

Knowledge and practice of health care professionals about nosocomial infections in public sector teaching Hospitals of Lahore

Saima Ayub,¹ Khadija Muneer,² Maryam Ayub,³ Taimia Ayub,⁴ Saim Maqsood,⁵ Ayub Ali⁶

ABSTRACT

Background: A nosocomial infection, is an infection acquired by a patient during a hospital visit (or among hospital staff) that becomes clinically evident after 48 hours of hospitalization.

Objective: To assess the knowledge and practices of health care professionals about nosocomial infections.

Methodology: A cross-sectional study with a convenient sample of 250 health care providers was conducted in two tertiary care hospital of Lahore (Sir Ganga Ram and Mayo Hospital) from November 2015 to January 2016. Out of 250 respondents, 244 replied and participation was voluntary. SPSS version 20 was used for data entry and analysis. Means \pm SD were calculated for continuous data and frequency and percentage was used for categorical data.

Results: Overall response rate was 97.6%, with majority (89.3%) of the respondents being females. Physicians comprised, 79.50% of the respondents while 20.5% were nurses. Among the physicians more than half were house officers (60.7%). Most of the respondents (87.7%) had a good idea about nosocomial infections, and many thought it was either respiratory tract infection (31.6%) or surgical wound infection (31.6%). Most common causative organisms described included simultaneously all of these; E.Coli, Staphylococcus Aureus, and Pseudomonas (38.1%). Immunocompromised adults were the most important risk factor. Among practices of health care professionals, majority denied washing their hands before touching every patient (62.7%), before aseptic procedures (60.2%), after exposure to body fluids (52.5%) or after touching a patient (42.2%). Out of 244, 215 (88.1%) agreed that all equipment should be properly sterilized, while, only about 119 (48.8%) responded that they always used a newly sterilized equipment for every new patient.

Conclusion: Knowledge of doctors and nurses of tertiary care hospitals for nosocomial infection is good; however there are gaps in the practices like as hand washing, ward hygiene, and proper sterilization.

Keywords: Nosocomial Infection, Health Care professionals, Knowledge Practice

Introduction

Hospital-acquired infections are the one developed in the hospital environment, such as one acquired by a patient during a hospital visit or one developing among hospital staff.¹ Usually they become clinically evident after 48 hours of hospitalization of the patients.^{1,2,3}

These infections are caused by fungi, bacteria and viruses and occur among patients with reduced resistance.⁴ Since medical staff moves from patient to patient, the staff themselves serves as a means for spreading pathogens. The colonizing pathogens can be categorized into 3 groups: iatrogenic, organizational and patient-related.⁵⁻⁸

Recent analysis by WHO found that health care-associated infections are more frequent in resource-limited settings than in developed countries.³ Recent studies have shown that about three quarters of patients' rooms are contaminated with Methicillin-resistant

Staphylococcus aureus (MRSA) and Vancomycin-resistant enterococci (VRE).⁹⁻¹³

Hospital-acquired infections add to functional disability and emotional stress of the patient and may, in some cases, lead to disabling conditions that reduce the quality of life. Nosocomial infections are also one of the leading causes of death.⁵ The economic costs are considerable.¹⁴⁻¹⁹

Nosocomial infection (NI) of exogenous origin are transmitted primarily by; direct contact (on hands of nurses, doctors and other personnel), indirect contact (by contaminated secretions as occurs in viral respiratory infection, staphylococcus and streptococcal infections) contaminated vehicles, (contaminated inanimate vehicle such as food, water, medication and medical devices) rarely by air borne route virtually never by insects or rodent vectors in modern hospitals.¹²⁻¹³

Health care professionals (HCP) including medical and paramedical staff, are the main reservoir and

1. Institute of Public Health, Lahore, Pakistan.

2. Department of Medicine, Sir Ganga Ram Hospital, Lahore, Pakistan.

3. Mayo Hospital, Lahore, Pakistan.

4. Fatima Jinnah Medical University, Lahore, Pakistan.

5. Indiana University, School of Medicine. IN, USA.

6. Department of Family & Community Medicine, King Faisal University, Saudi Arabia.

Correspondence: Dr. Saima Ayub, Assistant Professor, Department of Bacteriology, Institute of Public Health, Lahore, Pakistan.

Email: drsaimaayub@yahoo.com **Phone:** +92-3324678171

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source of microorganisms as well as the major transmitters, notably during patient care activities.⁸⁻⁹

Additional contributing factors for the admitted hospital patients include; duration of hospital stay –(10days stay 5% and with 20 days : 12% infection rate), extensive adventurous surgery, invasive procedures, indwelling catheters, immunosuppressive therapy, indiscriminate antibiotic use and, preoperative practices, Good intervention measures include.¹⁰⁻¹¹ Strict hand washing between patients, elbow operated or electronic taps, liquid soap containers, regular house-keeping, environmental monitoring, Hand washing between attending patients is probably the single most important measure for minimizing transmission of pathogenic microorganisms within a hospital setting prevention of nosocomial infections is the responsibility of all individuals and services providing health care. Everyone must work cooperatively to reduce the risk of infection for patients and staff. This include personnel providing direct patient care, management, provision of materials and products, and training of health workers. Infection control programmes are effective provided they are comprehensive and include surveillance and prevention activities, as well as staff training. There must also be effective support at the national and regional levels. There are hospital based programs for the control of nosocomial infection like Infection Control Committee, infection control manual, SOPs and Aseptic practices for housekeeping and sterilization and disinfection procedures.¹² Along with the above programs there are also supporting policies for the infection control which include antibiotics policy, sterilization policy and antiseptic and disinfectant policy.^{12,13} The study was to assess the knowledge and practices of health care professionals about nosocomial infections.

Methodology

A descriptive cross-sectional study was carried out on 250 physicians and qualified nurses of the Surgery, Medicine, Pediatrics and ICU departments of two tertiary care hospitals of Lahore (Sir Ganga and Mayo hospital) Convenient Study duration : November 2015 to January 2016. Convenient sampling technique was used for the study and data was collected

using a structured questionnaire which was administered by an interviewer. Health Professionals were questioned about their practices related to nosocomial infections. There were questions on the importance of hand washing, self-protection, ward hygiene, sterilization of instruments and equipment. Questions were also asked about investigation and treatment of patients of nosocomial infections. SPSS version 20 was used for data entry and analysis. Means \pm SD were calculated for continuous data and frequency and percentage was used for categorical data. Ethical approval from ethical committee was sought.

Results

Out of the 250 potential respondents approached, a total of 244 replied with a response rate of 97.6%. The analysis of demographic characteristics of the study group illustrates that the majority were females (89.3%). The discipline-wise distribution of respondents shows most of belonged to medicine (20.5%) Surgery (36.9%), peds (9.8%), ICU (1.2%) and Gynecology Obstetrics unit (31.6%).

Frequencies and Percentages of the answers to question regarding knowledge of health professionals about nosocomial infection is given in Table I. Out of 244 respondents, 214 (87.7%) said they knew what is nosocomial infection and out of these 214, 191 (89.25%) specified it as hospital infection. In this study, 190 (77.9%) HCP considered that immuno compromised adults to be in the high risk group for NI. 133 (54.5%) and 122 (50%) considered elderly and infant patients respectively to be in the high risk group, and 6 (1%) were of the view that improper hygiene was enough to put any patient into the high risk grp while 4 (1%) believed that all patients were at risk of NI (Table I).

It was noted that 96 (39.3%) reported airborne (droplet), 43 (17.6%) thought it was catheter and 40 (16.4%) blamed intravenous line as the chief mode of transmission. Most common Nosocomial Infection in the ward was Respiratory Tract Infection 77(31.6%) and Surgical Wound Infection 77(31.6%), while Urinary Tract Infection 72 (29.5%) was reported to be second most common infection. In this study 93 (38.1%) out of 244 thought that all of E.Coli, Staphylococcus Aureus, and Pseudomonas were the most common causative organisms while 52 (21.3%), 57 (23.4%), and 42(17.2%) were the responses for each of the

individual organism respectively. (Table I) Knowledge regarding different variables in decreasing spread of nosocomial infections, showed that regarding hand washing 225 (92.9%) said that it decreases the spread while 19 (7.1%) answered that it doesn't, 224 (90.9%) respondents replied affirmatively to use of gloves decreasing the spread while 20 (8.1%) replied negatively, 229 (94.0%) had knowledge of ward hygiene and 230 (95.1%) of washroom cleaning as important variables in decreasing the spread of infection, regarding sterilization of equipment 213 (86.3%) answered affirmatively Yes while 31(13.7%) said negatively and in cleaning site of IV/catheters 215 (85.1%) agreed to its role in Ni spread.

Table II gives information regarding the practices of health professionals about nosocomial infections. It shows that 111(45.5%) respondents always washed their hands after examining each patient while 82 (33.6%) frequently, 39 (16%) sometimes and 10 (4.1%) rarely washed their hands after each patient. Regarding frequency of using gloves, 80 (32.9%) always used gloves while 109 (44.1%) frequently, 22 (9%) sometimes and 33 (13.7%) rarely used gloves. In this study, 119 (44.8%) respondents said that new sterilized equipment was always used for every patient while 56 (23%) said frequently, 45 (18.4%) said sometimes, 14 (5.7%) said rarely and 10 (4.3%) said never. The practice of cleaning of sites of IV/catheters was replied as always by 122 (50%) while 68 (27.9%) said frequently, 35 (14.7%) said sometimes, 14 (5.7%) said rarely and 5 (2.0%) said never.

Table 2 shows data regarding the hand washing activities of health care professionals and hand washing facilities available to them. Out of 244, 153 (62.7%) denied washing their hands before touching a patient, 147 (60.2%) said they do not wash their hands before aseptic/cleaning procedures, 128 (52.5%) disagreed to the fact of washing hands after body fluid exposure, and 103 (42.2%) responded that they do not wash their hands after touching a patient. Use of Gloves is an important tool to prevent the spread of Nosocomial Infection from patient to patient and to protect Doctors and Nurses themselves. Regarding the use of gloves out of 244, 82 (33.6%) said that they rarely use gloves, 76 (31.6%) said they use gloves during examination, 27 (11.5%) said they use gloves when giving

injections, passing I.V lines or catheters and 57 (23.4%) said they always use gloves while touching patients.

Table I : Knowledge Assessment of Health Care Professionals towards Nosocomial infection (n= 244)

Variable	Frequency	Percentage (%)
Awareness of Definition of Nosocomial Infection		
Yes	214	87.7
No	19	7.8
Don't know	11	4.5
Population at risk		
Immunocompromised	190	77.9
Elderly	133	54.5
Infants	122	50
Any patient with improper hygiene	6	1
Any patient	4	1
Mode of Transmission		
IV line	40	16.4
Catheter	43	17.6
Bed linen	15	6.1
Air borne (droplet)	96	39.3
Direct contact	24	9.8
Other	26	10.7
Most Common NI in ward		
Urinary Tract Infection	72	29.5
Respiratory Tract Infection	77	31.6
Surgical wound infection	77	31.6
UTI and RTI	3	1.2
UTI and Surgical wound infection	2	.8
Other	13	5.3
Most Commonly Affected		
Doctors	24	9.8
Nurses	30	12.3
Attendants	18	7.4
Patients	172	70.5
Common Causative Organism		
E. Coli	52	21.3
Staphylococcus Aureus	57	23.4
Pseudomonas	42	17.2
All of the above	93	38.1

The factors which were thought to be creating hurdles for the Doctors and Nurses for washing their hands before and after examining the patients was, forgetfulness for 67 (27.4%) respondents, ignorance of guidelines for 51 (20.9%), high workload (33.2%), insufficient time (20.5%) and insufficient wash basins (20.5%).

Table II: Practices of Health Professionals Regarding spread of Nosocomial Infections

Practices	Frequency	Percentage
Hand washing after examining each patient		
Always	111	45.5
Frequently	82	33.6
Sometimes	39	16.0
Rarely	10	4.1
Never	2	0.8
Frequency of use of gloves		
Always	80	32.9
Frequently	109	44.1
Sometimes	22	9.01
Rarely	33	13.52
Never	0	0
New Sterilized Equipment used for every patient		
Always	119	44.8
Frequently	56	23.0
Sometimes	45	18.4
Rarely	14	5.7
Never	10	4.1
Cleaning of sites of IV/catheters		
Always	122	50.0
Frequently	68	27.9
Sometimes	35	14.3
Rarely	14	5.7
Never	5	2.0

Discussion

Hospital acquired infections are a continuing source of problem in hospitals.^{20,21,22} It is a serious source of morbidity, mortality and excess health cost.²² A study about nosocomial infection in Tertiary care hospital and data from it shows that the knowledge of doctors and health care workers towards the hospital acquired infections was good, but there is little deficiency regarding their practices.²² The literature review shows that nosocomial infections are caused by the lack of adherence to infection control measures, like hand hygiene, use of gloves, sterilization, etc, so proper

hand washing practices is the single most effective means of controlling and preventing the transfer of potential pathogens. This study revealed that more than half of doctors and nurses in hospital were not following proper hand washing practices due to inadequate hand hygiene facilities, ignorance of guideline, insufficient time, high workload and insufficient knowledge.

In our study, more than 85% of the respondents were female and they belong to different departments like surgery, gynae and medicine. In a study, done on hand washing in Nigeria, 500 questionnaires were distributed with response rate of 86.0%, out of which 230 (53.5%) were from doctors and 200 (46.5%) were from nurses. There were 162 (37.7%) males and 268 (62.3%) females.⁵ It is a responsibility of all health care workers to protect themselves from these infections. To combat infections they should possess enough knowledge about prevention measures and universal precautions for nosocomial infections. A study done to know level of awareness in prevention of nosocomial infections revealed that almost all people were aware that standard precautions can help prevent the nosocomial infections. Most of the health care workers were indulged in practice too.¹⁷ Our study also shows same results. In this research, participants were aware of common modes of transmission of nosocomial infection like I.V lines, catheters, ventilators, direct contact, body fluid and blood. Most of them said air born infections are the most common mode, but others said that I.V lines and catheters are most common causes. Participants believed that the rate of nosocomial infections in Government hospitals is higher than in private hospitals. According to this study, most common victims of nosocomial infection are elderly patients, infants and immune-compromised patients.

Methicilline Resistant Staphylococcus Aureus (MRSA), Pseudomonas, E.Coli are common causative pathogens worldwide. Participants were aware of the fact that Staphylococcus aureus is the most common pathogen responsible for nosocomial infections, while rest of them said E.Coli and Pseudomonas.

A study about Infection control practices were observed among doctors and nurses at G.B. Pant Hospital, New Delhi, India, a tertiary care hospital.¹⁴ A cross sectional survey of 400 health care personnel was conducted from September to December 2009

regarding hospital infection control practices (hand hygiene, standard procedures, hospital environmental cleaning and needle stick injury). The mean knowledge regarding hand hygiene was 86.8% with insignificant difference among doctors and nurses. Doctors (71.3%) were more knowledgeable about standard procedure regarding the transmission of pathogens when compared to nurses (52%). Nurses used these maximal barrier precautions significantly less in comparison to doctors.¹⁴

A study revealed that HCPs at the Lagos University Teaching Hospital have good knowledge of hand washing (83%). This finding is similar to that reported among healthcare staff in ICU of a Multispecialty hospital in India (90%),¹⁴ but higher than figures reported among HCPs in Cairo in Elgalea Government Hospital (73.1%), and Cleopatra Private Hospital (72.7%).^{18,19}

A cross sectional study was conducted in Italy from September 2008 to March 2009 via a one on one interview to gather information regarding demographic and practice characteristics; knowledge about HAIs and the disinfection practices; attitudes towards the utility of guidelines/protocols and perception of the risks of acquiring/transmitting HAIs; compliance with antisepsis/disinfection procedures; and sources of information. Only 29% were aware of the most common hospital acquired infections.⁷

A cross sectional study was conducted using self-administered questionnaires in January 2009 to assess the knowledge, attitudes and practices among 256 physicians of 2 tertiary care hospitals in Lima, Peru. Response was 82%. Theoretical knowledge was good when compared to poor awareness (<33%).¹⁰

Knowledge, beliefs, and practices of health care workers regarding nosocomial infections, central venous catheter care and hand hygiene was assessed by a self-administered survey with 125 participants conducted by University of Chicago. The response was 58%. Good response was shown regarding knowledge of central venous catheters and glove change. 31% knew the recommended duration for hand washing.⁶

Utilization of gloves and proper hand hygiene is an important method of preventing the spread of nosocomial infections. In another study conducted to know the knowledge and practices of hand washing and use of glove in health

facilitators of Shenen Gibe Hospital, South West Ethiopia, it was found that 82.9 % people had adequate knowledge while 68.08% practiced glove utilization.¹⁷ The results of our study manifest a very low practice rate as compared to this study due to inadequate availability of personal protective equipment.

Majority of participants believed that hand-washing practices after using gloves is important, but only half of them follow this protocol. Numerous studies show that health education is the most successful approach to increase the frequency and compliance to hand hygiene.

Hand washing is the main determinant in preventing transfer of infections. Study conducted in health professionals of Ain-Shams University hospitals, Egypt to assess hand washing, it was also found that that more than half of the health care workers practiced routine hand washing which corresponds with the results shown in our study.¹⁸ Substantial measures to improve compliance with hand washing should be adopted to minimize infections.

An observational study was conducted in Neonatal Intensive Care Unit (NICU) in Queen Mary Hospital regarding hand washing. Doctors and nurses were intervened for 1 year regarding the compliance and technique of hand hygiene before and after the program. Compliance of hand hygiene improved from 40% to 53% before and 39 to 59% after patient contact.⁹ Another study in Nigeria showed the attitude and practice of respondents before contact or bedside procedure with patients, nurses had significantly better hand washing practices (78%) than doctors (47%).²²

In our study, most of health professionals were aware of methods of disinfection for IV catheters as compared to the study by G.Cicolini in which only half of Italian nurses were having the knowledge about disinfection.²¹ Compared to knowledge and attitude, the proportion of people frequently practicing the disinfection of insertion sites of IV catheters was found to be low.

Better implementation of hygiene methods and regular educational programs regarding the importance of such measures are required to bring about an increase in this figure. Intervention done in ICU nursing staff in Barnes-Jewish Hospital resulted in drastic decrease in occurrence of infections.²² Therefore, educational programs in tertiary care hospitals may cause a fall in infections attributable to central line catheterization.

Many studies on the practice of hand washing by HCPs have reported low compliance rate.^{3,18,21} In an observational study conducted among HCPs in a tertiary hospital in Africa, a hand washing compliance rate ranging from 9.2% to 57% among doctors and 9.6% to 54% among nurses was reported.²² In a previous study, only 34% of the respondents had good practice of hand washing.¹⁹ In a similar study among HCPs in ICU in a tertiary hospital in Nigeria, hand washing compliance rate of 53% was reported.²²

Nosocomial Infection is a global threat that needs proper attention and immediate action to control it as it is responsible for morbidity, mortality and additional costs. Pakistan suffers from lack of published and authentic research data on nosocomial infection as proven by search of literature. Nosocomial infections even in this modern era of antibiotics continue to remain an important and formidable consequence of hospitalization. As found in literature, a disconnection exists between knowledge, attitude and practice of health care providers. Prevalence rate in developing countries can be as high as 30-50% which needs immediate attention and must be lowered down.

Conclusion

Knowledge and attitude of doctors and nurses of tertiary care hospital towards nosocomial infection is good. There is lack of obligation towards practices and major factors such as hand washing, ward hygiene, and proper sterilization are frequently ignored. The continuous education of Hospital authorities, Doctors and Nurses on the principles of infection control through training and re-training should be advocated.

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