



**ORIGINAL RESEARCH PAPER**

**Microbiology**

**A STUDY TO ASSESS THE AWARENESS OF NOSOCOMIAL INFECTION CONTROL PROTOCOLS AMONG HEALTH CARE PROVIDERS IN A TERTIARY CARE HOSPITAL**

**KEY WORDS:** Hospital infection control, Education, hand hygiene

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**ABSTRACT**

**Aim:** The study was undertaken to assess the awareness of the Healthcare providers (HCP) regarding basic hospital infection control practices such as hand hygiene, Isolation precautions (IP's), sharp injuries, and environmental cleaning protocols of the hospital.

**Methodology:** A total of 50 healthcare providers comprising of 20 doctors and 30 nurses were assessed by a structured questionnaire.

**Results:** Knowledge regarding hand hygiene was 88.88%. The study demonstrated considerable scope for improvement regarding the knowledge and implementation of Isolation precautions (IP's). Both doctors and nurses were well aware of maximum barrier precautions for invasive procedures. There was significant lack of knowledge of nurses regarding blood borne pathogens and of doctors regarding environmental hygiene.

**Conclusion:** Thus, the present study highlights the importance of educational interventions among the Healthcare providers for the prevention and control of nosocomial infections.

**Introduction:**

The concepts of asepsis and its application in hospital practice reduced the incidence of infection, but hospital infection still cause considerable mortality and morbidity [1]. The prevalence of Healthcare associated infection (HCAI) varies widely across the globe. Worldwide it is estimated that almost 10% of the hospitalized patients acquire at least one HCAI [2]. The prevalence of HCAI in developing countries can become as high as 30-50% [3]. Many of these pathogens implicated in HCAI are often multi-drug resistant and are able to survive in the environment for a long period of time [4]. The most important mechanism of spread of these HCAI is via the contaminated hands of the healthcare givers that is doctors, nurses, other staff or relatives/friends of the patients. Contaminated environmental surfaces are another important reservoir for spread of these infections. However, they are often under-recognized. Infection can also spread to patients by drugs, intravenous solutions or by foodstuffs [5].

Hand hygiene is by far the most effective method in reducing the prevalence of HCAI. The healthcare personnel's are also at increased risk of infection from blood-borne pathogens (BBP) like human immunodeficiency virus (HIV), Hepatitis B virus (HBV) and Hepatitis C virus (HCV). Exposure to infectious material can be minimized if they adhere to standard precautions (SPs). Besides the documented role of hand washing and SPs, other non-pharmacological interventions such as cleaner hospital environment have been shown to significantly reduce the rate of HCAI [6]. The present study was undertaken to assess the awareness of the Healthcare providers (HCP) regarding basic infection control practices such as hand hygiene, SPs, needle stick injury (NSI), post-exposure prophylaxis (PEP) and environmental cleaning protocols of the hospital.

**Methodology:**

A sample size of 50 Health care providers was included in the descriptive survey study conducted during period of one month in August 2017.

The investigator collected the data from health care providers by using structured questionnaire to assess the knowledge regarding nosocomial infection control protocols. The content of the questionnaire comprised of 25 main questions related to knowledge and practice regarding hand hygiene (7 questions), Standard and transmission based precautions (8 questions), Needle stick injury and post-exposure prophylaxis (5 questions) and hospital environment cleaning including blood spillage and biomedical waste management (5 questions). The data collected was analysed by using descriptive and inferential statistics.

Percentage and Chi-square test was used to find out the association between knowledge and selected demographic variables. A p value of  $\leq 0.05$  was taken as statistically significant.

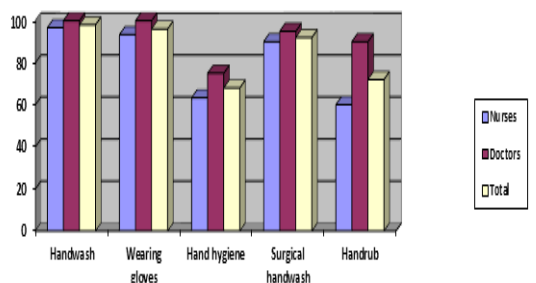
**Results:**

Fifty questionnaires were included for the final analysis. The study group comprised of 20 doctors and 30 nurses.

The respondents were asked few questions to assess their knowledge regarding hand hygiene

**Table 1: Knowledge regarding hand hygiene**

Knowledge regarding hand hygiene	No (%) of nurses giving correct response	No (%) of doctors giving correct response	Overall No (%) correct response
Hand hygiene is the most effective method to prevent HCAI	29 (96.66)	20 (100)	49 (98)
Wearing gloves eliminates the needs to wash hands	28 (93.33)	20 (100)	48 (96)
6 Steps and 5 moments of hand hygiene	19(63.33)	15(75)	34(68)
Surgical hand wash	27 (90)	19 (95)	46 (92)
Hand rub duration	18 (60)	18 (90)	36(72)

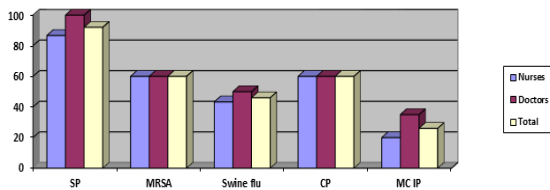


The mean knowledge regarding hand hygiene was 85.2% in the study group. There was no significant difference ( $p$  value of  $>0.05$ ) in the response of the doctors and nurses.

The respondents were asked to identify how important they thought certain aspects of Isolation Precautions were.

**Table 2: Knowledge regarding the Isolation Precautions**

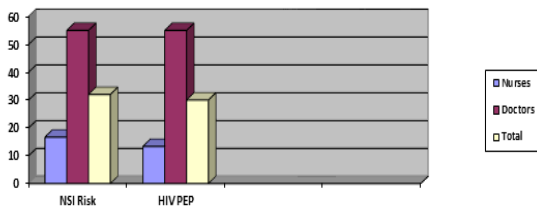
Isolation Precautions	Nurses (%)	Doctors (%)	Total (%)
Components of Standard precaution (SP)	26(86.66)	20(100)	46(92)
Methicillin Resistant Staphylococcus aureus (MRSA) Isolation precaution	18(60)	12(60)	30(60)
Swine flu Isolation precaution	13(43.33)	10 (50)	23(46)
Contact precautions (CP)	18(60)	12(60)	30(60)
Measles and Chickenpox (MC IP)	6 (20)	7 (35)	13 (26)



The knowledge regarding the Isolation Precautions was 61% and 53.98% amongst the doctors and nurses respectively. Doctors had significantly more knowledge ( $p$  value of  $<0.05$ ) regarding the Isolation Precautions as compared to the nurses.

**Table 3: Knowledge regarding transmission of blood-borne pathogens and their approximate risk**

Correct identification of	Nurses (%)	Doctors (%)	Total (%)
Percentage estimate of HIV,HBV and HCV Risk after Needle stick injury(NSI)	5(16.66)	11(55)	16(32)
HIV post exposure prophylaxis (PEP) should begin within 72 hours	4(13.33)	11(55)	15(30)



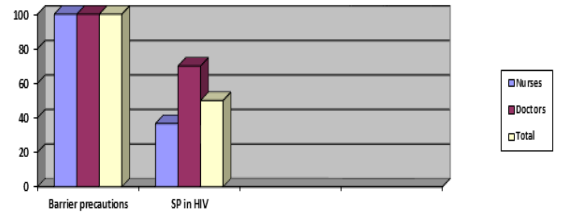
Knowledge regarding the transmission of blood-borne pathogens was 55% and 16.66% amongst the doctors and nurses respectively which was statistically significant. While knowledge regarding HIV PEP was 55% and 13.33% amongst the doctors and nurses respectively which was statistically significant.

**Table 4 : Practise of respondents regarding infection control practices**

What are the barrier precautions you undertake before central venous line insertion				
		Nurses (%)	Doctors (%)	Total (%)
1	Barrier precautions	30(100)	20(100)	50(100)

**Practise regarding standard precaution(SP)**

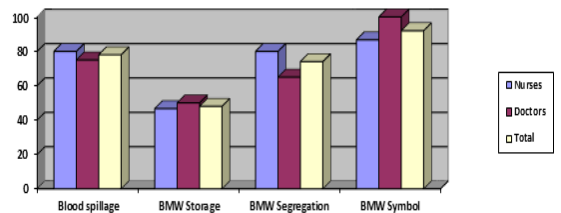
1	SP in case of known HIV positive patient	11(36.66)	14(70)	25(50)
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The knowledge regarding the use of cap, mask and gown as part of maximal barrier precautions was 100% among nurses and doctors respectively while knowledge of standard precautions in case of care during HIV patients was 70% and 36.66% amongst the doctors and nurses respectively.

**Table 5 : Number (%) of respondents identifying correct protocol for environment cleaning**

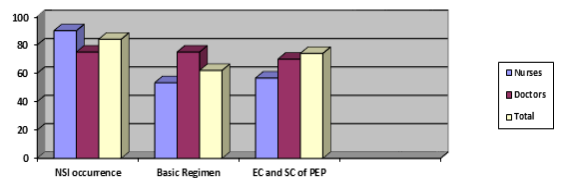
	Nurses (%)	Doctors (%)	Total (%)
Blood spillage management	24(80)	15(75)	39(78)
Biomedical waste (BMW) storage	14(46.66)	10(50)	24(48)
Biomedical waste (BMW) segregation	24(80)	13(65)	37(74)
Biomedical waste (BMW) symbol	26(86.66)	20(100)	46(92)



The mean knowledge regarding correct protocol for environment cleaning was 73% in the study group. The knowledge regarding environment cleaning was 72.5 % and 73.33 % amongst the doctors and nurses respectively. There was no significant difference ( $p$  value of  $>0.05$ ) in the response of the doctors and nurses.

**Table 6: Knowledge regarding safe injection practices and HIV Post exposure prophylaxis (PEP)**

	Nurses (%)	Doctors (%)	Total (%)
Needle stick injuries (NSI) occurrence	27(90)	15(75)	42(84)
Basic regimen of HIV PEP	16(53.33)	15(75)	31(62)
Exposure and status code of PEP	17(56.66)	14(70)	31(62)



There was statistical difference regarding the knowledge of HIV PEP ( $p$  value of  $<0.05$ ) amongst the doctors and nurses where doctors had significantly more knowledge (75%) than nurses (53.33%)

**Discussion:**

Hand hygiene is the first initial step towards successful infection control in any healthcare setup<sup>[7]</sup>. We found that in our set up

knowledge regarding hand hygiene was 85.2%. In our hospital, we enforce the importance of hand hygiene for infection control at every possible opportunity for interaction with the HCP. This could be the reason for improved knowledge. Other authors have observed the low compliance of HCP towards hand hygiene also. In a meta-analysis the hand washing compliance was 52% (range 27-86%). Many authors have identified reasons for this non-compliance which included lack of time, lack of means, patients not at risk or forgetfulness.

Our study demonstrated considerable scope for improvement regarding the knowledge and implementation of Isolation precautions (IP's). Only 54% of nurses could identify the correct protocols of isolation precautions. The findings in our study are consistent with previous reports of suboptimal compliance with IP's<sup>[8]</sup>. On enquiring about the maximal barrier precautions they take before the insertion of CVC, both the nurses and doctors response was 100 %. This finding has important implications as catheter-related blood stream infection (CRBSI) can largely be prevented by use of simple means such as maximal barrier precautions by both the operator and the assistants<sup>[9]</sup>.

Transmission of at least 20 different pathogens by injury to sharps has been reported in the literature. Hence, the HCP should be aware regarding the risks associated with the Blood borne pathogens (BBP). Another shortcoming that came to light was the significant difference between the awareness levels of doctors and nurses regarding the risk of acquisition of these BBP. Only 53.33% of the nurses were aware about the risk of transmission of these BBP as compared to of doctors. This lack of knowledge regarding BBP has been observed by other authors also. In one of the study, only 25% of the respondents were aware regarding the risk of acquiring BBP. In another study the difference between nurses and doctors knowledge regarding BBP was significant<sup>[10]</sup>. The study group was not aware about the percentage estimate of risk of these BBP and most of them felt HIV was most contagious. The difference was again significant and doctors were more knowledgeable. This could be because doctors during their course study are taught about the risk of infection due to individual viruses.

Hospital environment acts as a reservoir for many of these potential pathogens and there is documented evidence that environmental cleaning reduces the rates of HCAI<sup>[8],[10]</sup>. Hospital environment as a source of transmission is often overlooked in practice. The knowledge regarding environment cleaning was 72.5% and 73.33% amongst the doctors and nurses respectively. The cleaning of hospital environment is the responsibility of the house keeping staff under the supervision of the nurses. Though doctors are not directly involved in the cleaning protocols we feel that they should at least be aware of these protocols so that they can monitor increasing HCAI rates.

### Conclusion:

Thus, the present study highlights the importance of educational interventions among the Healthcare providers for the prevention and control of nosocomial infections.

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