

## Knowledge and Attitude towards Infection Prevention at a Newly Established Hospital

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**Abstract: Objective:** Health care associated infections are those infections that patients acquire in hospitals during their treatment and health care workers are important source for it. The study was designed to evaluate the knowledge and attitude of Health care workers towards infection control.

**Materials & Methods:** A cross sectional study conducted from December 2019 to February 2020 at NIBD & BMT. Approval was taken from NIBD Research Committee. A pre-designed questionnaire was given to staff that had given informed consent. The questionnaire was composed of two parts. The first part comprised of sociodemographic information and the second part comprising 37 questions of knowledge and 11 question of attitude. Data was analyzed by SPSS version 23. Frequencies and percentages were calculated for categorical variables and mean for quantitative data. Chi-square test was used for association with level of significance as P-value <0.05.

**Results:** A total of 82 health care professionals were interviewed. Out of which 49(60%) were male. The mean age of participants was 28.87 ± 6.4 years. Majority of staff had graduate or above graduate education 40(49%). The overall mean knowledge score was found below average with mean of 18.3±12.3. The mean knowledge scores between age groups (p=0.786), gender (p=0.760) and department (p=0.360) were not found significant. Knowledge score was significantly different among educations level (p= <0.001). 71% were found to have good attitude. Educational status was associated with attitude (p<0.001).

**Conclusion:** Our findings revealed below average knowledge however, attitude was found satisfactory. It is the need of time to organize training and educational sessions in order to minimize the rate of infection for the betterment of health care professionals and patients.

**Keywords:** Healthcare associated infection, Infection control, Knowledge and practices, Attitude towards infection control, Healthcare workers, Pakistan.

### INTRODUCTION

Health Care Associated Infection (HCAI) is one of the major dilemma encountered by developed and under developed countries. It is one of the important cause of increased morbidity and mortality along with great burden on hospital expenditures [1]. The term HCAs denotes the infections not present initially but acquired by patients during treatment or other health care facilities at the hospital. The average rate of occurrence of HCAs in developed countries is 15% however in developing countries it is reported to be 37% [2]. In USA, death rate due to HCAs has been reported to be around 40,000 to 80,000 per annum increasing the hospital expenses to about 4.5 billion US Dollars (USD) [3]. In a European study, the occurrence rate of hospital acquired respiratory infection was 7.59% that develops during 48 hours or more after hospitalization or within 30 days after receiving health care services [4]. While in Southeast Asia the occurrence rate of HCAs was 9.0% [5]. A study in Qatar accounted the rate of HCAs to be 5-10% in admitted patents i.e. out of every 20

patients 1 patient had developed HCAs [1].

Pakistan being a resource constraint under developed region is encountering dual burden of communicable and non-communicable diseases which increases the infectious disease rate as high as 40% in comparison with the developed countries [6]. A study from Hyderabad, reported the overall rate of HCAs of about 29.13% including 39.1% urinary tract infections, 30.15% respiratory tract infections, 23.7% blood stream infections and other 7.1% were skin, soft tissues, wounds and gastro intestinal infections [7]. The risk of infection is not substantially restricted to patients only but, the workers directly or indirectly involved in patient care are also at risk of acquiring infection [1].

Poor compliance with hand hygiene is considered as the most important source to acquire infection [8]. Infection control measures were initially focused at regional level but now-a-days HCAs prevention is discussed worldwide [9]. Knowledge and attitude towards the use of personal protective equipment (PPE) and hand hygiene vary among the staff which leads to varying risk of infection acquisition. Health

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care workers (HCWs) are main source of harboring and spreading infections due to compliance issues of proper hand washing protocols and use of PPEs. Thus, the international guidelines for hand washing are effective way to minimize the incidence of HCAs [10]. There is ample literature in this context to prove the significance of hand hygiene and thus if put into practice can limit the risk of transmission of infection at health care organizations [11].

Our study was designed to evaluate the knowledge and attitude among health professionals towards the basic infection control measures at our newly developed hospital in order to formulate policies and raise awareness for infection prevention among the staff to reduce HCAs in future.

## MATERIALS AND METHODS

The study was conducted as a cross-sectional study at National Institute of Blood Disease & Bone Marrow Transplantation (NIBD & BMT), PECHS Karachi, Pakistan, established in February 2018. Healthcare staffs at our hospital that are directly or indirectly part of patient care were given a questionnaire to evaluate knowledge and attitude towards infection control. For housekeeping department, maintenance, canteen department and staff who were not comfortable and finding difficulty, a clinical research associate interviewed them in a simple language to get the accurate response. However, questionnaire was distributed to doctors, pharmacist, nurses and other healthcare team who were comfortable to fill the questionnaire by their self. Approval was taken from NIBD Research Committee and the study adhered to declaration of Helsinki. Data was collected during the time frame of 03 months, from December 2019 to February 2020. Informed consent was taken prior the enrollment of participants in the study. A questionnaire was created by the infection control team and research team of our hospital. The questionnaire was composed of two parts. The first part comprised of 10 demographics questions including name, age, gender, education, department, religion and marital status, duty hours, employment duration and experience. The second part comprised of questions to evaluate knowledge and attitude. Knowledge was assessed by 37 closed ended questions in which 17 questions were given with the yes and no options and rest of the questions were given with the one correct and up to 4 incorrect answers. For every correct answer, a score of 01 and for incorrect answer, 0 score was given. Knowledge was graded according to the scores achieved; ranged from 0 to 37 in which excellent knowledge was considered for score >35, good knowledge 29-34, average knowledge 20-28 and below average knowledge was <20. Attitude was assessed by 11 questions consisting of yes and no option. Frequency and percentages were calculated to observe the good and negligible attitude. Participants who were following 70-100% infection control practices were

considered as good attitude and who were following <70% infection control practices, they needed improvement in attitude towards infection control practices.

Data was analyzed by Statistical Package for Social Science (SPSS) version 23. Frequencies and percentages were calculated for categorical variables. Mean and standard deviation was calculated for quantitative data. The chi-square test was applied to observe the association of attitude with respect to department, age, gender and education. Independent t-test for two groups and ANOVA for more than 2 groups were applied to observe the mean differences in knowledge scores of stratified groups. In ANOVA, LSD was used for post hoc analysis. Statistical significance was defined for P-value < 0.05.

## RESULTS

A total of 82 health care professionals were interviewed. Out of which, 49(60%) were male and 33(42%) were female. The mean age of participants was  $28.87 \pm 6.4$  years. The mean working experience was  $5.7 \pm 5.84$  years and mean duration of employment at the institute was  $1.1 \pm 0.72$  years. The mean duty hours were  $8.88 \pm 1.92$  hours. Majority of staff had graduate or above graduate education 40(49%). The demographic information of study participants is depicted in Table 1.

**Table 1.** Characteristics of Participants.

Variables		Frequency	Percentage
Gender, Male		49	60
Departments	Administration	6	7.3
	Food processing	2	2.4
	Clinical services	13	15.9
	House keeping	10	12.2
	Infection Control	1	1.2
	Laboratory	4	4.9
	Nursing	31	37.8
	Pharmacy	10	12.2
	Reception	3	3.7
	Research	2	2.4
Education	Post-graduation	5	6
	Graduate	35	43
	Intermediate (High School)	15	18
	Matriculation	14	17
Illiterate		13	16
Marital Status	Married	46	56.1
	Single	36	43.9
Religion	Islam	50	61.0
	Christian	32	39.0

The overall mean knowledge score was found below average with mean of 18.3±12.3 and 71% were found to have good attitude. The attitude and knowledge response is presented in

Table 2, it showed that the excellent mean knowledge score was observed in post graduate group and below average score was seen in <25 age group.

**Table 2.** The Attitude and Knowledge of Participants Regarding Infection Control.

Survey Items	Frequency	%
Do you use standard precautions?	60	73.2
Do you use PPE?	60	73.2
Do you wash hand regularly?	82	100
Do you wash hands after removing gloves?	60	73.2
Do you wash hands after patient care events?	60	73.2
Do you cough and sneeze into your elbow area?	60	73.2
Do you wash inter digital spaces?	25	30.5
Do you use alcohol base hand gel when needed?	82	100
Do you dispose of sharps immediately after use?	60	73.2
Do you covers cuts and wounds before performing your duties?	60	73.2
Do you clean contaminated patient care equipments?	60	73.2

The mean scores of knowledge and their association with stratified groups is presented in Table 3. The mean knowledge

scores between age groups (p=0.786), gender (p=0.760) and department (p=0.360) were not found significant (Table 3).

**Table 3.** Association of Knowledge Scores with Study Groups.

Variables	Mean Knowledge Score	p value
<b>Age in years</b>		
≤25	17.75	0.786
>25	18.57	
<b>Gender</b>		
Male	18.60	0.760
Female	17.80	
<b>Departments</b>		
Clinical	19.0	0.360
Non clinical	16.10	

Knowledge score was significantly different among educations level (p= <0.001). In post hoc analysis, significant difference in mean knowledge score was observed in

post-graduation group with graduation, intermediate, and matriculation and mean difference between matriculation and illiterate was also found significant as depicted in Table 4.

**Table 4.** Association of Knowledge Scores with Education Level by ANOVA, Post Hoc Analysis.

Education		p value	95% Confidence Interval	
			Lower Bound	Upper Bound
Graduate	Intermediate	0.407	-4.21	10.26
	Matriculation	0.216	-12.08	2.78
	Illiterate	0.21	-2.57	11.55
	Post-graduation	0.003	-28.05	-6.18
Intermediate	Matriculation	0.087	-16.49	1.13
	Illiterate	0.734	-7.04	9.96
	Post-graduation	0.001	-32.06	-8.22
Matriculation	Illiterate	0.039	0.47	17.81
	Post-graduation	0.043	-24.5	-0.42
Post-graduation	Illiterate	0.000	9.79	33.41

The attitude of staff among stratified groups is presented in Table 5 in which significant difference was observed in education category ( $p < 0.001$ ).

**Table 5.** Association of an Attitude towards the Infection Control with Study Groups.

Variables	Good Attitude n(%)	Needs Improvement in Attitude Practice n(%)	p value
<b>Age (in years)</b>			
≤25	16 (66.7)	08 (33.3)	0.603
>25	42 (72.4)	16 (27.6)	
<b>Gender</b>			
Male	33 (67.3)	16 (32.7)	0.412
Female	25 (75.8)	8 (24.2)	
<b>Departments</b>			
Clinical	45 (73.8)	16 (26.2)	0.303
Non clinical	13 (61.9)	08 (38.1)	
<b>Education</b>			
Matriculation	03 (23.1)	10 (76.9)	<0.001
Intermediate	10 (71.4)	04 (28.6)	
Graduation	35 (100)	0 (0)	
Post Graduation	02 (40)	03 (60)	
Illiterate	08 (53.8)	07 (46.7)	

## DISCUSSION

Globally infection prevention is considered as the key challenge for health care organizations. The present study was conducted to evaluate knowledge, practice of HCWs towards infection prevention at our newly established hospital. In our study, the knowledge was found below average among HCWs which is in contrast than an Ethiopian study conducted in northwest Ethiopia reported to have knowledge rate of 84.7% [12]. In 2013, a study conducted at India, the general infection control practices and their data revealed only 2% of the nurses as having excellent knowledge, 24% having good knowledge, 63% having average knowledge, and 11% with below-average knowledge [13]. In our study, 71% of the participants had good attitude. In contrast, a study was conducted by Unakal *et al.* [14] in which they found out that good attitude was observed in 48% participants while in other study 57% had good attitude [15]. Another study was conducted by Gezie *et al.* [16] reported that 76.4% had favorable attitude towards infection control which is somewhat comparable to our findings.

As we are newly established hospital system so, the difference seen in our study might be because of lack of trained staff, and demographic differences. In our study only 25(30.5%) of staff had previously taken infection control training session. In contrast Ethiopia reported that 57.3% of staff was involved in infection control activities [12].

Present study comprised 49(59.8%) male and 33(42.3%) female staff. The mean age of participants was 28.87 (SD ±

6.4) years. From northwest Ethiopia, a study reported a total of 150 health care professionals being interviewed in which 93(62%) were male. More than half of them 82(54.66%) were in age range between 26 and 30 years while the mean age was calculated as 25.25 (SD ± 4.5) and majority i.e. 92.66% were Christians [12]. The mean working experience was 5.7 (SD ± 5.84) years and mean working experience at our institute was 1.1 (SD ± 0.72) year. The mean duty hours was 8.88 (SD ± 1.92) hours.

Our findings revealed that education has significant impact on staff knowledge. HCWs with higher educational level attained more knowledge and attitude scores as compared those having lower educational level. In a study level of education and work experience were significantly associated with safe-infection prevention attitude [15]. A study from Ethiopia also reported as 47% of the participants being diploma holders and 55.3% of HCW as registered nurses [12]. This difference might be result of healthcare workers with higher educational having better essential information [17, 18]. Mean knowledge score was calculated as 18.3 according to our scoring system. However a study from Pakistan revealed the mean knowledge score as (mean score 2) for house officers and junior professionals; while senior professional were found to have a lower mean knowledge score (mean score 1.8) [19]. A study from Rawalpindi revealed that out of 300 workers 281(94%) were having good knowledge about HCAs while 143(47%) use PPE during routine practices [7]. The percentage was lesser than the study conducted in Italy in which only 57% changed gloves [20].

## CONCLUSION

The study was designed to assess the knowledge and attitude of health care professionals regarding infection control at newly established hospital system. In the light of our findings, there is a need to improve the knowledge of healthcare employees by regular educational programs, standard and transmission-based precautions and ward-based hands on teaching practices of care bundles which would help to minimise HCAs not only for the betterment and safety of patients but also the health care staff.

## LIST OF ABBREVIATIONS

HCAI	Health Care Associated Infection.
PPE	Personal Protective Equipment.
HCW	Health Care Worker.
SPSS	Statistical Package for Social Science.

## AUTHOR'S CONTRIBUTION

**Haya-UI-Mujtaba, Nida Anwar, Naveena Fatima, Samina Mukry, Aisha Jamal, Qurat-UI-Ain Rizvi, Tahir Sultan Shamsi** had substantial contributions to the conception or design of the study, data collection, analysis and interpretation, and in manuscript writing. All authors did the revision of manuscript critically and approved the final version. All authors are able to take public responsibility for the work and are agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

## CONFLICT OF INTEREST

Declared none.

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