

# Study to Assess the Knowledge of Infection Control Practices among the ICU Nurses in Apollo Hospitals Bhubaneswar, Odisha

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## Abstract

**Background of the Study:** The threat of healthcare-associated infections persists despite many new advances in the healthcare system. In this scenario, the lack of knowledge and practices related to preventing the spreading of various nosocomial infections can lead to more hospital-acquired infections and will hamper the quality of care provided by hospitals.

**Aim:** This study aims to assess the knowledge of infection control practices among ICU Nurses.

**Methodology:** This study is a descriptive study. The study used a self-administered structure questionnaire. A study population was selected by random sampling method.

**Results:** The comprehensive awareness of infection control practices among the nursing professionals as per their year of work experience in the respective nursing field was interpreted as Excellent when the positive responses to all those questionnaires were > 90%. Defined Good with a response of 80- 90 %, at the same time average with 50-80% and below average mostly who have scored < 50 % of the questionnaire.

## Implication of the study:

These findings suggest that more experienced nurses had good knowledge of various infection control practices whereas nurses with less experience had average and below-average knowledge. We can conclude that the infection control practices among ICU staff are average, which can lead to hospital-acquired infections.

**Conclusion:** The study confirms that knowledge related to infection control practices among ICU nurses is good; there is a scope of improvement.

**Keywords:** Infection Control Practices, Standard Precautions, Hand Hygiene

## Introduction:

According to “WHO expert committee 1956”-

“The hospital is an integral part of a social and medical organisation, the function of which is to provide for the population complete healthcare, both curative and preventive and whose outpatient services reach out to the family in its home environment the hospital is also a centre for the training of healthcare workers and for bio social research.”

### Again as per “WHO Expert Committee 1963”-

“A hospital is a residential establishment which provides short term and long term medical care consisting of observational, diagnostic, therapeutic and rehabilitative services for persons suffering or suspected to be suffering from disease or injury and for parturient. It may or may not also provide services for ambulatory patients on an outpatient basis.”

The threat of health care associated infections or nosocomial infections persists despite of many advances in the healthcare system. A lack of knowledge and continuous training with timely post training evaluation regarding various infection control practices among healthcare workers decreases the compliance rates in this practice. (1)

“The Centres for Disease Control and Prevention (CDC) reported that an estimated 1.7 million infections occur annually in hospitals in the United States (US), with 99,000 associated deaths.(2) The Study on the Efficacy of Nosocomial Infection Control (SENIC) estimated that the cost of HAIs was \$4.5 billion in 1992, and after adjusting for inflation, this cost increased to approximately \$6.65 billion in 2007 [3]. Infection prevention and control efforts have historically focused on monitoring and preventing HAIs locally; however, HAI prevention has recently become a global priority, which has resulted in an evolution of infection prevention and control.” [3]

As per the article of “National centre for biotechnology information Healthcare workers (HCWs) employed in hospital settings regularly deliver healthcare services to patients with unknown status of blood-borne diseases, such as Hepatitis B, Hepatitis C and human immunodeficiency virus (HIV) (Regina et al., 2002; Porto & Marziale, 2016) in addition to dealing with the increasing incidence and emergence of infectious diseases worldwide (Colet et al., 2017). This exposure places HCWs at risk of acquiring occupation-related viral infections. The literature has shown that nurses have the highest risks of acquiring occupation-related infections among HCWs since they have the most frequent direct interactions with patients while providing care (Porto & Marziale, 2016). According to the Centre for Disease Control and Prevention (CDC), nurses are the most HCWs whom are repeatedly included in either documented or possible occupationally acquired HIV infections (Regina et al., 2002).” [4,27]

As per the “World Health Organization (WHO), hundreds of millions of patients acquire healthcare-associated infections (HAIs) annually, where seven patients in developed and 10 in developing countries acquire a minimum of one HAI per 100 hospitalized patients at any given time (World Health Organization, 2015). Since decades till present, the CDC has firmly recommended infection control (IC) precautions to prevent the transmission of infections, disease outbreaks and assure the safety of HCWs (Wu et al., 2008). [4] Despite the development and improvement in the IC programmes in hospitals, low compliance with IC practices has been reported among HCWs worldwide over the years (Valim et al., 2013). This low compliance remains to be linked with HAIs (Colet et al., 2017). [4] A main contributing factor to the low compliance is lack of awareness (Sodhi et al., 2013). Having the most frequent direct interactions with patients while providing daily care, nurses have the highest risks of transmitting HAIs among patients and HCWs (Alrubaiee et al., 2017; Colet et al., 2017; Cruz & Bashtawi, 2016; Cruz et al., 2015) [4].”

In addition to education and training, the “CDC recommends periodic assessment of HCWs' knowledge and compliance with IC practices to control and prevent the transmission of HAIs (ALRawajfah, & Tubaihat, 2017). The CDC emphasizes that education on the principles and practices for preventing the transmission of infections shall be given to all HCWs. These education and training programmes should

be conducted regularly. However, new updates of IC guidelines are to be added to upcoming trainings (Centre for Disease Control & Prevention, 2007)” [4] (2)

**Keywords:** Infection control practices, standard precautions, hand hygiene

**Objective:**

The aim of this study is to assess the knowledge of infection control practices among ICU Nurses.

**Research Question:**

What are the level of nurse’s knowledge about infection control practices at all the ICU Areas of the hospital?

**Study Design:**

The study was conducted at 350-bedded NABH Accredited multi-speciality hospital. The healthcare organisation has a designated infection control officers and infection control nurses, who are actively contributing in various infection control training practices & surveillance programmes. The hospital has extensive infection control awareness programmes including an infection control manual for all the areas of the hospital, conducting wide hand hygiene campaign, regular surveillance of hand hygiene by ICN’s along with a monthly best hand washing compliances reward & recognition. They are encouraging for the Celebration of infection control month with various dynamic activities to increase the level of awareness among hospital employees. (3)

**Methodology:**

This study is a descriptive study. The study used a self-administered structure questionnaire to assess nurse’s knowledge on standard precautions followed by them as per WHO guidelines, health care associated infections and various hand hygiene methods which was scattered to the study group (ICU Nurses) through google questionnaire. In this study Data on knowledge on infection control practices were obtained and analysed. Study population were selected by random sampling method of all ICU Areas.

Sample size taken was 120 ICU Nurses. In total 120 nurses in ICU a google questionnaire with some multiple choice questions related to hand hygiene practices & standard precautions & general infection control practices were provided. The responses were scored as percentage. Statistical package for social science (SPSS) & excel was used for statistical analysis. (1)

The nurses were divided into three categories based on their overall work experience. We have taken staff nurses having 0-3 years of work experience, senior staff nurses having 3-5 years of experience in their respective field. Nurse in charges who has the experience level of 5 – 10 years and lastly, supervisors having the experiences of more than ten years in nursing field.

**Results:**

In our study total 120 number of nursing professionals has appeared the questionnaire. The distribution of ICU nursing staffs as per their years of work experience. Where we found 54.16 % (65 staffs in numbers) with 0-3 years of work experience, 22.54 % (27 staffs in numbers) were with 3- 5 years of

experience, 15 % (18 nursing staffs) with 5- 1 years of experience and lastly, 8.3% (10 nursing staffs) has the experience of more than 10 years. (1)

**Table-1**

		Percentage of staffs
<b>Percentage of Nursing staffs with years of experience who has appeared the questionnaire</b>	0-3 years	54.16
	3-5 years	22.54
	5-10 years	15
	>10 years	8.3
	Total	100

**Table -2** shows how many number of nursing staffs scored how many percentages, here 52 nursing staffs has scored 80-100% who has appeared the questionnaire related to infection control practices, some of the questionnaire were stated below: 1. The Cause of hospital acquired infections? 2. When is hand hygiene recommended, 3. When there is a risk of splashes of body fluids and bloods what the healthcare workers should use to prevent the spreading of infections, 4. What is the single most effective method of preventing and controlling nosocomial infections etc. among 120 ICU Nurses 68 have scored below 80%.

**Table-2**

Number of staffs	Obtained scores in Percentage
1	.8
2	2.5
3	5.0
1	5.8
3	8.3
6	13.3
4	16.7
17	30.8
31	56.7
52	100.0
120	

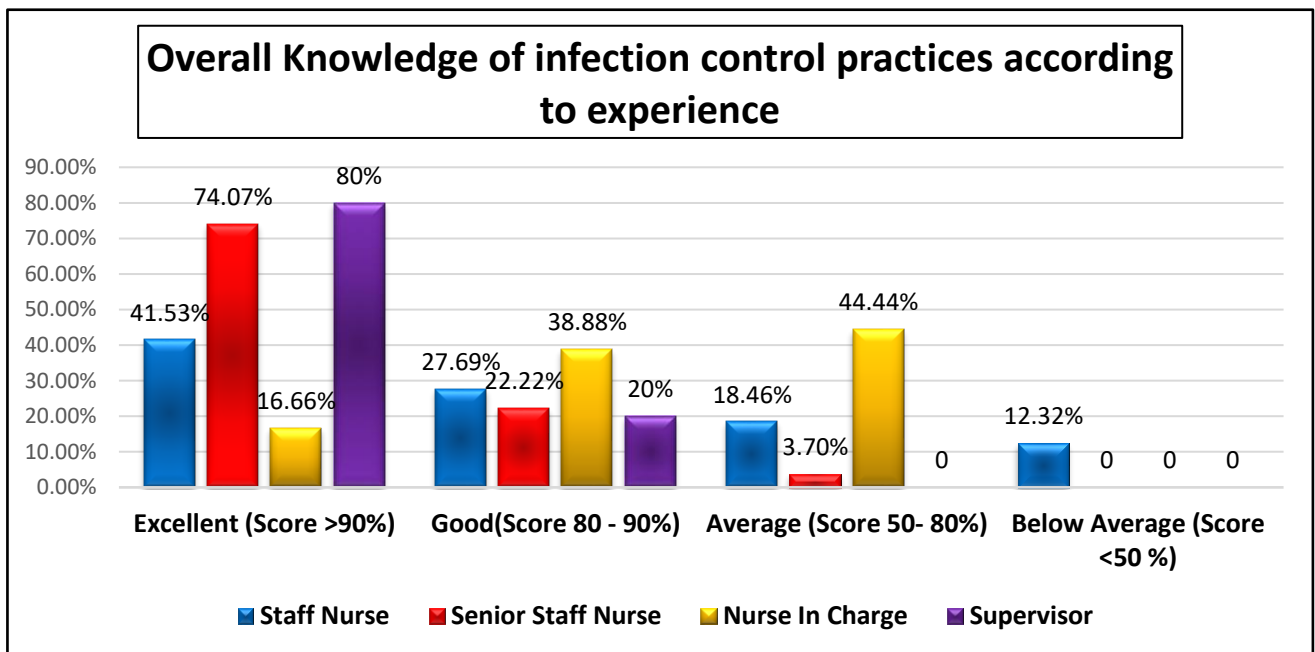
Table -3 shows the comprehensive awareness of infection control practices among the nursing professionals as per their year of work experience in the respective nursing field. The data in the below table was interpreted as Excellent when the positive responses to all those questionnaires were > 90%. Defined Good with the response of 80- 90 %, at the same time average with 50-80% and below average mostly who have scored < 50 % of the questionnaire.

Overall 53.07% nurses have excellent knowledge regarding infection control practices among whom 27 are staff nurses who have less than 3 years of experience or we can say they have only 6 months of work experience as per our study, 20 were senior staff nurses who have secured 74.07%, 3 were nursing in charges and 8 were nursing supervisors who have, more than 10 years of work experience and have

scored 100%. The overall Knowledge of infection control practices was good in 27.20% of the nurses among which 18 were staff nurses, 6 were senior staff nurses, whereas 7 were nursing in charge. 12.32% staffs have scored below average who were staff nurses and have joined recently having 4-5 months of work experience. More experience nurses had good knowledge of various infection control practices whereas nurses with less experience had average and below average knowledge.

**Table - 3**

Overall Knowledge of infection control practices according to experience					
Staff	Excellent (Score >90%)	Good(Score 80 - 90%)	Average (Score 50-80%)	Below Average (Score <50 %)	Total
Staff Nurse	27(41.53%)	18(27.69%)	12(18.46%)	8(12.32%)	65 Staff Nurses
Senior Staff Nurse	20(74.07%)	6(22.22%)	1(3.70%)	0	27 Senior Staff Nurses
Nurse In Charge	3(16.66%)	7(38.88%)	8(44.44%)	0	18 Nurse In charges
Supervisor	8(80%)	2(20%)	0	0	10 Nursing Supervisors



**Table - 4**

Department wise Overall Knowledge on infection control practices				
Department	Excellent (Score >90%)	Good(Score 80 - 90%)	Average (Score 50- 80%)	Below Average (Score <50 %)
HDU(5)	2(40%)	1(20%)	2(40%)	0
5TH ICU(17)	9(52.94%)	4(23.52%)	3(17.64%)	1(5.88%)
SCU(8)	2(25%)	4(50%)	1(12.5%)	1(12.5%)
PICU(1)	1(100%)	0	0	0

CICU(18)	7(38.88%)	11(61.11%)	0	0
CTVS ICU(23)	4(17.39%)	13(56.52%)	4(17.39%)	2(8.69%)
MICU-1(21)	9(42.85%)	9(42.85%)	1(4.76%)	2(9.52%)
MICU-2(9)	7(77.77%)	1(11.11%)	1(11.11%)	0
NHDU(7)	3(42.85%)	3(42.85%)	0	1(14.28%)
NICU(11)	6(54.54%)	3(27.27%)	2(18.18%)	0

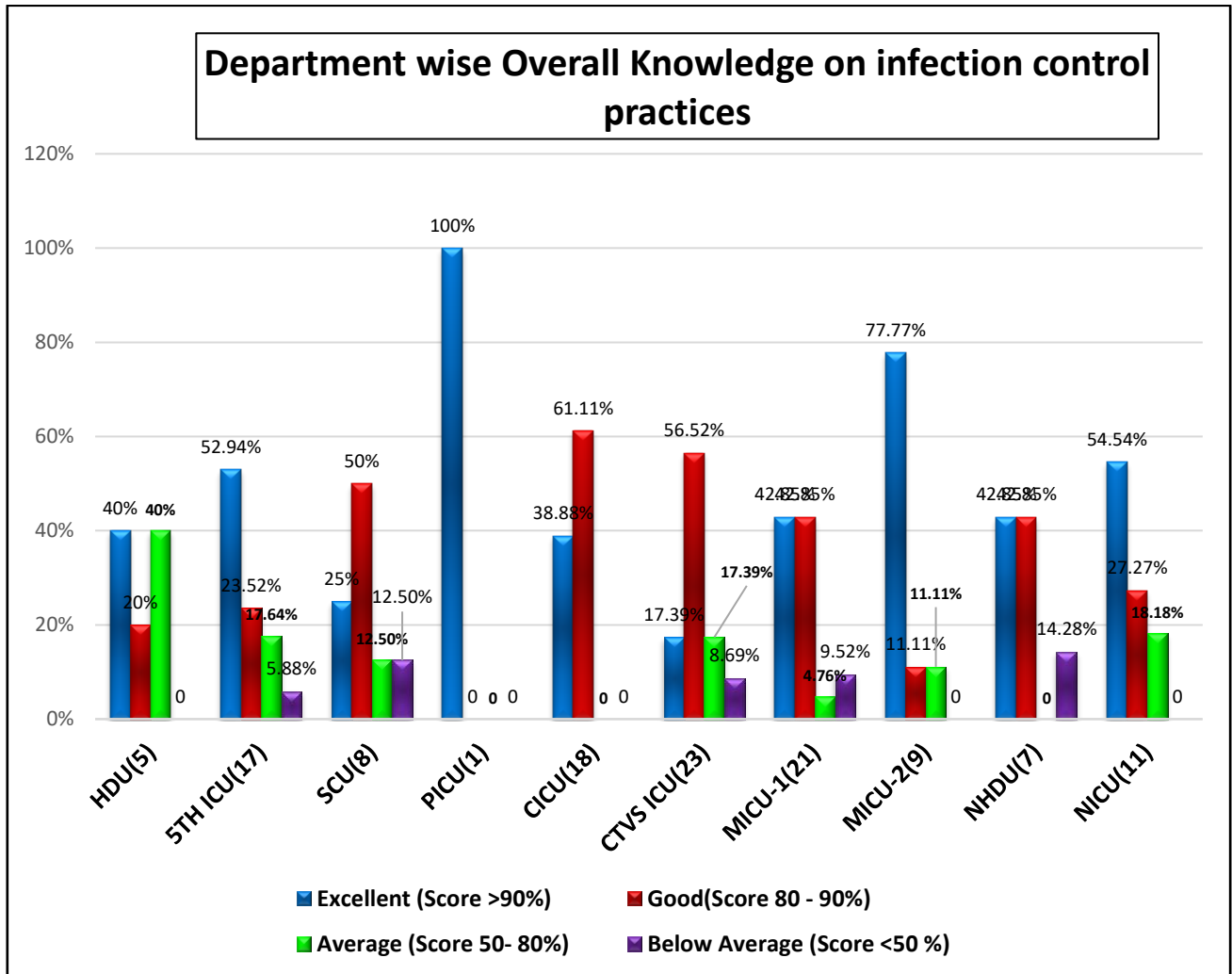


Table 4 presents the Department wise overall knowledge on various infection control practices. Where it has been found that NICU, PICU, MICU-1,2 nursing staffs has good knowledge about infection control practices.

**Discussion:**

In the present study more than 50% of the ICU Nurses has correctly answered over 80% of the questions related to important aspects of infection control practices as per WHO Guidelines. Among 120 ICU staffs we found knowledge related to hand hygiene was adequate whereas there was significant deficiency in the knowledge related to other standard precautions and definitions of healthcare associated infections. Approximately 65% of the staffs have scored lower in some of the definitions like



definition of healthcare associated infections, PPE full forms etc. along with standard precautions questionnaire.

“Various Studies have reported varying levels of knowledge regarding infection control in HCWs, and the proportion of HCWs who were aware of these practices ranged from 16—75%. A study of HCWs in Nepal reported that 16% of HCWs had knowledge of infection control. (13,1). A study in Jordan reported that 49.6% of HCWs had knowledge of infection control, whereas a study in India by Taneja et al. reported that 75.5% of staff nurses at a tertiary care hospital had knowledge of infection control.” (1,20,21).

Most previous studies recommended training to improve the infection control knowledge of HCWs (1). In our hospital setting there is a lot of focus on training is going on by our clinical instructors and as well as by our infection control nurses. In this study our scoring system and interpretation of those scores as excellent, good, average and below average was strict. We have considered more than 90% of scores as excellent. Nurses with more than 4 incorrect responses were considered to have poor knowledge related to various infection control practices. In our study experienced nurses( who have the experience of more than 7 years) scored more than the nurses who have joined recently or have less work experience. overall awareness of infection control practices among the nursing professionals as per their year of work experience in the respective nursing field. The data in the below table was interpreted as Excellent when the positive responses to all those questionnaires were > 90%. Defined Good with the response of 80- 90 %, at the same time average with 50-80% and below average mostly who have scored < 50 % of the questionnaire.

Overall 53.07% nurses have excellent knowledge regarding infection control practices among whom 27 are staff nurses who have less than 3 years of experience or we can say they have only 6 months of work experience as per our study, 20 were senior staff nurses who have secured 74.07%, 3 were nursing in charges and 8 were nursing supervisors who have, more than 10 years of work experience and have scored 100%. The overall Knowledge of infection control practices was good in 27.20% of the nurses among which 18 were staff nurses, 6 were senior staff nurses, whereas 7 were nursing in charge. 12.32% staffs have scored below average who were staff nurses and have joined recently having 4-5 months of work experience. More work experience nurses had good knowledge of various infection control practices whereas nurses with less work experience had average and below average knowledge. None of the nursing supervisors or nurses in charges were classified into average or below average category as they have scored excellent. This finding is in agreement with the study by “Suchitra JB, Lakshmi Devi N. Impact of education on knowledge, attitudes and practices among various categories of health care workers on nosocomial infections, which demonstrated that increased experience in a hospital was significantly correlated with increased knowledge, improved attitudes and the implementation of infection control practices among various categories of staff (7).” (1)

Even with such advances in healthcare system the threat of nosocomial (healthcare associated infections) infections remains. Hospital care givers and foremost leaders like nursing superintendent, infection control officer along with infection control nurses should strive to create an organisational atmosphere in which adherence to recommended infection control practices is considered to be an integral part of providing high quality health care. For all these hospitals must provide sufficient resources such as continuous education and training programme with knowledge and practices test with reward and recognitions. These training programmes should be continuous and designated according to the specific needs of each category of healthcare workers. The infection control team should be responsible for the

implementation of infection control guidelines, policies and procedure with training calendars by all healthcare personnel in the healthcare setting.

### Study Limitations:

Limitations of our study was that we have only taken few nurses as our samples which is 120 ICU Nursing staffs and the samples were not evenly distributed according to the experiences as per various departments. We have more junior staff nurses who have less experience and only 8-10 nurse in charge and supervisors who has more experience who have appeared the questionnaires.

In this study we have only focus to the knowledge level where as we didn't supervise the practices and training part of the nurses and totally relied on their subjective self-assessment in the questionnaire. Henceforth, the responses, may have been only knowledge based and may not have behaviour and practices towards various infection control practices. Therefore, the reported level of knowledge regarding such practices may not be accurate. Another limitation concerned to our study was that our questionnaire was not validated for the level of difficulty which may have led to incorrect result.

### Conclusion:

The study was conducted on nursing professionals who are working in all ICU Areas at a multispecialty hospital to assess their knowledge regarding various infection control practices. The study confirms that knowledge related to infection control practices among ICU nurses is fairly good but still there is a wide scope of improvement is needed. Regular educational training programmes related to infection control practices must be included in in house training schedules. Such training programmes should include the Execution of educational training programmes along with post training evaluation session to overcome any kind of shortcomings in the knowledge and practice of infection control practices by Health care providers. Mostly an organisation which adapt the culture that focuses on ground level training and handholding practices of the staffs related to prevent infection will definitely reduce the rate of hospital acquired infection in upcoming years.

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