

# Incidence of Nosocomial Infections Amongst Patients Admitted in Wards at a Tertiary Care Teaching Hospital.

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## ABSTRACT

**Background:** A hospital-acquired infection (HAI), also known as a nosocomial infection, is an infection that is acquired in a hospital or other health care facility. This study was done to evaluate the prevalence of nosocomial infections (NI) among the patients admitted in the ward in a medical hospital. **Methods:** The total study participants were 190 including 102 males and 88 females. Complete history of patients was taken along with the clinical examination. All the study subjects were examined daily to assess the treatment and to detect any new infection. Patient's body temperature was also monitored regularly. All the routine investigations such as complete blood picture, blood sugar level, urine analysis and chest radiograph were also done. Data so obtained was evaluated using SPSS-20 and was expressed as percentage and variables as required. **Results:** The percentage of subjects with nosocomial infection was 20%. Significant differences of NI were found with age, gender, socioeconomic status, educational level, and duration of stay in hospital. The urinary tract infection (UTI) was seen among most of the cases. Acinetobacter (32.5%) was the most commonly seen organism which followed Pseudomonas aeruginosa (25.2%) as the causative factors. **Conclusion:** The study revealed incidence rate of nosocomial infections as 20%. Hospital administration should maintain proper measures regarding infection control procedures.

**Keywords:** Intensive care unit, Nosocomial infection; Bacterial strain, Incidence.

## INTRODUCTION

Nosocomial infection is an infection that is acquired in a hospital or other health care facility. Such an infection can be acquired in hospital, nursing home, rehabilitation facility, outpatient clinic, or other clinical settings.<sup>[1]</sup> Infection is spread to the susceptible patient in the clinical setting by various means. Health care staff can spread infection, in addition to contaminated equipment, bed linens, or air droplets. The infection can originate from the outside environment, another infected patient, staff that may be infected, or in some cases, the source of the infection cannot be determined.<sup>[2]</sup> In some cases the microorganism originates from the patient's own skin microbiota, becoming opportunistic after surgery or other procedures that compromise the protective skin barrier.<sup>[3]</sup> Though the patient may have contracted the infection from their own skin, the infection is still considered nosocomial since it develops in the health care setting. The nosocomial infections are caused by bacterial, viral and fungal pathogens.<sup>[4]</sup> The most common pathogens are staphylococci, pseudomonas, E-coli, Klebsiella, mycobacterium tuberculosis, candida, aspergillus, fusarium, trichosporon and malassezia all of these pathogens leads to increased risk of morbidity and

mortality.<sup>[5]</sup> It can be due to contaminated food items, water or other equipments or may be vector borne due to flies, mosquito or rats.<sup>[6]</sup> It may be due to surgical drains, poor health status, not using gloves, irregular and inappropriate debridement. This study was done to evaluate the prevalence of nosocomial infections (NI) among the patients admitted in the ward in a medical hospital.

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## MATERIALS AND METHODS

The study was conducted among 190 patients including 102 males and 88 females admitted in hospital. Collection of data was done from patient, analysis of infections, and their causes was carried out. Prior permission was obtained from district surgeon and ethical clearance was obtained. Detailed history and physical examination were carried out. Blood and urine specimen among study patients was taken after 48 hours of admission who developed

fever after 48 hours of admission and followed till discharge from the hospital. Bacterial strains were identified with the help of gram staining and biochemical tests. All these study subjects were examined daily to assess the treatment and to detect the confirmation of any new infection. Patient's body temperature was also monitored regularly. The relevant investigations were performed according to the clinical presentation of patients and also after taking opinion from consultants of relevant departments. Data so obtained was evaluated using SPSS-20 and was expressed as percentage and variables as required.

### RESULTS

The total numbers of admissions to ward were 190 during the study. Patients were admitted for more than 48 hours out of which 102 were males and 88 were females. The percentage of subjects with nosocomial infection was 20%. Among these most of patients were suffering from Urinary tract infection (15) followed by Pneumonia (9) [Table 1].

**Table 1: Distribution of nosocomial infection among nosocomial positive patients.**

Nosocomial infection	Number of patients
Urinary tract infection	15
Pneumonia	9
Soft tissue infections	6
Gastroenteritis	3
Blood stream infections	3
Meningitis	2
Total	38/190

In UTI cause of infection was catheter in 5% patients whereas in Pneumonia, Ventilator support was cause of infection in 3% patients. The Incidence of Nosocomial infection according to gender, age, educational status, duration of stay, socio-economic status is given in [Table 2-6].

**Table 2: Incidence of Nosocomial infections according to gender.**

Sex	Nosocomial infections		
	Total	No	Yes
Males	102	80	22
Females	88	72	16
Total	190	152	38(20%)

**Table 3: Incidence of Nosocomial infections according to age.**

Age (years)	Nosocomial infections	
	No	Yes
20-30	42	4
31-40	56	12
41-50	32	8
≥51	32	14
Total	152	38

It was observed that as compared to females, males (22) were more affected. Greater prevalence of

nosocomial infection was seen in geriatric patients aged >51 years and whose hospital stay was 7-9 days. More prevalence of nosocomial infection were seen in lower socioeconomic class (20) having primary education level (17) where total number of patients who developed infection were 38. Acinetobacter (32.5%) was the most commonly seen organism which followed Pseudomonas aeruginosa (25.2%) as the causative factors of nosocomial infection [Graph 1].

**Table 4: Incidence of Nosocomial infections according to Educational status.**

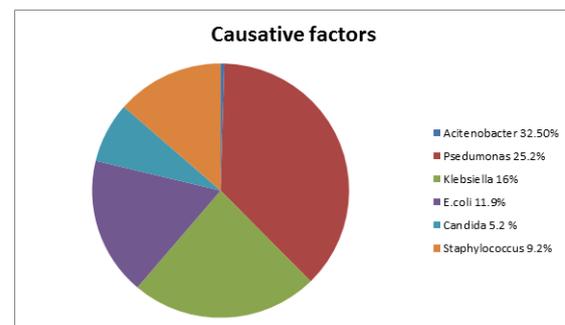
Educational level	Nosocomial infections	
	No	Yes
Primary	67	17
Secondary	41	10
Graduation	44	11
Total	152	38

**Table 5: Incidence of Nosocomial infections according to Duration of stay in hospital ward.**

Length of stay	Nosocomial infections	
	No	Yes
>3 days	54	8
4-6 days	76	14
7-9 days	22	16
Total	152	38

**Table 6: Incidence of Nosocomial infections according to socioeconomic status.**

Socioeconomic status	Nosocomial infection	
	No	Yes
Lower class	52	20
Middle class	78	12
Upper class	22	6
Total	152	38



**Graph 1: Pie chart showing various causative agents for nosocomial infections.**

### DISCUSSION

The incidence of Nosocomial infections in our study was 20%. Patients who are critically ill are at a higher risk of getting nosocomial infection due to multiple causes including disruption of barriers statement. The infection rate observed indicates a relatively low prevalence of nosocomial infections, suggestive of good aseptic practices, hand hygiene principles and good ventilatory and urinary catheter care. A study by Farzianpour et al also showed less

prevalence as 12.5%.<sup>[7]</sup> The present findings are also comparable with the study Su BH et al and Beaujean DJ et al but less compared to 33.5% by Beaujean et al.<sup>[8-10]</sup> This may be due to the relative small sample size of the present study.

The general distribution pattern of the nosocomial infections in our study showed UTI to be the most common, followed by pneumonia, skin and soft tissue infections, gastroenteritis, bloodstream infections and meningitis. Urinary tract infection (UTI) is the most common and frequent nosocomial infection seen in critically ill patients.<sup>[11,12]</sup> Nosocomial pneumonia is the second most frequent nosocomial infection in critically ill patients and represents the leading cause of death from infection acquired in hospital.<sup>[13]</sup> Whereas Pradhan et al found respiratory infections as the mostly frequently observed in their study.<sup>[14]</sup>

The frequency of different types of causative organisms in the study was mainly of *Acinetobacter* (32.5%) followed by *Pseudomonas* and *Klebsiella*. Another study by Sharma et al found *Acinetobacter* (83.2%) was the most common organism found followed by *Pseudomonas aeruginosa* (73.5%), *Escherichia coli* (72.5%), *Staphylococcus aureus* (53.3%), and *Eterococcus faecalis* (22.2%).<sup>[15]</sup>

To prevent these infection proper care should be taken, gloves, aprons should be worn, proper sterilization should be taken into consideration. Proper disposal of hospital and toxic waste should be done. In this study, due to lack of proper care, it was observed that the majority of the cases were referred to higher specialty centers; hence, the incidence of nosocomial infections may be under looked, also limiting to assess the mortality associated with these infections. Hence, the impact of nosocomial infections is more significant in resource-poor countries.<sup>[16]</sup> Main problems in developing countries are understaffing, poor infrastructure in ICU and poor maintenance of records making situation difficult to get clarity on the incidence of these infections. Although it is difficult to solve some problems associated with financial hardship in developing countries, most solutions are simple and not resource demanding. Infection control strategies such as hand hygiene and wearing gloves; paying attention to well established processes for decontamination and cleaning of soiled instruments and other items, followed by either sterilization or high-level disinfection; and improving safety in operating rooms and other high-risk areas where the most serious and frequent injuries and exposures to infectious agents can resolve the problem to a major extent.<sup>[17]</sup> The nosocomial infection is one of major problems in the hospitals. We suggest large scale studies to be carried out among Indian population for prevention and management of nosocomial infections as this was small sample size study. The study on the community acquired infections should also be conducted. Even though the sample size was

very less, unequal distribution of samples according to gender and age due to which exact prevalence of nosocomial infections was not calculated for independent variables, nosocomial infections mere presence among the present study cases cannot be ruled out. Hence, further systematic and standardized large scale studies are suggested in for prevention and management of these nosocomial infections.

## CONCLUSION

The study revealed incidence rate of Nosocomial infections as 20%. Hospital administration should maintain proper measures regarding infection control procedures. Nosocomial infections in the ICU of teaching hospital showed a significant relation with age, socioeconomic status and duration of stay in the ICU.

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