

## Nosocomial Infections and its Prevention

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### ABSTRACT

**Background:** To assess the knowledge of medical & paramedical staff regarding nosocomial infections and their preventive measures in tertiary care hospitals.

**Aim:** To prevent, reduce, and ultimately eliminate healthcare-associated infections.

**Methods:** This prospective study was conducted from 1<sup>st</sup> July to 30<sup>th</sup> September 2016. 352 health care persons were included in the study. A 30 stem questionnaire was distributed during visits to hospitals.

**Results:** The results demonstrated that knowledge of nosocomial infections and precautions was moderate among paramedics and was fairly good among doctors but not up to the mark.

**Conclusion:** In order to reduce the incidence of nosocomial infections in our hospitals, level of knowledge regarding prevention of nosocomial infections and strict compliance to the universal precautions is needed to be raised in the health care providers in our hospitals.

**Keywords:** Nosocomial infections, healthcare associated infections (HAIs), hospital infections.

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### INTRODUCTION

A nosocomial infection can be defined as an infection acquired in hospital by a patient who was admitted for reason other than that infection<sup>1</sup>. This also includes infections acquired during hospital stay but appearing after discharge, and infections among health care providers<sup>2</sup>. Nosocomial infections occur worldwide. Standard precautions and awareness education has not been given due importance among health care workers particularly in developing countries.

The importance of hand hygiene, personal protective equipment, continuous surveillance, regular auditing and updating of protocols, facilitating disinfection and sterilization processes, and proper infectious waste segregation and disposal is immense when prevention of nosocomial infections is in question<sup>3</sup>. It is believed that one third of nosocomial infections are preventable and as many as 92% of deaths from hospital infections can be prevented<sup>4</sup>. Patients may get infected mainly by transmission of contaminated blood or blood products and/or through contaminated medical equipment. Health care workers are at high risk of needle stick

injuries and consequently, at high risk of being exposed to blood-borne pathogens<sup>5</sup>. Factors promoting infection are: decreased immunity, increasing variety of medical procedures and invasive techniques creating potential routes of infection and poor compliance to standard precautions<sup>6</sup>. A study conducted at tertiary care hospital in Katmandu concluded that the health care workers understand the importance of hand washing but tend to wash hand selectively depending upon the indications.

According to the WHO estimate, in year 2003, sharp injuries resulted in 16,000 hepatitis C virus, 66,000 hepatitis B virus and 200-5000 HIV infections in health care workers worldwide. The incidence rate of these factors is higher in developing countries. A prevalence survey of WHO in 55 hospitals of 14 countries showed an average of 8.7% of hospital patients had nosocomial infections. At any given moment, over 1.4 million people worldwide suffer from infectious complications acquired in hospital. Even health care providers are at risk of getting the infection due to occupational hazards in the hospital setting, including exposure to blood borne infections such as HIV and hepatitis B and C virus infection from sharps injuries and contact with body fluids<sup>7</sup>. It was also observed that paramedics need training to increase their compliance with standard precautions<sup>8</sup>.

The majority of the health care workers wash their hands after examination of patient (not before). The level of practice of standard precautions may differ from one type of health care worker to another. The differences in knowledge of standard

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precaution by health care workers may be influenced by their type of training.

The objective of the study was to assess the knowledge of nosocomial Infections and compliance to standard precautions among doctors and paramedical staff.

**MATERIAL & METHODS**

This 3 months descriptive cross sectional study was conducted at Combined Military Hospital, Military Hospital, Holy Family Hospital Rawalpindi, Rawalpindi Institute of Cardiology and Fauji Foundation Hospital Rawalpindi from 1<sup>st</sup> July to 30<sup>th</sup> September 2016. 352 members (173 doctors and 179 paramedics) of staff including doctors and paramedical staff participated in this study. Due permission was taken from hospital administration and approval of relevant ethical committees. A 30 stem Questionnaire was distributed to study subjects after taking informed consent. Data analysis was done by using SPSS version 17. Descriptive statistics including means, standard deviations and frequencies were assessed on variables. Chi test was applied on qualitative variables and T test was applied on quantitative variables. Inclusion & exclusion criteria: All the participants who had post graduate degree in their respective fields were excluded from the study.

**RESULTS**

352 members (173 doctors and 179 paramedics) of staff including doctors and paramedical staff were in this study. 51% replied that they were sure about the universal precautions required while dealing with the patients. 36% don't know and 13% of participants were not sure about these precautions. Level of awareness is further sub divided among doctors and paramedical staff in figure 1. Regarding general questions, 97 participants (27.6%) don't think that

nosocomial infections can be life threatening to life. Few other points regarding general knowledge about nosocomial infections as shown in table 1.

Most of the healthcare workers (85%) believe that they are at risk of developing nosocomial infection but still 21% don't think that it is necessary to use gloves while dealing with cuts. Perception of doctors and paramedical staff regarding washing of hands in between treating of patients is given in table 2. Difference in the opinion in standard practice using gloves between doctors & paramedics is also shown in figure 2.

Fig. 1: Awareness about universal precautions

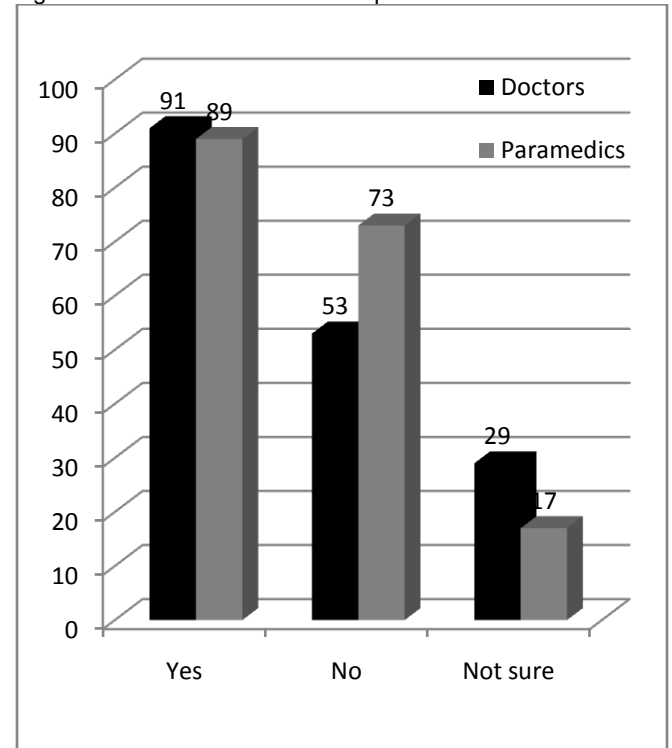


Table 1 General knowledge of nosocomial infections.

Variables	Yes	No	Not sure
Are you familiar with the term nosocomial infections?	237 (67.3%)	65 (18.5%)	50
Are you aware of the systems affected?	195 (55.4%)	115 (32.7%)	50 (14.2%)
Do invasive procedures increase the risk of infections?	224 (63.6%)	67 (19%)	61 (17.3%)
Can nosocomial infections be life threatening?	255 (72.4%)	97 (27.6%)	Nil (0%)

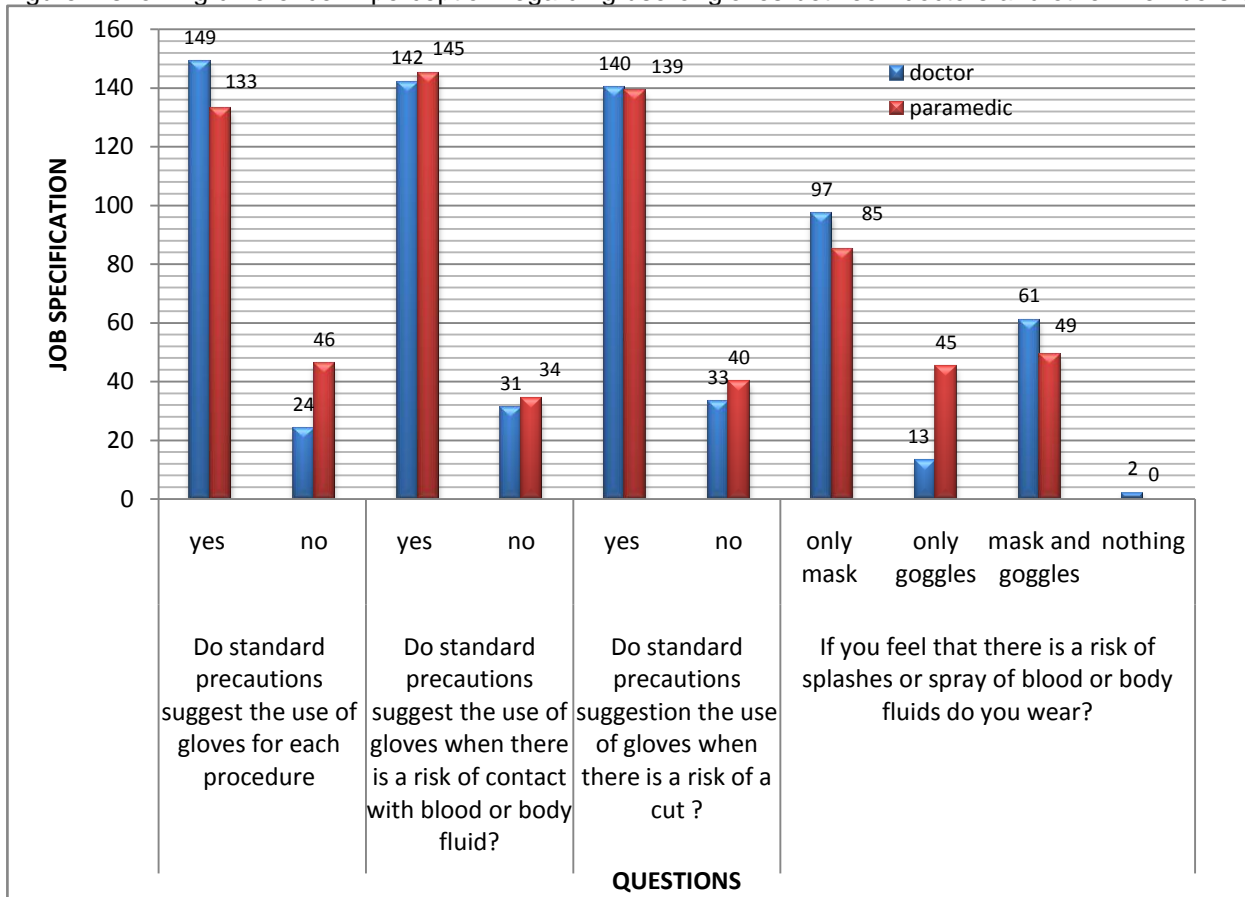
Table 2: Normal practice related to hand washing.

Variables	yes	No
Before attending patients do you wash your hands?	212 (60.2%)	140 (39.8%)
Do you use alcohol based hand wash as an alternative to traditional hand washing?	188 (53.4%)	164 (46.6%)
Do you use alcohol based hand wash as an alternative to surgical hand wash?	183 (52%)	169 (48%)
Between attending different patients would you use same pair of gloves?	117 (33.2%)	235 (66.8%)
After removing gloves do you wash your hands?	234 (66.5%)	118 (33.5%)

Table 3 showing standard practice regarding hand wash and use of gloves.

Variable	Doctors		Paramedics	
	Yes	No	Yes	No
After removing gloves do you wash your hands?	116 (67%)	57(32.9%)	118(65.9%)	61(34.1%)
Do you alcohol based hand wash as an alternative to traditional hand washing?	86 (49.7%)	87(50.3%)	102(57%)	77(43%)
Do you use alcohol hand wash as an alternative to surgical hand wash?	84 (48.6%)	89(51.5%)	99(55.3%)	80(44.6%)
Do you perform traditional hand wash before using alcohol based hand wash?	80 (46.2%)	93(53.8%)	78 (43.5%)	101(56.4%)

Figure 2 showing difference in perception regarding use of gloves between doctors and other members of staff.



**DISCUSSION**

Nosocomial infections remain an important cause of morbidity, mortality, and increased health care costs in hospitalized patients<sup>9,10,11</sup>. In this study the knowledge and practice of standard precaution among doctors and paramedics is not satisfactory. Hand hygiene is a leading measure for prevention of nosocomial infections and a study conducted at King Edward Medical University, Lahore concluded that the knowledge of hand hygiene among house officers was unsatisfactory<sup>12</sup>.

A study about recapping needle in India concluded that the knowledge of dental professional on needle stick injury and their preventive measures was inadequate<sup>13</sup>.

A study revealed that only 9% of participants (13 out of 144) had good knowledge regarding hand hygiene<sup>14</sup>.

A similar study at Rouen, France the knowledge of paramedical staff relating to universal precautions was better than doctors. This study, however, showed better knowledge among doctors. The knowledge of paramedics was acceptable while knowledge of doctors was better than the paramedical staff. The

study also showed that alcohol based hand wash is replacing traditional hand washing.

Less than half of the paramedics said that they recapped needles after use while the remaining minority said that recapping was done by someone else and almost the same number said they did not recap the needles after use<sup>15</sup>. In another study 45% of the nurses recapped needles/syringes after use. In the same study it was observed that only 25.6% with needle prick injury had post-exposure prophylaxis while in this study the percentage was even lower, dropping to a 20 % (71/352). In this study a good majority of the doctors and paramedics used new gloves for each patient compared with another research in which all doctors and laboratory scientists always used gloves compared to 94.8% (91/96) nurses while handling patients or materials<sup>16</sup>.

In another research 8 out of 10 clinicians cleaned their stethoscopes at least once in the past and of those, 3 reported that they cleaned at least weekly, 1 at least monthly, and 4 less than once monthly. Two of the 3 claiming to clean at least weekly indicated that they did so, on a regular basis.<sup>17</sup> None of the participants cleaned daily or after every patient. This was similar to this research as this research also states that one third of the study population cleaned their stethoscopes daily while few never cleaned them and the remaining rarely cleaned their stethoscopes.

In a study to assess the knowledge, attitudes and practices among the different health care workers on nosocomial infections. It was observed that the compliance level to hand washing practices differed among the different health care workers. Total compliance was 63.3%<sup>18</sup>.

A good population washed their hands for more than 10 seconds, 16 out of these 228 washed their hands for over a minute while the remaining 124 out of the total 352 washed their hands for less than 10 seconds thus it can safely be said that hand washing procedures were correctly being followed by majority of the population. In a similar study 61 (60.4%) nurses and 40 (39.6%) doctors, hand washing was inadequately practiced, and the correct hand washing procedure was not followed by 70% of the staff. The average time taken to wash hands varied between 15 and 20 seconds<sup>10</sup>. According to study conducted at Nizam's Institute of Medical Sciences, Hyderabad India, to assess the level of knowledge of nosocomial infections and standard precaution compliance among health care workers, the knowledge of standard precautions was 63.3% among doctors, 56.6% in technicians and 40.05 in nurses. Knowledge of standard precautions was highest among doctors (63.3%), followed by technicians (56.6%) and nurses (40.0%)(4). In another study 98.7 percent of the

paramedics agreed that increasing age does increase the chance of developing nosocomial infections<sup>19</sup>.

Study conducted at Rajkot India revealed: 80 (93.02%) participants had heard about HAIs. More than half (60.4%) of the participants acknowledged that urinary and respiratory tract infections were the two most common HAIs. 52 (60.4%) of the participants acknowledged that direct skin to skin contact and improper handling of bio medical waste were the two most common modes of transmission of HAIs. 47 (56.6%) practiced hand washing before and after surgical procedures. 30 (36.1%) participants had 'good' knowledge regarding HAIs<sup>20</sup>.

## CONCLUSION & RECOMMENDATIONS

Although knowledge of nosocomial infection is adequate but poor compliance on preventive techniques resulting in high prevalence of hospital acquired infections demands attitudinal change as it is the most effective means of prevention. A review of health care curriculum, hands on training of staff, workshops on regular basis can help to reduce risks of nosocomial infections in health care setting of low income countries.

**Conflict of interest:** No conflict of interest present

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