DOI: 10.5958/2319-5886.2015.00059.4

International Journal of Medical Research & Health Sciences

www.ijmrhs.com Volume 4 Issue 2 Coden: IJMRHS Copyright @2014 ISSN: 2319-5886

Received: 23rd Dec 2014 Revised: 27th Jan 2015 Accepted: 10th Feb 2015

Research article

PREVALENCE OF HEALTH CARE ASSOCIATED INFECTIONS IN A TERTIARY CARE HOSPITAL IN DAKSHINA KANNADA, KARNATAKA: A HOSPITAL BASED CROSS SECTIONAL STUDY

*Animesh Gupta[1], Divya C V[1], Diwakar K Singh[1], Krutarth B[2], Maria N[2], Srinivas R[1]

[1]Postgraduate, [2]Assistant Professor, Department of Community Medicine, A J Institute of Medical Sciences & Research Centre, Mangalore, Karnataka, India

*Corresponding author email: animesh245@gmail.com

ABSTRACT

Background: Health Care-Associated Infections (HCAI) affect millions of people each year and raise a great risk for patients in health care settings, leading to high rates of morbidity and mortality. **Objective**: To estimate the prevalence of HCAI and to explore the association between certain socio-demographic factors, invasive procedures and mean duration of hospital stay with HCAI in a tertiary-care hospital. **Materials and Methods**: Data was obtained from the patients who were admitted for more than 48 hours in the general wards and their records in tertiary-care hospital for duration of 3 months (February 2014 to April 2014). **Results**: Among 290 patients, the prevalence of HCAI was estimated to be 11.7%. The prevalence of HCAI was proportionately less among men (10.2%) than in women (14.2%), was more (15.6%) among patients who underwent invasive procedures after admission and with mean duration of hospital stay of 12.47 days. **Conclusion:** Health Care-Associated Infections (HCAIs) were found to be significantly associated with increased duration of hospital stay and invasive procedures done after admission. Prevalence was higher in patients aged more than 40 years.

Keywords: Health Care-Associated Infection, Prevalence

INTRODUCTION

Health Care-Associated Infections (HCAI) are the infections acquired during hospital care which are not present or incubating at admission. Infections occurring more than 48 hours after admission are usually considered hospital associated. [1]

HCAIs are an important public health problem in developing as well as in developed countries. Hospital-wide prevalence of HCAI in low- and middle-income countries varied from 5.7% to 19.1% with a pooled prevalence of 10.1% and even as high as 15.5% in high quality studies.[2] Over 1.4 million people worldwide suffer from HCAI at any given time.[1] The risk is 2 to 20 times higher in developing than in developed countries.[2]

Some of the factors responsible for HCAI are prolonged and inappropriate use of invasive devices and antibiotics, high-risk and sophisticated procedure, immuno-suppression and other severe underlying patient conditions, insufficient application of standard and isolation precautions. [3]

The fight against HCAI as a public health priority was promoted through the World Health Organization's 'Clean Care is Safer Care' campaign. HCAIs are multi-factorial, which are related to healthcare systems and procedures as well as behavioral practices. [4] At any given time, out of every 100 hospitalized patients, 7 in developed and 10 in developing countries will acquire at least one health care-associated infection. [2]

The most common types of HCAIs are urinary tract infection, surgical tract infection, lower respiratory tract infection, blood stream infection, skin and soft tissue infection. Gastroenteritis is the most common HCAI in children[1].

HCAI is a great risk for patient safety and its impact can result in prolonged hospital stay, long-term disability, increased resistance of microorganisms, and additional financial burden for the health system, patients and their families, as well as excess deaths.[2]

It is estimated that 80% of all hospital deaths are directly or indirectly related to HCAIs[5].

Some of the common determinants of HCAI are inadequate environmental hygienic conditions, poor infrastructure, insufficient equipment, understaffing, overcrowding, inadequate infection control measures, unsafe injection practices, absence of local and national guidelines and policies[3]. The main modes of transmission of HCAI are contact, droplet, air-borne, common vehicle and vector-borne.

The risk of contracting HCAI is universal and percolates every health-care facility and system worldwide, but the true burden remains unknown, particularly in developing countries [2].

HCAIs usually receive public attention only when there is epidemic [1].

Although often hidden from public attention, no institution or country can claim to have solved this very real ongoing endemic problem, despite many efforts[2].

Objectives

1. To estimate the prevalence of HCAI.
2. To estimate the association of HCAI with certain risk factors**.**

MATERIALS AND METHODS

Study setting: A Hospital based cross-sectional study was conducted in a tertiary-care hospital in Dakshina Kannada district of Karnataka, India for duration of 3 months from February 2014 to April 2014. All in-patients admitted in the wards of Medicine, Surgery, Orthopedics, OBG, and Pediatrics in a tertiary-care hospital for more than 48 hours were included in the study irrespective of their age & Sex. Patients who were critically ill and those admitted in ICUs were excluded from the study.

Sample size calculation: Taking the prevalence of 26% from a study done by Saleem M et al[6] and with 20% of allowable error, the sample size was calculated by using the formula $n = 4pq/ L^2$. The sample size was estimated was 290.

Method of data collection

Ethics clearance from the institution was obtained. A pretested structured proforma was used to collect the data after obtaining written informed consent from the patients by interview method. The proforma included name, age, gender, IP number, name of the ward, date of admission and discharge, diagnosis, treatment and procedures done. History and physical examination were conducted for each patient from the date of admission until discharge. All the patients in the study were visited at least once a day. Laboratory results and medical charts were reviewed. The study subjects were followed up from the day of admission till the day of discharge.

Statistics: The data was entered in Microsoft excel 7.0 and analyzed in SPSS Trial Version 16. Descriptive statistics and tests of significance like Pearson Chi-square test were used and the statistical significance level was fixed at $p<0.05$.

RESULTS

The mean age of study population was found to be 41.8 years (SD-15.4, Range- 4 to 85 years) and the mean age of patients who developed HCAI was 42.2 years (SD-16.5, Range- 7 to 75 years).

Table 1: Prevalence of HCAI in relation to age

Age group (in years)	No. of Patients Examined	HCAI No. (%)
0-15	11	1 (9.1)
16-30	69	6 (8.7)
31-45	89	14 (15.7)
46-60	90	10 (11.1)
>61	31	3 (9.7)
Total	290	34 (11.7)

Fisher's exact test value = 1.986, p value = 0.742 (non significant)

The maximum patients were 31% in the age group 46-60 years followed by 30.7% in the age group 31-45 years as shown in Table 1. The prevalence rate of HCAI was 11.7%, of which thrombophlebitis, urinary tract infection (UTI) and fever were found to be 5.86%, 4.14% and 1.82%, respectively. Out of the 34

patients who had developed HCAI, 41.2% and 29.4% corresponds to age groups 31-45 and 46-60 years, respectively.

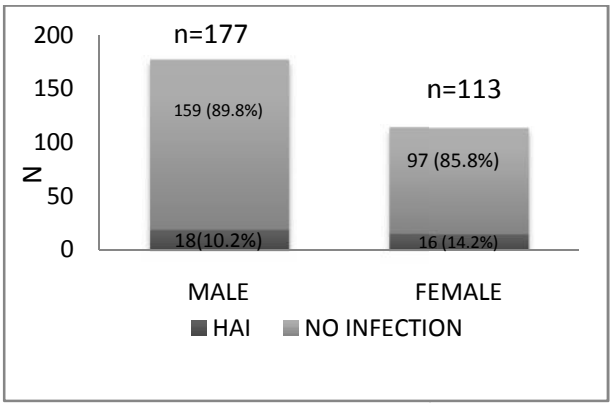

Fig1: Prevalence of HCAI in relation to gender (n=290)

In this study, 61.0% were males, but the prevalence of HCAI was found to be proportionately higher in females (14.2%) compared to males (10.2%) as shown in Figure 1.

Table 2: Association of HCAI in relation to multiple variables (n=290)

Variables		Health care-associated infection		Chi square value	P value
		Present	Absent		
Age (in years)	≤ 40	14 (11.1%)	112 (88.9%)	0.081	0.776
	> 40	20 (12.2%)	144 (87.8%)		
Duration of stay in hospital	≤ 7 days	4 (2.9%)	135 (97.1%)	20.18	0.000*
	>7 days	30 (19.9%)	121 (80.1%)		
Invasive procedures	Yes	21 (15.7%)	113 (84.3%)	145.16	0.000*
	No	13 (8.3%)	143 (91.7%)		

*significant

Table 2 shows the association of HCAI in relation to age, duration of stay in hospital and invasive procedures done. In this study, it was found that the patients who were more than 40 years had higher prevalence of HCAI (12.2%) compared to those less than 40 years (11.1%), though it was not found to be statistically significant (p>0.05). This finding was probably due to the higher number of invasive procedures done among those above 40 years of age leading to longer duration of stay in the hospital. The patients who had undergone invasive procedures had significantly high prevalence of HCAI with 21 (15.6%) compared to those who had not undergone invasive procedures with 13 (8.3%). The prevalence of HCAI was higher in patients who stayed in hospital for more than 7 days compared to less than or equal to 7 days, which is statistically significant. The mean duration of hospital stay for the patients with HCAI was found to be 12.47 days and for those without HCAI was 7.98 days.

DISCUSSION

Majority of patients in this study were males (61.0%). Similarly, in a study by Dileep Kumar S et al[7] and Rahim B et al[8], showed that 53.0% and 53.6% of the study subjects were males, respectively.

The prevalence of HCAI in this study was 11.7%. Similar findings were observed in studies conducted by Malhotra S et al[9] and Razine R et al[10]. The mean age of patient was high among who developed HCAI which was similar to the study done by Satpathy et al [11].

Females had proportionately higher prevalence of HCAI than males in this study, which was also found in study done by Dileep Kumar S et al[7] and Saleem M et al. [6] Prevalence of HAI was insignificantly high among patients above 40 years of age which was similar to the findings from the study done by Dileep Kumar S et al[7].

In this study the prevalence of HCAI was significantly higher in patients who stayed for more than 7 days which showed, longer the duration of hospital stay, more the chances of developing HCAI. Similar facts were observed in multiple studies analyzed by World Health Organization were hospital stay more than 7 days was found to be a risk factor for the development of an HCAI[2].

The patients who developed HCAI had presented as thrombophlebitis (5.8%), UTI (4.1%) and fever (1.8%). Thrombophlebitis was the commonest HCAI. Askarian M et al[12] showed the prevalence of blood stream infection as 2.5% and UTI as 1.4%, which concluded that blood stream infection was more compared to other HCAIs. These findings were similar to those in this study.

The prevalence of HCAI was significantly higher in patients who underwent any invasive procedures like intravenous lines, urinary catheterization and any

surgical procedures. Similar trend was observed in most of the studies analyzed by World Health Organization[2].

CONCLUSION

The present study of Health Care-Associated Infections (HCAIs) in the tertiary care hospital showed a prevalence rate of 11.7%. HCAI were found to be significantly associated with increased duration of hospital stay and invasive procedures done after admission. The prevalence was higher among patients aged more than 40 years and proportionately more among female patients. HCAI was common in hospital patients in medical and surgical wards.

Recommendations: In India, however, hospitals often do not follow infection control practices, and this leads to the spread of disease. In response to the growing burden of HCAIs in India, the Global Antibiotic Resistance Partnership (GARP) is issuing several key recommendations that aim at reducing the prevalence of HCAIs, including increased hand-washing, use of isolation rooms for infected patients, increased availability and uptake of diagnostic tests, reminders to limit catheter use, and use of gloves and gowns.

The Ministry of Health & Family Welfare Task Force also recommends that all hospitals create an infection control plan, committee and team. Surveillance of antibiotic resistance, combined with tracking physician prescribing patterns, can be the foundation of successful infection control programmes in hospitals. A large proportion of these hospital infections are easily preventable with increased hospital infection control, including stepping up hygiene practices, such as frequent hand-washing.

Limitations: The study was conducted for duration of 3 months to estimate the prevalence of HCAI, since the number of study subjects was small, so it is possible that the prevalence rates may not be extremely precise.

Acknowledgement: The authors are thankful to Dr. (Prof) Manohar Rao, Dr. (Prof) Jayaram S, Dr. (Prof.) P V Kurulkar, Dr. (Prof.) Prasanna K S and Dr. (Prof.) Hemant Kumar of the Community Medicine department for their valuable guidance and support.

Conflict of interest: The authors declare no conflict of interest & not funded by any agency.

REFERENCES

1. Prevention of hospital-acquired infections; A Practical Guide; 2nd edition, World Health Organization.[Available at http://www.who.int/csr/resources/publications/whocdscsreph200212.pdf]
2. World Alliance For Patient Safety. Global Patient Safety Challenge 2005 – 2006. Clean Care Is Safer Care.[Available at http://www.who.int/patientsafety/events/05/GPSC_Launch_ENGLISH_FINAL.pdf]
3. World Health Organization. Health care-associated infections Fact Sheet. [Available on http://www.who.int/gpsc/country_work/gpsc_ccisc_fact_sheet_en.pdf]
4. Gignon M, Farcy S, Schmit J L, Ganry O. Prevention of healthcare-associated infections in general practice: Current practice and drivers for change in a French study. Indian J Med Microbiol 2012;30:69-75
5. Hughes AJ, Ariffin N, Huat TL, Abdul Molok H, Hashim S etal., Prevalence of nosocomial infection and antibiotic use at a university medical center in Malaysia. Infect Control Hosp Epidemiol 2005; 26:100-4
6. Saleem M, Vaish AK, Idris MZ, Sonkar AA, Agarwal J, Singh M, etal., Pattern of Nosocomial Infection among patients admitted in Medical and Surgical wards of a secondary care hospital in north India: An epidemiological evaluation. Indian Journal of Community Medicine, 2012; 24(4): 285-90
7. Dileep Kumar Sharma, Yogendra Kumar Tiwari, Nitya Vyas and Rakesh Kumar Maheshwaril. An investigation of the incidence of nosocomial infections among the patients admitted in the intensive care unit of a tertiary care hospital in Rajasthan, India. International Journal of Current Microbiology and Applied Sciences, 2013; 2(10): 428-35
8. Rahim Baghaei, Peyman Mikaili,, Davood Nourani, Hamid Reza Khalkhali. An epidemiological study of nosocomial infections in the patients admitted in the intensive care unit of Urmia Imam Reza Hospital. An etiological

investigation. Annals of Biological Research, 2011; 2 (5) :172-78.
9. Malhotra S, Sharma S, Hans C. Prevalence of Hospital Acquired Infections in a tertiary care hospital in India. Int. J. Med. Med. Sci., 2014; 1(7): 91-94
10. Razine R, Azzouzi A, Barkat A, et al. Prevalence of hospital-acquired infections in the university medical center of Rabat, Morocco. International Archives of Medicine 2012;5:26
11. Satpathy. P261: Study of hospital associated infections (HAI) at tertiary hospital in India; economic implication for developing countries. Antimicrobial Resistance and Infection Control 2013, 2 (Suppl 1):P261
12. Askarian M. Point prevalence and risk factors of hospital acquired infections in a cluster of university-affiliated hospitals in Shiraz, Iran. Journal of infection and public health, 2012; 5:169-16.