

**Knowledge, Attitude and Practices of Health Professionals towards Nosocomial Infection**

\*Umair Mustafa, \*\*Sana, \*\*\*Mubeen Nasir

\*Muhammad Medical College, Mirpurkhas, \*\*King Edward Medical College, \*\*\*Punjab Medical College

**Abstract**

**Introduction:** A hospital-acquired infection, also known as Nosocomial Infection, is an infection whose development is favored by a hospital environment, such as one acquired by a patient during a hospital visit or one developing among hospital staff, that becomes clinically evident after 48 hours of hospitalization.

**Objectives:** To assess the knowledge, attitude and practices of Health care professionals towards Nosocomial Infection, to find the gap present between knowledge, attitude and practices and to give suggestions to remove the gap.

**Methodology:** This cross-sectional study was conducted among the doctors and nurses in different units of Allied Hospital Faisalabad. Out of 250 only 244 participants replied, and convenient sampling was used. It was an anonymous survey and participation was voluntary. SPSS used for data entry and analysis. Means  $\pm$  SD were calculated for continuous data and tables and figures used for categorical data. All the tests were performed using  $\alpha=0.05$

**Results:** For this KAP study the response rate was 97.6%, majority of the participants (89.3%) were females; the mean age was  $24.52 \pm 3.240$  years, 79.50% were doctors and 20.5% were nurses, more than half were house officers (60.7%). 87.7% had a good idea about nosocomial infection, and majority thought it was either respiratory tract infection (31.6%) or surgical wound infection (31.6%). Most common causative organism is thought to be all 3 of *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. Only 22.1% of health care professionals kept themselves well updated with latest antibiotics prescribing information.

**Conclusion:** Knowledge and attitude of doctors and nurses of Allied 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.

**Keywords:** Health Professionals, Nosocomial Infection. KAP study. Methicillin-resistant *Staphylococcus aureus*.

**Introduction:** A hospital-acquired infection, also known as nosocomial infection, is an infection whose development is favored by a hospital environment, such as one acquired by a patient during a hospital visit or one developing among hospital staff, that becomes clinically evident after 48 hours of hospitalization.

Nosocomial infections mostly include fungal, bacterial and viral infections and are aggravated by the reduced resistance of individual patients. Some medical procedures bypass the body's natural protective barriers. Since medical staff moves from patient to patient, the staff themselves serves as a means for spreading pathogens.

Such colonizing pathogens can be categorized into 3 groups: iatrogenic, organizational and patient-related. Recent analysis by WHO found that health care-associated infections are more frequent in resource-limited settings than in developed countries. Research shows that nearly three quarters of patients' rooms are contaminated with Methicillin-resistant *Staphylococcus aureus* (MRSA) and Vancomycin-Resistant Enterococci (VRE)<sup>1</sup>. A survey was conducted in 2007 in a large tertiary care teaching hospital in Pakistan with 1750 beds and 40 inpatient units of which 13 were surveyed using audit tools to learn about their immunization status against Hepatitis B. Of the 13 units, only two had hand hygiene facility. Gowns were shared among workers and from patient to patient. Seven units had adequate supply of face masks while 8 units properly dispose hypodermic needles in IV infusion bags. Eleven units shared receptacles in urinary catheterization and urinary bags touched the floor in six units. Ventilators were contaminated. Isolation

precautions were not taken for pulmonary tuberculosis patients. There was no autoclave in dental clinic. Over fifty proctoscopies were performed with a couple of tools without disinfection. According to the result of on spot survey, 60% health care workers had completed Hepatitis B vaccination while 85% had sustained needle stick injury<sup>2</sup>. Hospital infection control knowledge, attitude and practice were assessed during the Hajj period in 2003. A cross-sectional study was conducted via self-administered structured questionnaire. Response to practice questions was much better for nurses than doctors but both showed variable compliance to strict hospital infection control practices<sup>3</sup>. Evidence based practices were implemented in 6 neonatal ICUs in Vermont Oxford Network health care facilities to address 3 areas of census: hand washing, line management and accuracy of diagnosis. The outcome was decreased incidence of coagulase-negative staphylococcus bacteria. There was an observed reduction from 24.6% in 1997 to 16.4% by the end of 2004 due to effective practice changes.<sup>4</sup> A comparative cross-sectional study was carried out among 273 health workers in Oshogbo in Southwestern Nigeria, using multistage sampling method to gather data at primary, secondary and tertiary level of health care facilities. All health care workers at 3 levels had good awareness that patients could be a good source of Hospital acquired Infections (HAI). Awareness of common HAIs, awareness of hospital staffs, equipment and the environment as sources of transmission of HAIs were good for health care workers in both tertiary and secondary level care, but poor among primary

health care workers. A good attitude was seen while reporting or willingness to report personal illness in both secondary (43.9%), and tertiary care (70.3%) while, poor in primary care (12.3%). There was a good attitude towards readiness to wear protective devices, towards washing of hands before and after touching patients<sup>5</sup>. Infection control practices were observed among doctors and nurses at G.B. Pant Hospital, New Delhi, India; a tertiary care hospital. 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<sup>6</sup>. 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 antiseptics/disinfection procedures; and sources of information. Only 29% were aware of the most common hospital acquired infections<sup>7</sup>. 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<sup>8</sup>. 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<sup>9</sup>. 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%)<sup>10</sup>. 864 *Staphylococcus Aureus* samples were collected from patients of Jinnah Hospital, Lahore. A cross sectional study and non-probability purposive sampling was done between June 2007 and November 2008. 27.7% of isolates were found to be MRSA and was much lower than findings in other hospitals of Punjab. Maximum isolates (57.69%) were from endotracheal secretions and central venous catheters mainly in ICUs<sup>11-12</sup>. 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% that needs immediate attention and must be lowered down.<sup>13</sup>

**Methodology:** This descriptive cross-sectional study was carried out on 250 registered doctors and qualified nurses of the Surgery, Medicine, Pediatrics and ICU departments of Allied hospital Faisalabad. Convenient random sampling technique was used, and data was collected using a structured questionnaire administered by an interviewer. Health Professionals were questioned about their practicing activities that may be a major factor causing nosocomial infection. There were questions on the importance of hand washing, self-protection, ward hygiene, sterilization of instruments and equipment, and on how they investigate and treat a patient of nosocomial infection. SPSS version 20 was used for data entry and analysis. Means  $\pm$ SD were calculated for continuous data and tables and figures used for categorical data.

**Results:** Of the 250-potential respondent approached, a total of 244 replied with a response rate of 97.6%. The analysis of demographic characteristics of the study group shown in table 1 illustrated that the majority were females (89.3%), the mean age was 24.52  $\pm$ 3.240 years (range 18-46 years), 194 (79.50%) were doctors and 50 (20.5%) were nurses, more than half (60.7%) were house officers, majority had an experience of less than two years (75.80%), most of them belonged to Surgery (36.9%) and Gynecology and Obstetrics unit (31.6%), and about half of the wards had 10-20 beds (49.20%) as shown in table 1.

Table 1: Demographic and Professional Characteristics of Health Care Professionals (n=244)

Variable	Frequency	Percentage (%)
Age(years)		
18-23	72	29.5
24-29	162	66.39
30-35	7	2.87
>36	3	1.24
Mean $\pm$ SD <sup>1</sup>	24.52 $\pm$ 3.240	
Gender		
Male	26	10.7
Female	218	89.3
Designation		
Consultant	3	1.2
PG trainee	31	12.7
Senior registrar	6	2.5
Medical officer	6	2.5
Staff nurse	24	9.8
Student nurse/trainee	26	10.7

House officer	148	60.7
Experience of Working		
< 2 years	185	75.8
2-5 years	52	21.3
6-10 years	6	2.5
> 10 years	1	.4
Units of AH <sup>2</sup>		
Medicine	50	20.5
Surgery	90	36.9
Pediatrics	24	9.8
ICU <sup>3</sup>	3	1.2
Gynecology and Obstetrics	77	31.6
Total Number of Beds		
Less than 10	28	11.5
10-20	120	49.2
More than 20	96	39.3

<sup>1</sup>Standard Deviation, <sup>2</sup> Allied Hospital, <sup>3</sup> Intensive Care Unit

Frequencies and percentages of the answers to question regarding knowledge of health professionals about nosocomial infection is given in table 2.

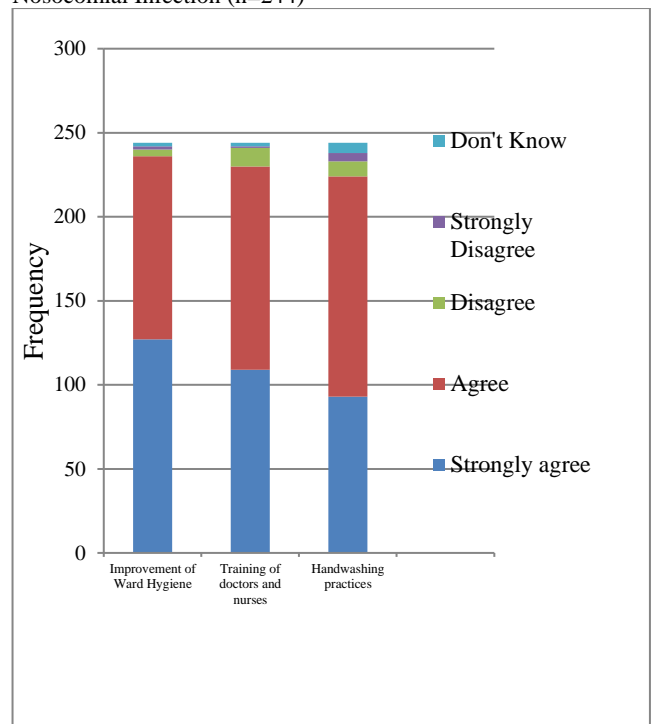
Table 2: Frequencies and Percentages of Knowledge Assessment of Health Care Professionals towards Nosocomial Infection (n=244)

Variable	Frequency	Percentage (%)
<b>Awareness for Definition of Nosocomial Infection</b>		
Yes	214	87.7
No	19	7.8
Don't know	11	4.5
<b>If Yes, Specify (n=214)</b>		
Hospital Infection	191	89.25
Cough	8	3.8
HIV <sup>1</sup> , HCV <sup>2</sup> , TB <sup>3</sup>		1.85
RTI <sup>4</sup> , UTI <sup>5</sup> , Skin-Infection	8	3.8
Not Specified	3	1.4
<b>Mode of Transmission</b>		
IV <sup>6</sup> 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
<b>Most Common NI<sup>7</sup> in ward</b>		
Urinary Tract Infection	72	29.5
Respiratory Tract Infection	77	31.6
Surgical wound infection	77	31.6
UTI <sup>5</sup> and RTI <sup>4</sup>	3	1.2
UTI <sup>5</sup> and Surgical wound infection	2	.8
Other	13	5.3
<b>Most Commonly Affected</b>		
Doctors	24	9.8
Nurses	30	12.3
Attendants	18	7.4
Patients	172	70.5

Out of 244 respondents, 214 (87.7%) said they knew what nosocomial infection is and 191 (89.25%) specified it as hospital infection. 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 (31.6%) and Surgical Wound Infection (31.6%), while Urinary Tract Infection (29.5%) was reported to be second most common infection. Patients (70.5%) of both genders (50.8%) were most commonly thought to be affected. 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 organism respectively. As shown in figure 1.

Figure 1: Attitude of Health Care Professional towards Nosocomial Infection (n=244)

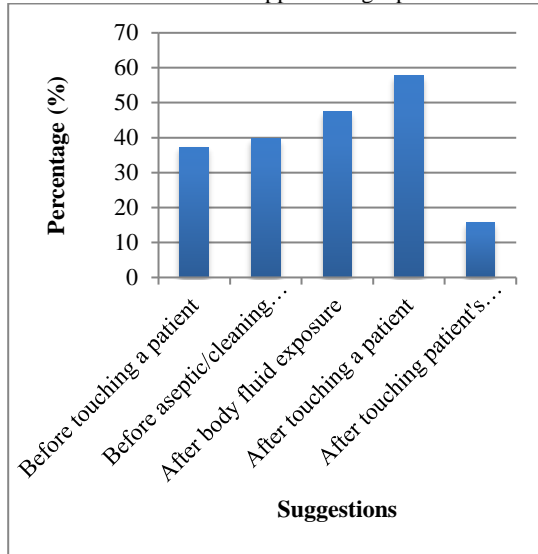


190 (77.9%) responded that immunocompromised adults were the most important risk factor, while 133 (54.5%) thought it was elderly patients and 122 (50%) thought it was infants (Table 2)

Figure 1 shows attitude of health professionals towards nosocomial infection. Out of 244, 127 (52.0%) strongly agreed, 109 (44.7%) agreed, 4 (1.6%) disagree while only 2 (0.8%) strongly disagree of nosocomial infection. Training of doctors and nurses can lead to deterrence of nosocomial infection is the statement that lead most of health professionals into agreement (44.7% strongly agreed and 49.6% agreed) while 12 professionals disagreed (4.5%) and the rest 2 did not know its turnout. Majority of the respondents (91.2%) also agreed upon the phenomenon that hand washing can prevent the spread, 6 (2.5%) did not know its effect and the rest disagreed (5.7%).

Figure2 shows data regarding the hand washing activities of health care professionals and hand washing facilities available to them.

Figure 2: Hand washing actions of Health Care Workers before and after approaching a patient



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. Only 111 (45.5%) agreed that it is always necessary to wash hands after removing gloves. Number of washing basins in the ward and OPD is also one of the important determinants which affects hand washing practices. As shown in table 4, nineteen (7.8%) said that they have no wash basins in their ward, 85(34.8%) said they have one, 85(34.8%) said two, 30(12.3%) said three, 11 (4.5%) said four, nine (3.7%) said five, four (1.6%) said six and one (0.4%) said seven wash basins in their wards. Eighty (32.8%) were satisfied with the number of wash basins but 158(64.8%) complained that wash basins were not enough for them.

Almost 32% of the respondents believed that doctors and nurses wash their hands sufficiently but the majority (62.7%) disagreed. 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%). 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. Table 5 shows that out of 244, 222 (90.90%) agreed that that wearing gloves reduce the risk of transmitting Nosocomial infection. Eighty-two (33.6%) said that they rarely use gloves, 77(31.6%) said they use gloves during examination, 28(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. Health care professionals believed that patients acquire nosocomial infections

from other patients, (65.6%) believed from hospital staff, (47.5%) believed it was from contaminated objects. According to the formulated data shown in figure, out of 244, only 65 (26.6%) disposed-off the waste in the right color-coded bags, while 93 (38.1%) did it frequently, 54 (22.1%) did it sometimes, 13 (7.8%) rarely disposed it off the right way and 13 (5.3%) never bothered.

Frequencies and percentages of various activities of health care professionals regarding ward hygiene are given in table 6. There was a strong agreement (93.4%) among health care workers that unclean washrooms increase the risk of spread of nosocomial infection. More than half (58.1%) agreed that ward washrooms were cleaned twice a day and a few (26.2%) reported that it was more than twice a day, the rest (15.6%) did not know. Majority (89.6%) agreed that unclean ward floors increase the risk of spread while about half of them (47.5%) said that wards were cleaned more than once a day, some believed (37.3%) it was once a day, 12 out of 244 (4.9%) believed it to be on alternate day and the rest (10.2%) said when it needed. There were a variety of replies on the standard of ward cleanliness with a rare (6.6%) response for excellence, a frequent (47.1%) response was good, (23.8%) believed it was fair and the rest thought it was poor (18.1%). There was a good response that bed sheets were changed regularly (80.3%), on a daily basis (84.2%). Only half of the wards (48.8%) had facility of isolation room for infectious patients. Regarding the activities of sterilization and its effects on the spread of Nosocomial Infections; out of 244, 215 (88.1%) lead into an agreement 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. Only 46.3% of the health care professionals believed that the bed sheets and patient gowns were always sterilized. Half (50.0%) of the clinicians approved that the staff cleans the site before insertion of intravenous line or a catheter.

**Discussion:** Hospital acquired infections are a continuing source of problem in hospitals. It is a serious source of morbidity, mortality and excess health cost. This study about nosocomial infections at Allied hospital showed that the knowledge and attitude of doctors and health care workers towards the hospital acquired infections was good, but there is a little deficiency regarding their practices. The literature review shows that nosocomial infections are caused by the lack of adherence to infection control measures, like hand hygiene, use of gloves and sterilization; therefore, 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 AH were not following proper hand washing practices due to inadequate hand hygiene facilities, ignorance of guideline, insufficient time, high workload and insufficient knowledge. 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<sup>14</sup>. *Methicillin 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*. Misuse of antimicrobials is an important cause of re-emergence of nosocomial infections and this study shows that 1/3 of doctors and nurses are not mindful of it. 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. Improvement of ward hygiene, training of doctors and nurses, proper hand washing and proper sterilization are important factors for prevention of nosocomial infection. The continuous education of Hospital authorities, doctors and nurses on the principles of infection control through training and re-training should be advocated. There should be proper Hospital waste management and infectious waste should be disposed-off in proper way. Workload on the doctors should be reduced by increasing the number of doctors per ward, so that there is balance between doctors-patients' ratio and they have enough time to adopt proper hand hygiene practices. There should be isolation facilities in each ward for the infectious patients.

**Conclusion:** Knowledge and attitude of doctors and nurses of Allied Hospital towards nosocomial infection is good. There is lack of obligation towards practices and major factors such as hand washing, hard hygiene, and proper sterilization are frequently ignored.

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