

## Factors Influencing Adherence to Infection Control Measures Among Health Professionals

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### Original Research Article

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**Abstract:** Health care professionals whose duty it is to protect patients from acquiring infections while hospitalised or while in a health care set up. By maintaining an infection free environment, the patient's recovery will be promoted and high-quality nursing care will be delivered. The main purpose of this study was to identify the factors responsible for compliance of infection control measures among health professionals. A quantitative descriptive study was conducted at A.J. Institute of Medical sciences and research center hospital, Mangaluru. Data was collected from a total of 80 staff nurses and 70 other health professionals using the Self-developed validated self administered assessment tool. According to this study all, the participants reported that availability of infection control measures were adequate and reported adequate provision of protective materials.

**Keywords:** Adherence, Infection Control Measures, Health care professionals.

### INTRODUCTION

Medical treatment is intended to save life and enhance health, and all health workers have a responsibility to prevent transmission of health-care associated infections. Adherence to safe injection practices and related infection control is part of that responsibility it protects patients and health workers [1]. Hospital acquired infections (HAIs) pose a real and serious threat to both the patients and health care workers [2]. Infection control is a key component of practice for all healthcare professionals, not only for their health [3]. But also to reduce nosocomial infections [4, 5] and thus improve patient safety [6].

HCAI can be defined as an infection occurring in a patient during the process of care in a hospital or other healthcare facility which was not present or incubating at the time of admission [7]. According to the literature, healthcare associated infections (HAIs) remain as the most frequent adverse event in any healthcare delivery system and affect millions of people each year, leading to significant morbidity and mortality [8].

Data from American hospitals demonstrated that HAIs alone account for an estimated 1.7 million infections within a year. The same data additionally indicated 98,987 HAIs associated deaths; of these, 36.3% were for pneumonia, 31% for blood stream infections, 13.2% for urinary tract infections, 8.3% for surgical site infections, and 11.2% for infections of other sites [9].

A multi-center study conducted at twelve Indian intensive care units found an overall rate of 9.06 HAIs per 1000 intensive care days, which is close to the global average in high income countries [10].

However, there is considerable variability in infection rates at institutions across the country. Several single site studies have reported considerably higher HAI rates, with levels reaching between 25 and 40 infections per 1000 patient days [11].

At the national level, there has been growing recognition of the need for policy and guidance documents, and in 2016 the Indian Council of Medical Research released guidelines on infection prevention and control [12]. In addition, as part of the national Swachh Bharat Abhiyan (clean India mission) the National Health Mission launched Kayakalp (clean hospital initiative), which aims to promote and reward cleanliness, hygiene, and infection control practices in public healthcare facilities [13]. Despite these initiatives, the successful implementation of an infection prevention and control programme in Indian healthcare settings faces some important challenges, including insufficient funding and human resources, hospital overcrowding, and low nurse-to-patient ratios even in intensive care units [14 15].

Effective implementation of infection control practices is crucial to controlling the transmission of HAIs in settings with high infection rates [16]. Infection control measures include hand washing; use of barriers (gloves, gown, cap and mask); care with devices, equipment and clothing used during care; environmental control; adequate discarding of sharp instruments; and patient's accommodation in accordance to requirement levels as an infection transmission source [17]. Hand hygiene is most important among the infection control measures advocated [18, 19].

Compliance to infection prevention and control guidelines is critical to improving the quality of hospital care based on their efficacy in reducing the occurrence of infections that compromise patients' outcomes [17, 20]. Compliance is the level of precision and constancy in following prescribed standard protocols to achieve the desired outcomes [21].

Compliance is the level of precision and constancy in following prescribed standard protocols to achieve the desired outcomes [21]. Various factors can influence the level of compliance including cultural, economical and social factors. Adding to that, the level of individual's self-efficacy and knowledge can affect their level of compliance. Different studies revealed that following standard precautions reduced the exposure risk of blood and body fluids. Furthermore, they proved that compliance with standard precautions correlates with nurses' perception of risk, type of training received, their level of practice, and the nature of work setting [22-24].

According to the national and international literature, major reported factors that affect compliance with standard precautions include but not limited to lack of understanding and knowledge among healthcare workers [25, 26], shortage of time to implement the precautions (work overload), limited resources, lack of proper training, uncomfortable equipment, skin irritation, forgetfulness, distance from the necessary facilities, and insufficient support from management in creating a facilitating work environment [27-31].

Moreover, certain sociodemographic variables such as age, sex, job category, marital status, working site in the hospital and work experience were found to be associated with compliance with standard precautions [32, 33]. A recent meta-analysis found that over ninety-five percent intervention compliance is required to reduce central line-associated bloodstream infections [16]. While the necessary rate of compliance is not known for other infections, all infection control

interventions are complex, multifaceted, and challenging to sustain [34].

Despite the risks of blood splash and the establishment of guidelines around the world, compliance rates with infection control measures, especially protective eye wear, is less than 100% in all clinical settings. An American study observed 88 emergency department personnel with a video camera. Of the 304 procedures observed, 22% were undertaken with inadequate protective eye wear and 32.2% without a mask [35]. In Hong Kong, only 25.4% of 306 nurses sampled who were working in an acute hospital used protective eyewear when they anticipated a blood splash. In a study, compliance with gloves, gowns/aprons and face masks was relatively higher than for goggles/face shield, rates being 79%, 44.9% and 46.7% respectively [22]. In a North Indian study of seven participating hospitals, the results were very similar, with compliance rates with protective eyewear, gloves and masks being 32.4%, 67.6% and 58.7% respectively [36]. Factors affecting nurses' noncompliance with standard precautions showed that two fifth (40%) of the sample recorded lack of supplies and equipment, around one third (29.1%) of them forgot to use, and 23.6% viewed compliance with standard precautions as time consuming [37]. In another study factors preventing the practice of standard precautions revealed that, 66.1%, identified lack of appropriate or adequate resources to practice standard precautions, 52.4% lack of regular training on infection control, 38.9% lack of an infection prevention and control committee and 34.8% excess workload as the major challenges preventing routine practice of standard precautions [38].

Many researchers focused on the factors that contribute to non-compliance with Standard Precautions. Reported factors were lack of knowledge [39, 40], lack of time [39, 41, 42], lack of means [39, 40], negative influence of the equipment on nursing skills [41-45], uncomfortable equipment [46], skin irritation, lack of training [23], conflict between the need to provide care and self-protection [23] and distance to necessary equipment or facility [40].

In order for infection prevention measures to be successful, barriers to effective implementation must be identified and overcome [38]. Nurses are involved in more contact with patients than other health care workers (HCWs). Therefore, they are more exposed to various HAIs [47]. Hence, nurses play a vital role in preventing HAIs, and their compliance with infection control measures seems to be necessary for preventing and controlling HAIs [46].

## STUDY OBJECTIVE

- To find out the factors responsible for compliance of infection control measures among health professionals.

## SIGNIFICANCE OF THE STUDY

Adherence of infection control measures among health care professionals will help to reduce the rate of health-care associated infections. At the organizational level this will help in development of preventive interventions among health care professionals.

## MATERIALS & METHODS

### Design

A descriptive cross-sectional research design was used in the current study.

### Source of data

Health professionals - Nurses, physicians, surgeons, interns and post graduates of A.J. Institute of Medical sciences and research centre hospital, Mangaluru of all age groups. Participants were selected by purposive sampling from medical, surgical and orthopedic wards.

### Inclusion criteria

- All health professionals including nurses, physicians, interns and post graduates.

### Exclusion criteria

- Health professionals not willing to participate in the study.

### Sample

Health professionals-

- Staff Nurses-80
- Others-70

## METHOD OF COLLECTION OF DATA

Data was collected in the form of self-reporting questionnaire Instruments.

### Part I

Characteristics of health professionals such as socio demographic information including age, gender, discipline, area of work, Professional experience, work shift and the attendance of previous training concerning the infection control.

### Part II

Rating scale on Factors responsible for compliance of infection control measures among health professionals Composed of four sections with (26

items): hand hygiene (3 items) PPE (3), injection (4 items), disinfection (3 items), waste disposal (6 items) and prevention programmes (6 items). The scores were represented in three points rating scale ranging from (2-0); 2 = fully available, 1- available to some extent, and 0= not available. The reliability was confirmed by Cronbach's alpha coefficient (0.84).

## PILOT STUDY

A pilot study was carried out on Health professionals to test the clarity, completeness, the objectivity of the study tools and also, to determine the time required to complete the data collection. According to the results of the pilot study, necessary modification, omissions and/or additions were performed.

## ETHICAL CONSIDERATION

Permission to conduct the study was obtained from the study administrative authorities and confidentiality was assured. It was emphasized to all health professionals included in the study that, their participation will be voluntary and they were assured about the anonymity and the confidentiality of their replies. Written consent was obtained from health professionals who accepted to take part in the study.

## METHODS

Once permission was granted to proceed in the current study, the researchers initiated the data collection. The purpose and nature of the study were explained by the researchers for the health professionals included in the study. All health professionals were asked to complete self administered questionnaire.

## RESULTS

Table-1 shows sociodemographic characteristics and professional characteristics for participants. It demonstrates that majority (86.3%) of staff nurses and (75.7%) of other health professionals were (20-30) years old. All (100%) staff nurses and (74.3%) of other health professionals were females. Majority 55(68.8%) of staff nurses and (82.9%) of other health professionals were working in surgical wards. A higher proportion 62(77.5%) of staff nurses had 1-3 years of professional experience. Most 70(87.5%) of the staff nurses were working on alternative shifts where as majority (74.3%) of other health professionals were working on long shifts. Most (98.8%) of the staff nurses had attended one day infection control training programme where as only 27.1% of other health professionals attended one day infection control training programme .

**Table-1: Frequency and Percentage of Demographic Data**

Variables	Staff nurses	Other health professionals
	Frequency (%)	Frequency (%)
<b>Age(in years)</b>		
20-30	69(86.3%)	53(75.7%)
31-40	7(8.7%)	17(24.3%)
41-50	4(5%)	0
50 & above	0	0
<b>Gender</b>		
Male	0	18(25.7%)
Female	80(100%)	52(74.3%)
<b>Discipline</b>		
Staff nurses	80(100%)	11(15.7%)
Surgeons	0	24(34.3%)
Interns	0	35(50%)
Post graduates	0	
<b>Area Work</b>		
Medical	0	6(8.6%)
Surgical	55(68.8%)	58(82.8%)
Ortho	25(31.3%)	6(8.6%)
<b>Professional Experience</b>		
<1year	18(22.5%)	35(50%)
1-3years	62(77.5%)	30(42.85%)
3-6years	0	5(7.15%)
	0	0
<b>Work shift</b>		
Long Day	8(10%)	52(74.3%)
Night Shift	2(2.5%)	10(14.3%)
Alternating Shifts	70(87.5%)	8(11.4%)
<b>Participation in Infection control training</b>		
One Day	79(98.8%)	19(27.1%)
Two Days	1(1.3%)	0
Three Days	0	0
More than three Days	0	0
None	0	51(72.9%)
<b>How Long ago</b>		
0-6months	72(90%)	16(22.9%)
6months-1year	8(10%)	3(4.2%)
More than 1 year ago	0	0
Not Applicable	0	51(72.9%)

Results in Table-2 shows that all, the staff nurses and other health professionals agreed that there were adequate infection control measures.

**Table-2: Frequency and Percentage distribution of Adequacy of Infection Control Measures**

Grading	Staff nurses	Other health professionals
	F (%)	F (%)
Adequate(27-52)	80(100)	70(100)
Inadequate(0-26)	00	00

Results presented in Table-3 reveals that all the health facilities were observed for the necessary supplies needed to implement infection control measures. The most available item was Soap/soap

solution at washing points, while the least available item was protective eye wears.

Seventy percent of nurses and 82.8% of other Health professionals who stated that Soap/soap solution at washing points were available and 50% of staff nurses and 74.3% other Health professionals reported that sources for flow of water was available and 56% of staff nurses and 82.8% other Health professionals them said that Alcohol based hand solution were available fully. Similarly, more than half of staff nurses and other Health professionals stated that gloves and face mask were adequate and protective eye wears were inadequate.

Fifty three point eight percent of staff nurses and 75.7% of other health professionals agreed that there were adequate Single use Injection syringes. More than half of staff nurses and most of other Health professionals reported that Sharp disposal container, Puncture proof water resistant container and Sharp injury log were available in the unit. More than half of staff nurses and most of other Health professionals agreed that there were adequate Disinfection facilities available in the units.

**Table-3: Frequency and Percentage Availability of Infection Control Measures**

Items	Not Available		Available to some extent		Available fully	
	Staff nurses	Other health professionals	Staff nurses	Other health professionals	Staff nurses	Other health professionals
	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)
<b>Hand hygiene:</b>						
Soap/soap solution at washing points	0(0%)	4(5.8 %)	24(30%)	8(11.4%)	56(70%)	58(82.8%)
Sources for flow of water	8(10%)	8(11.4%)	32(40%)	10(14.3%)	40(50%)	52(74.3%)
Alcohol based hand solution	4(5%)	4(5.8 %)	31(38.8%)	8(11.4%)	45(56.3%)	58(82.8%)
<b>PPE:</b>						
Disposable glove	1(1.3%)	11(15.7%)	35(43.8%)	8(11.4%)	44(55%)	51(72.9%)
Face masks	6(7.5%)	11(15.7%)	32(40%)	17(24.3%)	42(52.5%)	42(60%)
Protective eye wear	56(70%)	58(82.8%)	24(30%)	8(11.4%)	0(0%)	4(5.8 %)
<b>Injection:</b>						
Single use Injection	3(3.8%)	6(8.6%)	34(42.5%)	11(15.7%)	43(53.8%)	53(75.7%)
Sharp disposal container	0(0%)	1(1.5%)	33(41.3%)	11(15.7%)	47(58.8%)	58(82.8%)
Puncture proof water resistant container	6(7.5%)	3(4.2%)	25(31.3%)	5(7.2%)	49(61.3%)	62(88.6%)
Sharp injury log	4(5%)	8(11.4%)	35(43.8%)	11(15.7%)	41(51.3%)	51(72.9%)
<b>Disinfection:</b>						
Functional autoclave	5(6.3%)	0(0%)	34(42.5%)	8(11.4%)	41(51.3%)	62(88.6%)
Disinfection of surfaces	0(0%)	6(8.6%)	28(35%)	11(15.7%)	52(65%)	53(75.7%)
Disinfection of instruments in units	9(11.3%)	2(2.8%)	23(28.8%)	17(24.3%)	48(60%)	51(72.9%)

Data in Table-4 shows more than half of staff nurses and most of other Health professionals agreed that there were adequate Waste disposal facilities available in the units Similarly, most of staff nurses

and other Health professionals stated that there were adequate infection control training programmes, Policies on infection control prevention and periodic assessment of compliance of protocol.

**Table-4: Frequency and Percentage Availability of Infection Control Measures**

Items	Not Available		Available to some extent		Available fully	
	Staff nurses	Other health professionals	Staff nurses	Other health professionals	Staff nurses	Other health professionals
	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)
<b>Waste disposal:</b>						
Colour coded plastic bags	3(3.8%)	3(4.2%)	31(38.8%)	5(7.2%)	46(57.5%)	62(88.6%)
Container with secure lid	12(15%)	3(4.2%)	23(28.8%)	16(22.9%)	45(56.3%)	51(72.9%)
Safety signs for hazardous waste container	5(6.3%)	8(11.4%)	21(26.3%)	11(15.7%)	54(67.5%)	51(72.9%)
Sterile gloves for Waste disposal	2(2.5%)	3(4.2%)	15(18.8%)	5(7.2%)	63(78.8%)	62(88.6%)
Incinerator	4(5%)	6(7.5%)	38(47.5%)	11(15.7%)	38(47.5%)	53(75.7%)
Waste pit	0(0%)	11(15.7%)	34(42.5%)	8(11.4%)	46(57.5%)	51(72.9%)
<b>Prevention programmes:</b>						
Qualified individual responsible for infection control system	3(3.8%)	3(4.2%)	28(35%)	5(7.2%)	49(61.3%)	62(88.6%)
Periodic assessment of compliance of protocol	10(12.5%)	0(0%)	20(25%)	8(11.4%)	50(62.5%)	62(88.6%)
Assessment protocol for staff infection control	6(7.5%)	11(15.7%)	25(31.3%)	6(7.2%)	49(61.3%)	53(75.7%)
Periodic training programme	1(1.3%)	8(11.4%)	20(25%)	11(15.7%)	59(73.8%)	51(72.9%)
Policies on infection control prevention	9(11.3%)	1(1.5%)	25(31.3%)	11(15.7%)	46(57.5%)	58(82.8%)
Respiratory protection programme	7(8.8%)	1(1.5%)	21(26.3%)	11(15.7%)	52(65%)	58(82.8%)
Screening of staff infection	6(7.5%)	11(15.7%)	25(31.3%)	8(11.4%)	49(61.3%)	51(72.9%)

## DISCUSSION

According to this study all, the participants reported that availability of infection control measures were adequate and reported adequate provision of protective materials. Availability of supplies and awareness programs increase compliance on standard precautions. This differed significantly from the study conducted which found that only 56.4% of the respondents strongly agreed that their departments has a running water source, 27.1% of the respondents strongly agreed that the departments in which they worked had adequate supply of soap or detergents for washing hands, table 15% of the respondents strongly agreed that they received training on waste segregation, 27.1% of the respondents strongly agreed that there was adequate supply of color-coded dust bins to aid in waste segregation, Majority of the departments had adequate supply of needles and

syringes [48]. Nigerian study found that the main factors influencing non-adherence to preventive measures among professionals were: lack of PPE, carelessness, lack of informative pamphlets on the SP, low perception of risk for blood borne pathogens, lack of time, loss of the technical ability to use PPE and uncooperative patients [49].

In another study investigator SP. Jawaid *et al.*, [12] listed five factors to improve compliance level including availability of equipment, time, ability to remind to comply, applicability, and sufficient knowledge about standard precautions, isolation technique and proper waste disposal [50]. Therefore, it is important to instill good infection control practices through education and supervised practice from the very beginning, before incorrect practice develops into a habit and increase their awareness of PPE to avoid



exposure to blood borne pathogens. Additionally, the other study revealed that majority of respondents reported that non availability of the equipments was a major reason for noncompliance to standard precautions. [51].

## CONCLUSIONS

The study investigated the Factors responsible for compliance of infection control measures among health professionals and concludes there are adequate infection control measures are available in the hospital. Finally, the study revealed that the Infection prevention and control committee in the hospital is active and many workers do have access to policies on infection prevention and control. Proper hospital infection control and monitoring system, adequate provision of well trained manpower with continued education of the staff on importance of hand hygiene may reduce the rates of hospital acquired infections.

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