

<https://doi.org/10.33472/AFJBS.6.6.2024.7068-7073>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

A Study on Hospital Acquired Infections with Its Steps Prevention

Ashok Sagar^{1*}, Safia maqbool², Sunil Shekhar Ghimire³, Mohammad Irfan⁴, Jay Prakash Singh Rajput⁵

^{1*}Professor & HOD, Department of Forensic Medicine & Toxicology, Santosh medical college and hospital, Santosh Deemed to be University, Ghaziabad, NCR Delhi,

²Assistant Professor, Department of Microbiology, Krishna Mohan Medical College & Hospital, Pali Dungra, Sonkh, Mathura, UP,

³Tutor, Department of Microbiology, Brahmanand College of Medicine & Research, Chaparada, Junagadh, Gujrat, Haryana,

⁴Assistant Professor, Department of clinical Laboratory Science, college of Applied Medical Sciences, Dawadmi, 17464 Saudi Arabia

⁵Associate Professor, Department of Physiology, MM College of Medical Sciences & Research, Sadopur, Ambala, Haryana,

Corresponding Email: dr.sagarashok@gmail.com

Email: ²sufishah88@gmail.com, ³shekarsunil27@gmail.com ⁴mquraish@su.edu.sa

⁵jpsrajput50@gmail.com

Article Info

Volume 6, Issue 6, July 2024

Received: 15 May 2024

Accepted: 22 June 2024

Published: 11 July 2024

doi: [10.33472/AFJBS.6.6.2024.7068-7073](https://doi.org/10.33472/AFJBS.6.6.2024.7068-7073)**ABSTRACT:**

A hospital-acquired infection (HAI), also known as a nosocomial infection is an infection that is acquired in a hospital or other health care field. Hospital acquired infection are major complication in every unit of hospital, Specially, Critical Care Unit. Hospital acquired infection is burden for the society. This increased morbidity, mortality, cost of treatment and also hospital staying condition. Mostly patients, their relatives & health care provider get infected by the nosocomial infection.

The main aims of this study were to assess magnitude of different hospital acquired infection (HCAI), duration of stay and antibiotic use in Critical Care Unit and also to assess the cleanness practice among doctors and staffs in Critical Care Unit. During the 2 months period a total of 84 patients were admitted Santosh Medical college and Hospital for more than 48 hours and were included in the study. In admitted 84 patients, 28 (33.33%) were confirmed and documented with nosocomial infection. Out of 28 nosocomial infected patients, that rate of urinary tract infection, respiratory tract infection, surgical site infection, intravascular infection and other was 15(53.57%), 9(32.14%), 6(21.42%), 8(28.57%) and 5(17.85%) respectively.

© 2024 Ashok Sagar1, This is an open access article under the CC BY license (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source,

1. Introduction

Hospital-acquired infections (HAIs) are sometimes termed as nosocomial infections (NIs), which the patient acquires during his stay or healthcare workers (HCWs) get during their day-to-day hospital activities.^{1,2} Infections are considered nosocomial if they appear 48 to 72 hours after hospital admission or within 10 days after discharge.³

Healthcare workers acquire these infections during specimen collection, processing and discarding, handling and discarding of medical equipment as well as during patient to HCWs direct interaction at the time of examination.⁴⁻⁵ Nosocomial infection commonly results in urinary tract infection (UTI), surgical site infection, lower respiratory tract infections, bloodstream infection and other non-bacterial infections.^{6,7} However, in low- and middle-income countries the most common healthcare associated infection was surgical site infection.^{8,9} Moreover, NI is a major public health concern and leads to prolonged hospital stay, long-term disability and even deaths.⁹

Hospital-acquired infection preventions are a process of placing a barrier between susceptible host and the microorganism which are an essential component of delivering safe and high-quality service at the facility level. Hence, HAI associated morbidity and mortality are preventable through infection prevention strategy like established representative infection

control committee, good practice and safe procedure in proper waste handling, good sanitation, safety radiation and occupational protection.¹⁰⁻¹²

However, HAI prevention does not get enough attention in third world countries, including Ethiopia, particularly in the study area where the burden of infectious diseases is high. Therefore, this study was conducted to assess knowledge, attitude, practices and associated factors towards HAI prevention among HCWs at University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia. Information from this study will be submitted to the responsible body which will potentially assist in filling the gap towards HAI prevention application and indicate the measures to be taken to address the problem among HCWs HAI prevention.

Objectives of the present study:

1. To assess magnitude of different hospital acquired infection (HAI), duration of stay in hospital.
2. To assess the cleanliness practice among doctors, medical technologists, nurses and nonmedical staffs in hospital.

2. Methodology

In the present study mostly, secondary data has been used. Secondary data have been collected from various interim and annual reports presented to the ministry of Tourism, Govt. of India. In addition to this, data have been collected from various journals, articles, magazines, newspaper archives. The research is also based on the referred sources- published, unpublished and electronic. Self-administered questionnaire was used for data collection.

The first part elicits about knowledge, the second part includes questions concerning attitude and the last part includes practice assessment questions towards infection prevention. The collection of information is done in two principal sources- Primary Data and Secondary Data.

- 1. Primary Data:** It is the information collected directly without any references. In this study it is gathered through interviews with concerned officers and staff, either individually or collectively, sum of the information has been verified or supplemented with personal observation in trading times and conducting personal interviews with the concerned officers.
- 2. Secondary Data:** The secondary data was collected from already published sources such as, NSE websites, internal records, reference from text books and journal relating to derivatives. The data collection includes:
 - a) Collection of required data from NSE and BSE websites
 - b) Reference from text books and journals relating to Indian stock market system and financial derivatives.

3. Result

Pre-designed proforma was developed to assess the incidence of nosocomial infection in CCU. The proforma was designed in two parts.

Part A: The proforma enlisted demographic details of the patient including age, sex, geographic details and diagnosis.

Part B: It was used to establish presence or absence of nosocomial infection in the study subject. Criteria for establishment of nosocomial infection were adopted in accordance with the simplified definition derived from the Centre for disease control, USA. The selected criteria to establish the presence or absence of nosocomial infection was as under:

Table 1: Total number of observed patients in CCU during the study period.

No of stay (day)	No of patient	No of male patient	No of female patient
0	10	7	3
1	19	13	6
2	15	7	8
3	16	8	8
4	16	10	6
5	17	10	7
6	9	5	4
7	5	4	1
8	7	5	2
9	4	3	1
10	3	3	0
12	3	2	1
13	1	0	1
16	1	0	1
20	2	1	1
Total	128	78	50

Total 128 number of patients were observed. Out of which 78 were male and 50 were female.

Table 2: Distribution of Sex and Admitted in CCU more than 48 hours.

Duration of staying	No of total patient	No of male patient	No of female patient
3	16	8	8
4	16	10	6
5	17	10	7
6	9	5	4
7	5	4	1
8	7	5	2
9	4	3	1
10	3	3	0
12	3	2	1
13	1	0	1
16	1	0	1
20	2	1	1
Total	84	51	33

During the study period for more than 48 hours staying, 84 patients were nosocomial infected and out of total 84 patients 51 male and 33 female. Most of the patient stays for 3 to 5 days.

Table 3 shows that among 28 nosocomial infected patients, belonging in lower class 16, middle class 9 and upper class 3

Socio economic status	Nosocomial infection	
	Yes	No
Lower class	16	35
Middle class	9	51
Upper class	3	14
total	28	100

Table 4: Outcome Result Due to Nosocomial Infection and Without Nosocomial Infection

Types of infection	Total no. of patient	expired	discharged	Transfer out	Transfer to general ward	Percentage of mortality
Nosocomial infection	28	12	7	3	6	42.85%
Non-nosocomial infection	56	15	20	4	17	26.78%

Table 4 shows that among 28 nosocomial infected patient, 12 (43%) expired, 7 (25%) discharged, 3 (10.71%) transferred out and 6 (21%) transferred to general ward. Percentage of mortality was 42.85% among 56 non nosocomial infected patient, 15 (27%) expired, 20 (36%) discharged, 4 (7%) transferred out and 17 (30%) transfer to general ward. Percentage of mortality rate was 26.78%.

4. Conclusion

In our observed study shows that rate of urinary tract infection, respiratory tract infection, surgical site infection, intravascular infection and other was 15(53.57%), 9(32.14%), 6(21.42%) ,8(28.57%) and5(17.85%) respectively. most common nosocomial infection is urinary tract infection. Infection rate of male and female was 40% and 60% respectively. Women are particularly more vulnerable to develop UTI because of their short urethra and certain factors like delay in micturition, sexual activity and use of diaphragms and spermicides which promote colonization of coliform bacteria in the periurethral region. Infection in most women occurs when the bacteria present in the perineal or per urethral region enter the urethra and ascend into the bladder. Second most common nosocomial infection respiratory tract infection. It is the most common nosocomial infection encountered in the intensive care unit (ICU), with 9-28% of all intubated patients developing VAP.

Suggestions/Recommendations

1. During entering in CCU wear apron and uses caps and mask.
2. Proper hand washing and use of hand rub solution before touching patient.
3. Used of disposal shoe cover before entering in CCU.
4. Fumigation to be processed in the regular interval.

These guidelines, written for clinicians, contains evidence-based recommendations for the prevention of hospital acquired infections Hospital acquired infections are a major cause of mortality and morbidity and provide challenge to clinicians. Measures of infection control include identifying patients at risk of nosocomial infections, observing hand hygiene, following standard precautions to reduce transmission and strategies to reduce VAP, CR-BSI, CAUTI. Environmental factors and architectural lay out also need to be emphasized upon. Infection prevention in special subsets of patients - burns patients, include identifying sources of organism, identification of organisms, isolation if required, antibiotic prophylaxis to be used selectively, early removal of necrotic tissue, prevention of tetanus, early nutrition and surveillance. Immunodeficient and Transplant recipients are at a higher risk of opportunistic infections. The post-tranplant timetable is divided into three time periods for determining risk of infections. Room ventilation, cleaning and decontamination, protective clothing with care regarding food requires special consideration. Monitoring and Surveillance are prioritized depending upon the needs. Designated infection control teams should supervise the process and help in collection and compilation of data. Antibiotic Stewardship Recommendations include constituting a team, close coordination between teams, audit, formulary restriction, de-

escalation, optimizing dosing, active use of information technology among other measure. The recommendations in these guidelines are intended to support, and not replace, good clinical judgment. The recommendations are rated by a letter that indicates the strength of the recommendation and a Roman numeral that indicates the quality of evidence supporting the recommendation, so that readers can ascertain how best to apply the recommendations in their practice environments.

5. References

1. Who guideline. Prevention of hospital-acquired infections: A practical guide. Second edition .2012.
2. Chakraborty P, Mukherjee S. A study on the prevalence and microbiological profile of nosocomial infections in the ICU of a tertiary care hospital in Eastern India. *Int J Curr Microbiol Appl Sci.* 2016;5(55):920-5.
3. Kundu D, Paul T, Medhi PS, Bedi N. Hospital Acquired Urinary Tract Infection: An Epidemiological Study Carried out in a Tertiary Care Hospital of North East India. *Int. J. Life. Sci. Scienti. Res.* 2017 May;3(3):1059-62.
4. Nicolle LE. Catheter associated urinary tract infections. Antimicrobial resistance and infection control. 2014 Dec;3:1-8.
5. Singh S, Chakravarthy M, Rosenthal VD, Myatra SN, Dwivedy A, Bagasrawala I, Munshi N, Shah S, Panigrahi B, Sood S, Kumar-Nair P. Surgical site infection rates in six cities of India: findings of the International Nosocomial Infection Control Consortium (INICC). *International health.* 2015 Sep 1;7(5):354-9.
6. Jarvis WR, Edward JR, Culver DH. Nosocomial Infection rates in ICUs in the United States: National Nosocomial Infection Surveillance System. *Am J Med Br.* 1991;91:1855–15 61
7. Verdeil X, Bossavy JP, Roche R, Barret A, Pouns J. Nosocomial infection surveillance in a vascular surgery unit. *Annals of Vascular Surgery.* 1990 Nov 1;4(6):553-7.
8. Worthington T, Elliott TS. Diagnosis of central venous catheter related infection in adult patients. *Journal of Infection.* 2005 Nov 1;51(4):267-80.
9. Safdar N, Fine JP, Maki DG. Meta-analysis: methods for diagnosing intravascular device-related bloodstream infection. *Annals of Internal Medicine.* 2005 Mar 15;142(6):451-66.
10. G.DeAngelisA, MurthyJ, BeyersmannS, Harbarth .Estimating the impact of healthcare-associated infections on length of stay and costs.*Clinical Microbiology and Infection. Clin Microbiol Infect.* 2010 Dec;16(12):1729-35
11. Glance LG, Stone PW, Mukamel DB, Dick AW. Increases in Mortality, Length of Stay, and Cost Associated with Hospital-Acquired Infections in Trauma Patients.*Arch Surg.* 2011 Jul; 146(7): 794–801.
12. Klevens RM, Edwards JR, Richards Jr CL, Horan TC, Gaynes RP, Pollock DA, Cardo DM. Estimating health care-associated infections and deaths in US hospitals, 2002. *Public health reports.* 2007 Mar;122(2):160-6.