

Pattern of Nosocomial infection among patients admitted in Medical and Surgical wards of a Secondary care hospital in north India-An epidemiological evaluation

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Abstract

Objective: Nosocomial infections occur worldwide and affect both developed and resource-poor countries. Infections acquired in health care settings are amongst the major causes of death and increased morbidity among hospitalized patients. In this study, we aimed to determine the epidemiological status of nosocomial infections in the Medical and Surgical Wards of a secondary care hospital.

Study design: Cross sectional hospital based study.

Study site: Department of Medicine, General Surgery and Orthopedic Surgery, Dr. Shyama Prasad Mukherji (Civil Hospital) Lucknow.

Patients: The patients admitted in the Department of Medicine, General Surgery and Orthopedic Surgery were included in this study.

Results: The present study has been carried out on 176 patients (Medical ward=82, Surgical ward=94). This study was conducted between January 2011 to December, 2011. All the 176 patients were clinically examined. Among them, fever was found in 140 patients. A total of 63 blood, 27 pus/discharge, 25 sputum and 85 urine specimen were collected from the patients who developed fever after 48 hours of admission. The overall proportion of nosocomial infection was 26.1% (Medical ward-28%; Surgical ward-24.5). The proportion of nosocomial infection was higher among females (33.3%) than males (21.8%). Older patients were more affected than younger (<35 years=20%, >=35 years=29.3%).

Conclusions: Nosocomial infections are common in hospitalized patients in the medical and surgical setting. More studies are needed to be carried out in Indian population to plan long term strategies for prevention and management of nosocomial infections.

Key words: Pattern, Nosocomial infections, Medical ward, Surgical ward, Secondary care hospital.

Introduction:

Health-care-associated infection (NI) is a major global safety concern for both patients and health-care professionals^{1,2}. NI is defined as an infection occurring in a patient during the process of care in a hospital or other health-care facility that was not manifest or incubating at the time of admission. This includes infections acquired in the hospital and any other setting where patients receive health care and may appear even after discharge. NI also includes occupational infections among facility staff¹. These infections, often caused by multiresistant pathogens, take a heavy toll on patients and their families by causing illness, prolonged hospital stay, potential disability, excess costs and sometimes death³⁻⁵.

Nosocomial infections occur worldwide and affect both developed and resource-poor countries. Infections

acquired in health care settings are amongst the major causes of death and increased morbidity among hospitalized patients. They are a significant burden both for the patient and for public health. A prevalence survey conducted under WHO in its 4 Regions (Europe, Eastern Mediterranean, South-East Asia and Western Pacific) showed an average of 8.7% of hospital patients had nosocomial infections. At any time, over 1.4 million people worldwide suffer from infectious complications acquired in hospital⁶. The highest frequencies of nosocomial infections were reported from hospitals in the Eastern Mediterranean and South-East Asia Regions (11.8 and 10.0% respectively), with a prevalence of 7.7 and 9.0% respectively in the European and Western Pacific Regions⁷.

The most frequent nosocomial infections are infections of surgical wounds, urinary tract infections and lower respiratory tract infections. Thus, the present study was

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planned to investigate the pattern of nosocomial infection among the patients admitted in the Medical and Surgical wards in a tertiary care hospital in north India.

Material and Methods:

Study design:

It was a cross-sectional hospital based in which the patients admitted in the Department of Medicine, General Surgery and Orthopedic Surgery, Dr. Shyama Prasad Mukherji (Civil Hospital) Lucknow for various surgical procedures, without evidence of initial infection, were included in the study. The inclusion criteria for the patients who had no infection or they had not been in incubation period at the admission time and had positive culture after third day of admission (Guidelines, CDC, 2008)⁹.

Data Collection:

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.

Strain identification:

Bacterial strain was identified with the help of gram staining and biochemical tests. Mainly, facultative anaerobes and aerobic bacteria such as Staphylococcus aureus, Enterococcus faecalis, Escherichia. coli, Klebsiella species, Pseudomonas species etc (CLSI, 2008)⁹.

Statistical Analysis:

The data collected was entered in the Microsoft Excel computer program and checked for any inconsistency. The results are presented in proportions/percentages.

Ethical consideration:

Ethical clearance was taken from the Institutional Ethics Committee of King George’s Medical University UP, Lucknow. The consent was taken from each patients included in the study.

Results:

A total of 176 patients were included in the study out of which 82 were from medical ward and 94 from surgical ward. The bio-social characteristics of the patients are depicted in the Table-1.

Table-1: Distribution of patients by bio-social characteristics

bio-social characteristics	Secondary Care hospital					
	Medical ward (n=82)		Surgical ward (n=94)		Total (n=176)	
	No.	%	No.	%	No.	%
Age Group						
<15	4	4.9	4	4.3	8	4.5
15-25	12	14.6	12	22.3	33	18.8
26-35	15	18.3	15	12.8	27	15.3
36-45	14	17.1	14	19.1	32	18.2
46-55	19	23.2	19	11.7	30	17.0
>55	18	22.0	18	29.8	46	26.1
Sex						
Male	45	54.9	65	69.1	110	62.5
Fem ale	37	45.1	29	30.9	66	37.5
Educa tion						
Illiterate	53	64.6	57	60.6	110	62.5
< High school	12	14.6	16	17.0	28	15.9
High school-Intermediate	12	14.6	17	18.1	29	16.5
Graduate+	5	6.1	4	4.3	9	5.1
Occupation						
Service	26	31.7	31	33.0	57	1.7
Professional	0	00	3	3.2	3	7.4
Agriculture	11	13.4	2	2.1	13	26.7
Housewife	28	34.1	19	20.2	47	21.6
Unemployed	13	15.9	25	26.6	38	10.2
Labor	4	4.9	14	14.9	18	10.2
SES						
II	6	7.3	9	9.6	15	8.5
III	6	7.3	9	9.6	15	8.5
IV	5	6.1	11	11.7	16	9.1
V	65	79.3	65	69.1	130	73.9

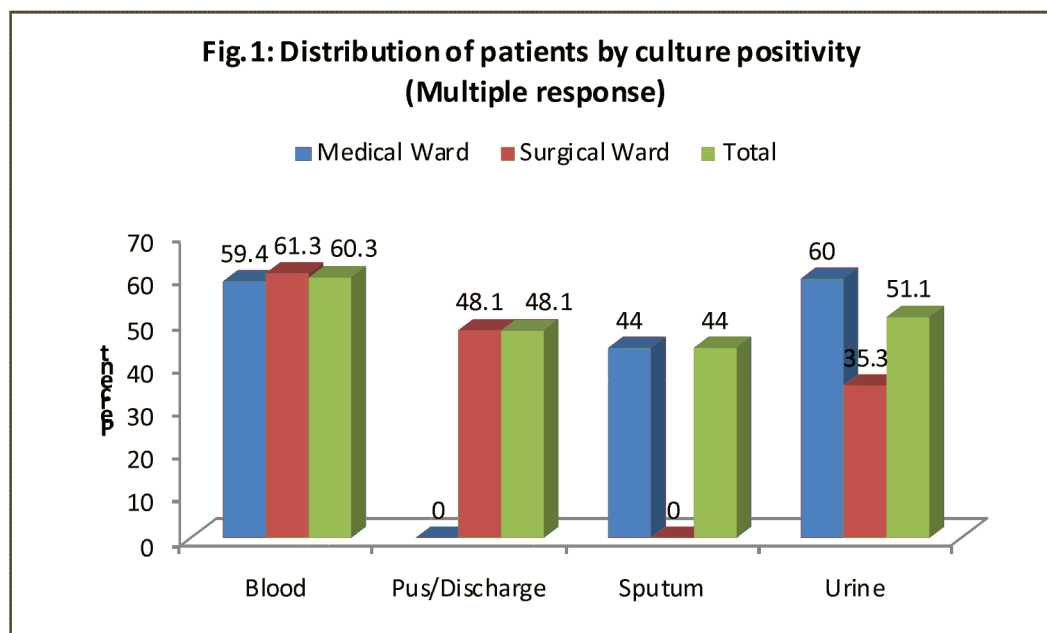
In majority of the patients who had fever, the blood specimen (92.6%) had been taken (Medical ward-94.1%, Surgical ward-91.2%). However, pus/discharge was taken in 39.7% of the patients (Surgical ward=79.4%) and sputum was taken in 36.8% (Medical=73.5%) of the patients. The urine was taken in 60.7% (Medical ward=77.8%, Surgical ward-42.6%) of the patients (Table-2).

Table-2: Distribution of patients by specimen taken

Type of specimen*	Secondary Care hospital						Total		
	Medical ward			Surgical ward			No. of patients with fever	Specimen taken	
	No. of patients with fever	Specimen taken		No. of patients with fever	Specimen taken			No.	%
		No.	%		No.	%			
Blood	34	32	94.1	34	31	91.2	68	63	92.6
Pus/Discharge	34	0	0.0	34	27	79.4	68	27	39.7
Sputum	34	25	73.5	34	0	0.0	68	25	36.8
Urine	72	56	77.8	68	29	42.6	140	85	60.7

*Multiple specimen

The overall blood culture positivity rate was 60.3%. However, the blood culture positivity rate was almost similar among the patients of Medical (59.4%) and Surgical wards (61.3%). The positivity rate of pus/discharge and sputum was 48.1% and 44% respectively. The overall urine positivity was 51.1%. However, the urine culture positivity rate was higher among the patients of Medical wards (60%) as compared to Surgical wards (35.3%) (Fig. 1).



The overall proportion of nosocomial infection rate was 26.1% (46/176). Not much difference was observed in the pattern of nosocomial infection rate among the patients of Medical (28%) and surgical wards (24.5%) (Fig.2).

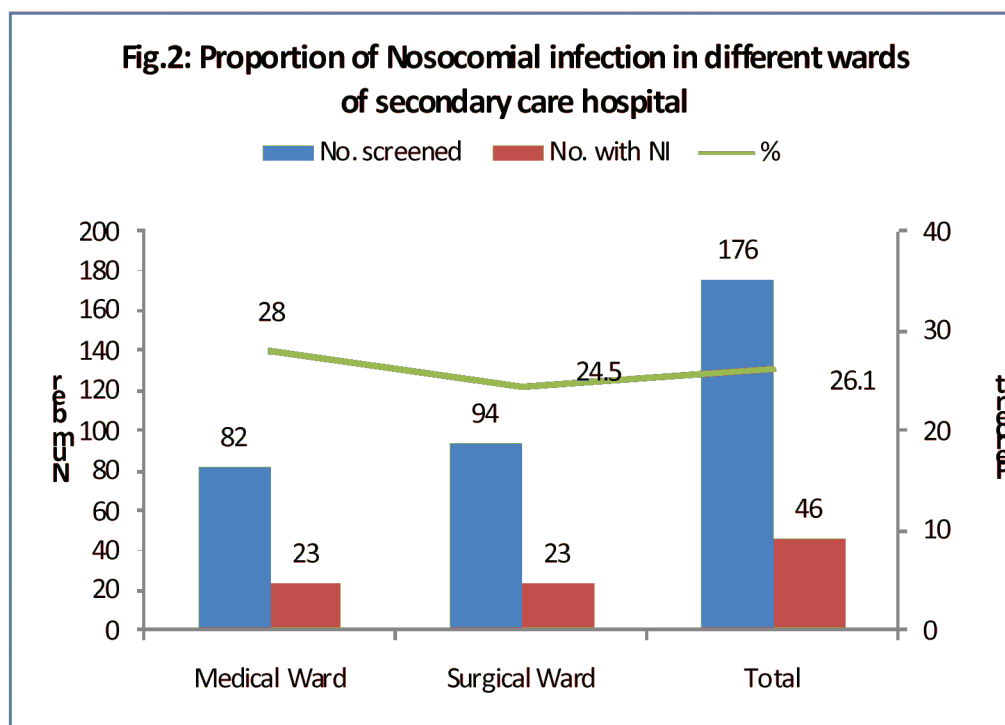


Table-3 predicts the proportion of nosocomial infection by bio-social characteristics of the patients. The pattern of NI was insignificantly ($p>0.05$) higher among the age >35 years (29.3%) than ≤ 35 years (20%). Almost similar pattern was observed among the patients of Medical (≤ 35 years=25%, >35 years=29.6%) and Surgical (≤ 35 years=15.6%, >35 years=29%) wards. The proportion of NI was higher among female (33.3%) patients than males (21.8). The proportion of NI was also higher among the

females of both Medical (Male-24.4%, Female-32.4%) and Surgical ward (Male-20%, Female-34.5%). The proportion of NI was higher among the illiterate patients than others, however, this was statistically not significant ($p>0.05$). The significant association was observed between proportion of NI and occupation in both Medical ($p=0.003$) and Surgical wards ($p=0.001$).

Table-3: Pattern of Nosocomial Infection (NI) in different wards of the secondary hospital by bio-social characteristics

	Medical ward			Surgical ward			Total		
	No. Screened	No.	%	No. Screened	No.	%	No. Screened	No.	%
Age in years									
<=35	28	7	25.0	32	5	15.6	60	12	20.0
>35	54	16	29.6	62	18	29.0	116	34	29.3
p-value	0.66			0.15			0.18		
Sex									
Male	45	11	24.4	65	13	20.0	110	24	21.8
Female	37	12	32.4	29	10	34.5	66	22	33.3
p-value	0.42			0.13			0.09		
Education									
Illiterate	53	19	35.8	57	16	28.1	110	35	31.8
<High school	12	2	16.7	16	4	25.0	28	6	21.4
High school-Intermediate	12	2	16.7	17	3	17.6	29	5	17.2
Graduate+	5	0	0.0	4	0	0.0	9	0	0.0
p-value	0.17			0.55			0.09		
Occupation									
Service	26	3	11.5	31	6	19.4	57	9	15.8
Professional	0	0	0.0	3	3	100.0	3	3	100.0
Agriculture	11	0	0.0	2	1	50.0	13	1	7.7
Housewife	28	12	42.9	19	2	10.5	47	14	29.8
Unemployed	13	5	38.5	25	3	12.0	38	8	21.1
Labor	4	3	75.0	14	8	57.1	18	11	61.1
p-value	0.003*			0.001*			0.001*		

Discussion:

Patient care is provided in facilities which range from highly equipped clinics and technologically advanced university hospitals to front-line units with only basic facilities. Despite progress in public health and hospital care, infections continue to develop in hospitalized patients, and may also affect hospital staff. Many factors promote infection among hospitalized patients: decreased immunity among patients; the increasing variety of medical procedures and invasive techniques creating potential routes of infection; and the transmission of drug-resistant bacteria among crowded hospital populations, where poor infection control practices may facilitate transmission.

In the present study, the overall proportion of nosocomial infection rate was 26.1% (46/176). Not much difference was observed in the pattern of nosocomial infection rate

among the patients of Medical (28%) and surgical wards (24.5%). However, this contradicts with the trend of NI over a 5-year period in a tertiary health facility in Nigeria where proportion of NI ranged between 2% and 3% with no significant variation over the 5-year study period¹⁰ and few other studies¹⁰⁻¹³. However, direct international comparisons of NI are often difficult due to methodological differences resulting from definitions of NI, type of NI covered and the health units surveyed¹⁴. The proportion of NI was higher in Surgical wards than Medical wards which was consistent with other studies^{15,16}, surgical wards continue to be hot spots for NI. This is often due to the breached skin defenses resulting from invasive surgical procedures.

Conclusions:

Nosocomial infections are common in hospitalized patients in the medical and surgical setting. More studies are needed to be carried out in Indian population to plan long term strategies for prevention and management of nosocomial infections.

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