial pneumonia. Of the 43

illnesses, 19 had a diagnosis of urinary tract infection.

**Conclusion:** In this study the prevalence of nosocomial infections was 43%. Nosocomial pneumonia was found to be the most common infection.

**Keywords:** Pneumonia, Nosocomial Infection, Hospital.


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### INTRODUCTION

A nosocomial infection is defined as an infection that is not present or incubating when the patient is admitted to hospital or other health care facility.<sup>1</sup> It has been reported that the incidence of nosocomial infections in the intensive care unit (ICU) is about 2 to 5 times higher than in the general in-patient hospital population.<sup>2</sup> The increased morbidity and mortality associated with nosocomial infections in the ICU is a matter of serious concern today. Serious medicolegal issues also arise in this context, since the patient or their families sometimes blame the hospital staff for the infection and demand compensation.<sup>3</sup> It has been reported that in hospitals with an effective program for nosocomial infection surveillance, infection rates can be reduced by approximately one-third.<sup>4</sup>

National nosocomial infections surveillance system has defined nosocomial infection as a localized or systemic condition that results from an adverse reaction to the presence of an infectious agent(s) or its toxin(s) that was not present or incubating at the time of admission to the hospital.<sup>5</sup>

The important nosocomial infections in the ICU based on frequency and potential severity include urinary tract infection (UTI), pneumonia, bloodstream infections, skin and soft tissue infections, gastroenteritis, hepatitis, and meningitis.<sup>6,7</sup> Hence, this study was conducted to assess the Incidence of nosocomial infections among patients admitted in wards in a tertiary care hospital.

### MATERIALS AND METHODS

Present study was conducted in Department of General Medicine, Shadan Institute of Medical Sciences, Teaching Hospital & Research Centre, Himayatsagar Road, Hyderabad, Telangana, India. This study comprised of total 100 subjects. For analytical purposes, patients who were infected at the time of admission were included in the noninfected group. However, when these individuals contracted a new infection at a different anatomical site while they were in the intensive care unit, they were added to the group of patients with ICU-acquired infections. In order to gather

information on the duration of hospital stays and mortality outcomes, every patient in the study group was also monitored until their discharge from the hospital. Every patient's details were entered into an organized case report form. The APACHE II scoring was divided into two classes for statistical analysis:  $\geq 13$  and  $< 13$ , with the median APACHE score serving as the cut-off. The percentage of infections was used to calculate the incidence of nosocomial infections. Additionally, infection rates were computed using the CDC-recommended formulas either per 1000 patient days or per 1000 device days (for specific device-associated infections).

**RESULTS**

This study comprised of 100 subjects out of which 50 were males and 50 were females. Among 100 subjects, nosocomial infections were prevalent in 43% of the cases. Nosocomial pneumonia was the nosocomial infection that was diagnosed the most frequently. Of the 43 patients with pneumonia, 21 had nosocomial pneumonia, which combined ventilator associated pneumonia (VAP) and non-VAP. When considered independently, 18 subjects received a diagnosis of VAP, while 3 patients with infection received a diagnosis of nonventilator related nosocomial pneumonia. Of the 43 illnesses, 19 had a diagnosis of urinary tract infection.

**Table 1: Gender-wise distribution of subjects**

Gender	n	%
Males	50	50%
Females	50	50%
Total	100	100%

**Table 2: Prevalence of nosocomial infections among subjects.**

Prevalence of infection	n	%
Absent	57	57%
Present	43	43%
Total	100	100%

**DISCUSSION**

Nosocomial Infections (NI) occur worldwide and affect both developed and developing countries. Infections acquired in health care settings are among the major causes of death and increased morbidity among hospitalized patients. These infections result in substantial morbidity, mortality and increased financial burden. NI are also important public health problems in developing countries as well as in developed countries. The socio-economic impact, i.e., prolongation of hospitalization, mortality and cost, of these infections adversely affects patients and nation's economic well-being.<sup>8,9</sup> A incidence survey was conducted under the auspices of World Health Organization (WHO) in 55 hospitals of 14 countries representing four WHO Regions (Europe, Eastern Mediterranean, South-East Asia and Western Pacific) showed an average of 8.7% of hospital patients had NI. At any time, over 1.4 million people worldwide suffer from infectious complications acquired in hospital.<sup>10</sup>

NI are infections acquired during hospital cares which are not present or incubating at admission. Infections occurring more than 48 hours after admission are usually considered nosocomial. Definitions to identify NIs have been developed for specific infection sites (e.g., urinary, pulmonary). These are derived from those published by the Centers for Diseases Control and Prevention (CDC) in the United States of America or during international conferences and are used for surveillance of NI.<sup>11-13</sup> Hence, this study was conducted to assess the Incidence of nosocomial infections among patients admitted in wards in a tertiary care hospital.

This study comprised of 100 subjects out of which 50 were males and 50 were females. Among 100 subjects, nosocomial infections were prevalent in 43% of the cases. Nosocomial pneumonia was the nosocomial infection that was diagnosed the most frequently. Of the 43 patients with pneumonia, 21 had nosocomial pneumonia, which combined ventilator associated pneumonia (VAP) and non-VAP. When considered independently, 18 subjects received a diagnosis of VAP, while 3 patients with infection received a diagnosis of nonventilator related nosocomial pneumonia. Of the 43 illnesses, 19 had a diagnosis of urinary tract infection. Ginawi I et al<sup>14</sup> in their study, 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. Dasgupta S et al<sup>15</sup> determined the incidence of nosocomial infections acquired in the ICU, their risk factors, the causative pathogens and the outcome in a tertiary care teaching hospital. This was a prospective observational study conducted in a 12 bedded combined medical and surgical ICU of a medical college hospital. The study group comprised 242 patients admitted for more than 48 h in the ICU. Data were collected regarding severity of the illness, primary reason for ICU admission, presence of risk factors, presence of infection, infecting agent, length of ICU and hospital stay, and survival status and logistic regression analysis was done. The nosocomial infection rate was 11.98% (95% confidence interval 7.89–16.07%). Pneumonia was the most frequently detected infection (62.07%), followed by urinary tract infections and central venous catheter associated bloodstream infections. Prior antimicrobial therapy, urinary catheterization and

length of ICU stay were found to be statistically significant risk factors associated with nosocomial infection. Nosocomial infection resulted in a statistically significant increase in length of ICU and hospital stay, but not in mortality. They concluded that nosocomial infections increase morbidity of hospitalized patients. Choudhuri AH et al<sup>16</sup> in their study, described the epidemiology and characteristics of nosocomial infections acquired in a tertiary care ICU and the impact of the various risk factors in their causation. A retrospective study was conducted on the prospectively collected data of 153 consecutive patients admitted in a tertiary care ICU between July 2014 and December 2015. The primary objective was to assess the epidemiology of ICU-acquired bacterial infections in terms of the incidence of new infections, causative organism, and site. The secondary end point was to assess the risk factors for developing ICU-acquired infections. Out of the 153 patients enrolled in the study, 87 had an ICU-acquired nosocomial infection (58.86%). The most common organism responsible for infection was *Klebsiella pneumoniae* (37%), and the most common infection was pneumonia (33%). The duration of mechanical ventilation and length of ICU stay were significantly prolonged in patients developing nosocomial infections. There was no difference in mortality between the groups. The multivariate analyses identified intubation longer than 7 days, urinary catheterization >7 days, duration of mechanical ventilation more than 7 days, and ICU length of stay longer than 7 days as independent risk factors for nosocomial infections. The study demonstrated a high incidence of nosocomial infection in the ICU and identified the risk factors for acquisition of nosocomial infections in the ICU.

## CONCLUSION

In this study the prevalence of nosocomial infections was 43%. Nosocomial pneumonia was found to be the most common infection.

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