



## Original article

# Correlation between health professionals' knowledge, attitude and practice about infection control measures

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### Abstract

Infection control measures are recommended to prevent transmission of infection in hospitals. However, their implementation is dependent on the knowledge and attitudes of healthcare workers (HCW). This study describes health workers knowledge and practice compliance and attitude regarding infection control measures among health care workers. A cross-sectional study was undertaken among health care workers at A. J. Hospital and Research Center, Mangaluru. A total of 80 staff nurses were selected by purposive sampling from medical, surgical and orthopedic wards. Data was collected via a structured self-administered questionnaire assessing knowledge and practice compliance and attitude regarding infection control measures. There was a linear correlation between knowledge and attitude; and knowledge and practice scores. Overall, there was no correlation between attitude and practice scores of individuals.

**Key words:** Attitude, Health Professionals, Infection control measures, Knowledge, Practice

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Infection prevention is a systematic effort or process of placing barrier between vulnerable host and the microorganisms. Infection control also refers to all or any strategies, techniques and activities that aim to prevent or minimize the chance of transmission of infectious disease at health care facility<sup>1</sup>. Inadequate infection control favors the spread of microorganisms in healthcare facilities that might cause healthcare-associated infections (HAI)<sup>2</sup>. Health care-associated infection is "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"<sup>3</sup>.

As per the WHO, 7.1 million instances of HAI happen each year. One out of each 20 individuals suf-

fers from nosocomial infection. This leads to 99,000 cases of death every year<sup>4</sup>. HAIs aggravate the patient's general health status, leading to extra prescription of antibiotics, resulting in inflated costs for patients and also the healthcare system, in addition to antibiotic resistance<sup>5</sup>. It has been estimated that the prevalence of HCAI in developed and developing countries is 7.6% and 10.1% respectively<sup>2,5</sup>. In an individual healthcare facility, staff practice, which is driven by their knowledge and attitudes, plays a decisive role in the accomplishment of infection control programmes<sup>6</sup>.

An important determinant of the high burden of HAIs is paucity of knowledge and lack of application of basic infection control measures<sup>7</sup>. HAIs

have vital consequences on patients, their families, and the community in general. The foremost common consequences of HAIs are increased morbidity, mortality, and length of hospitalization<sup>7,8</sup>. Such outcomes contribute considerably to raise both the direct and indirect cost of the health care services that lead to extra expenses to treat infected cases.

The components that can limit the danger of HAI incorporate the precise treatment of patients, avoiding prolonged length of hospital stay, the utilization of antibiotics, the utilization of suction catheters, hand washing by human services work force, and the use of sterilization techniques in therapeutic procedures<sup>9</sup>. One of the major reasons for these high rate HCAIs is the lack of infection control programs, which have been neglected due to limited resources, competing priorities, and other barriers<sup>7</sup>.

The avoidance of HAI expects consideration regarding three elements: knowledge, attitude and practice<sup>10</sup>. For the occurrence of a behavior, the presence of such factors as inspiration and feeling is fundamental. An appraisal of the information, attitude and practice of infection control measures by healthcare workers is an essential for starting and executing a fruitful infection prevention and control strategy in any health facility. Longer period of professional skilled expertise, information and training in standard precautions, and high risk perception have all been associated with improved compliance with standard precautions among health workers<sup>11,12</sup>.

A study conducted in Nigeria showed that among the 290 study participants, knowledge scores positively correlated with attitude scores (Spearman rho = 0.4,  $p < 0.0001$ ) but there was no significant correlation when practice scores were compared with percentage knowledge or attitude scores ( $p > 0.05$ ). Percentage knowledge scores positively correlated with attitude scores among doctors ( $r = 0.39$ ,  $p < 0.0001$ ), nurses ( $r = 0.398$ ,  $p < 0.0001$ ) and MLS ( $r = 0.44$ ,  $p < 0.013$ )<sup>13</sup>. As individuals from the health care team, staff nurses assume a critical job in HAI control. Nurses must have adequate knowledge and important skills in this field. The findings of a study done by Ghanbari et al<sup>14</sup> on 130 staff nurses demonstrated that most nurses don't have adequate information and practice regarding prevention of nosocomial infection. The outcomes additionally demonstrated that their practice relied upon working pressure, time and access to resources. The observation of health procedures is subsequently the most essential health principle and the most fundamental health behavior<sup>15</sup>.

The majority of studies from around the world have reported higher compliance with standard precautions among nurses than doctors<sup>16-21</sup>, but a few others have not<sup>11,22-24</sup>. A recent study in Jamaica highlights that though the healthcare workers are aware of the risk of transmission of infection, the compliance with universal precautions was inadequate and recommended a need for an improvement in knowledge and practice with clear guidelines and a comprehensive programme to educate HCWs regarding compliance with universal precautions<sup>25</sup>. In an individual healthcare facility, staff practice, which is driven by their knowledge and attitudes, plays a decisive role in the success of infection control programmes<sup>6</sup>.

Hence, nurses play a vital role in transmitting HAIs, and their compliance with infection control measures seems to be necessary for preventing and controlling HAIs<sup>26</sup>. Accordingly, they should be aware of how to prevent transmission of NIs and be knowledgeable of its potential risk to patients, other staff, and as visitors. This study was conducted to find the relationship between health professionals' knowledge and practice compliance and attitude regarding infection control measures in order to improve the current training courses and enhance future good practice. The results of this study could guide the development and implementation of infection prevention and control activities in the study sites similarly in other health facilities.

## Materials and methods

The study was a descriptive cross-sectional survey conducted among 80 staff nurses working at a 1550-bedded A. J. Hospital and Research Center, Mangaluru. The participants were selected by purposive sampling from medical, surgical and orthopedic wards. The only exclusion criterion was reluctance to participate in the study.

*Tools for data collection:* It included three tools which were designed by the researchers in an English language after reviewing of the related literature. These tools were comprised of the following parts:-

### Tool I: Knowledge questionnaire

- Part 1: Characteristics of health professionals such as demographic information including age, gender, discipline, area of work, Professional experience, work shift and the attendance of previous training concerning the infection control.
- Part 2: Knowledge questionnaire, including 7 areas with 41 items about the Concept of infection

control (5 items), prevention of blood stream infection (6 items), prevention of Urinary tract infection (7 items) and prevention of surgical site infection (7 items), hand washing (6 items), protective personal equipment (4 items) and transmission of infection (4 items); each correct answer to the items was scored 1 and each wrong answer was scored zero.

**Tool II:** Observational checklists to assess health professionals' practices regarding the infection control measures. The nurses' actual practices were assessed by using the 2 checklists namely self reported rating scale and direct observation check list. Self reported rating scale included 9 areas with 46 items measuring individual practice in relation to the hand hygiene (15 items), use of protective personal equipment (5 items), prevention of Urinary tract infection (8 items), prevention of surgical site infection (14 items), prevention of blood stream infection (4 items), notification (3 items), biomedical waste management (3 items), spill management (3 items) and handling linen (2 items); direct observation check list 6 areas with 20 items measuring individual practice in relation to compliance to hand wash (5 items), use of mask (1 items), use of gown (1 items), care of sharp instruments (2 items), biomedical waste management (3 items) and use of glove (8 items).

**Tool III:** Attitude scale, including 26 items. The attitude was rated on a 5-point Likert scale from 1 to 5 (Strongly disagree=1, Disagree=2, Neutral=3, Agree=4, Strongly agree= 5).

**Pilot study:** A pilot study was carried out on 10 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:** This study was conducted after obtaining approval from the Institutional Ethical committee. 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 also; 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:** The investigators explained the purpose of the study to respondents and obtained their consent before the questionnaire was filled anon-

ymously by the respondents and returned within 1 h or when not possible, at the end of the day's work. As regards to the observational checklist it was assessed by the researchers throughout their daily work.

**Statistical analysis:** The collected data were organized, tabulated and statistically analyzed using SPSS version 19. Pearson's, correlation coefficient, tested the relations between variables

## Results

**Table 1:** Frequency and percentage of demographic variables

Variables	Staff nurses n (%)
<b>Age(years)</b>	
20-30	69 (86.3%)
31-40	7 (8.7%)
41-50	4 (5%)
50 & above	-
<b>Gender</b>	
Male	-
Female	80 (100%)
<b>Area work</b>	
Medical	-
Surgical	55 (68.8%)
Orthopedics	25 (31.3%)
<b>Professional experience</b>	
<1year	18 (22.5%)
1-3years	62 (77.5%)
3-6years	-
>6 years	-
<b>Work shift</b>	
Long day	8 (10%)
Night shift	2 (2.5%)
Alternating shifts	70 (87.5%)
<b>Participation in infection control training</b>	
One day	79 (98.8%)
Two days	1 (1.3%)
Three days	-
More than three days	-
None	-
<b>How long ago</b>	
0-6 months	72(90%)
6 months-1year	8(10%)
More than 1 year ago	-
Not applicable	-

**Table 2:** Shows summary of descriptive statistics for the sample knowledge, attitude and practice scores

	Knowledge	Attitude	Self reported practice	Observed practice
Maximum score	41	130	94	100
Mean $\pm$ SD	15 $\pm$ 9.92	94.12 $\pm$ 14.18	72.02 $\pm$ 2.78	68.9 $\pm$ 16.3
Median	15.5	96	78	64
Range	0-39	58-118	63-87	40-98

Table 1 shows socio demographic characteristics and professional characteristics for participants. It demonstrates that majority (86.3%) of staff nurses were (20-30) years old. All (100%) staff nurses were females and majority 55 (68.8%) 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 and most (98.8%) of the staff nurses had attended one day infection control training program.

**Table 3:** Frequency and percentage of staff nurses level of knowledge, attitude and practice scores

Variables	Level	Staff nurses (n=80)		
		n	%	Mean $\pm$ SD
Knowledge	Good	3	3.75	
	Average	41	51.25	15 $\pm$ 9.92
	Poor	36	45	
Self reported practice	Good	33	41.25	
	Average	47	58.75	72.02 $\pm$ 2.78
	Poor	-	-	
Observed practice	Good	25	31.25	
	Average	55	68.75	68.9 $\pm$ 16.3
	Poor	-	-	
Attitude	Negative	22	27.50	
	Positive	58	72.50	94.12 $\pm$ 14.18

Table 2 records the descriptive statistics for the sample knowledge, attitudes and practices scores. The knowledge score show a mean of 15 $\pm$ 9.92, median of 15.5, in a range of 0-39. It therefore indicates that nurses have inadequate knowledge on infection prevention and control. The attitude score show a mean of 94.12 $\pm$ 14.18 and a median of 96 in a range of 58-118. It therefore indicates that the nurses have positive attitudes towards infection prevention and control. The self reported

practice score show a mean of 72.02 $\pm$ 2.78 and a median of 78, in a range of 63-87 and observed practice score mean was 68.9 $\pm$ 16.3 and a median of 64, in a range of 40-98. It therefore indicates that the nurses' practices were average with regard to infection prevention and control.

Table 3 shows that majority of staff nurses had average knowledge scores (51.25%), self reported practice scores (58.75%) and observed practice scores (68.75%) whereas majority (72.50%) of staff nurses had positive attitude scores (51.25%) with regard to infection prevention and control.

**Table 4:** Correlation between knowledge and infection control practice scores

	Mean knowledge	Mean attitude	Mean practice
Mean knowledge	1	0.161	0.146
Mean attitude	0.161	1	0.038
Mean practice	0.146	0.038	1

Table 4 shows that there was a linear correlation between knowledge and attitude ( $r = 0.161, p < 0.05$ ), and knowledge and practice scores ( $r = 0.146, p < 0.05$ ). Overall, there was no correlation between attitude and practice scores of individuals with regard to infection prevention and control.

## Discussion

The results of current study revealed that majority of staff nurses had average knowledge scores (51.25%), self reported practice scores (58.75%) and observed practice scores (68.75%) whereas majority (72.50%) of staff nurses had positive attitude scores (51.25%) with regard to infection prevention and control.

The findings of this study are similar with the results of other studies in which staff nurses had average knowledge and practice<sup>12,27,28</sup>. Other studies demonstrated that staff nurses had poor knowledge<sup>29,30</sup>. Where as in other studies, staff nurses had a very good knowledge and good practice of infection control<sup>31-34</sup>.

In the current study there was a linear correlation between knowledge and attitude ( $r = 0.161, p < 0.05$ ), and knowledge and practice scores ( $r = 0.146, p < 0.05$ ). Overall, there was no correlation between attitude and practice scores of individuals with regard to infection prevention and control. The study findings are not consistent with findings of other studies where there was a strong correlation between knowledge and attitude regarding standard and isolation precautions and significant relationship between knowledge and practice<sup>12,35-39</sup>.

The finding of linear correlation between knowledge and practice suggests knowledge does not always translate into good practice. Lack of resources, excess workload and time constraint have been reported as major factors influencing the poor practice of infection control in healthcare facilities. This might be the fact that those haven't ever taken training would be less likely to get updated information, which hinders updating their knowledge on infection prevention.

### Conclusion

According to the results, majority of nurses had an average knowledge and practice, positive attitude about infection control. Therefore, it is necessary that staff nurses should be trained about the prevention of hospital acquired infection based on successful educational models.

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**Conflict of interest:** None

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