

ASSESSMENT OF DETERMINANTS OF INFECTION PREVENTION AND CONTROL IN CLINICAL PRACTICES AMONG STAFF NURSES IN TERTIARY CARE HOSPITAL RAWALPINDI

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ABSTRACT

Objectives: Infection Prevention and Control (IPC) is a worldwide and essential factor of all healthcare systems as Hospital Acquired Infections (HAIs) interrupt the health and safety of all those who use those facilities and who deliver them. The aim of the study was to assess the levels of knowledge, attitude and practices of the staff nurses towards prevention of infection and control in clinical practice.

Study Design: An institution based cross sectional study.

Place and Duration of Study: Fauji Foundation Hospital (FFH), Rawalpindi over a period of 06 months (from Jan 2021 to June 2021).

Patients and Methods: Using purposive sampling technique, a sample of 200 participants were chosen and through a structured self-administered questionnaire data were collected and analyzed using SPSS version 26.

Results: Among the study participants, 154 (77%), 165 (82.2%), and 106 (53%) were having adequate knowledge, positive attitude and satisfactory practice scores, respectively. About 1/3 (35%) of the respondents were untrained on risk assessment. Around sixty eight percent participants (68.5%) were recapping needles after use. There was a high (37%) prevalence of needle stick injury but limited (32.5%) use of post-exposure prophylaxis after potential exposure. The level of knowledge and practice scores among the study participants were also found to be low.

Conclusion: In spite of adequate knowledge and awareness of universal protocol for the prevention of HAIs, the adherence to the protocol was poor among the health care workers.

Keywords:

Attitude, Healthcare professional, Knowledge, Nurses, Practice, Safety, Tertiary care hospital

INTRODUCTION

Infection Prevention and Control (IPC) is an unanimously important constituent of healthcare organizations. It affects health as well as safety of all users of healthcare services and all providers of these services.¹

One of the major health problems is Hospital Acquired Infections (HAIs). It affects approximately 1.5 million people around the world annually. In developing countries, 10 out of 100 hospitalized patients are affected

by HAIs, which leads to ethical and legal problems as well as social issues. This also results in longer stay at hospital, increased costs due to longer stay and even mortality.²

HAIs remain a common and costly problem in spite of the many advances. As per estimation of Centers for Disease Control and Prevention (CDC), in merely US, approximately 2 million hospitalized patients in acute care settings are affected by HAIs annually. This leads to approximately \$3.5 billion direct costs per year. It is also suggested that at least 20% of all nosocomial infections are preventable, of which approximately 56% are vascular catheter-related infections.³

Pakistan is a country having large burden of disease. The burden of infectious diseases contributes more than 40% and the rest is for Non-Communicable Diseases (NCDs).⁴ Hospitals are places where there is risk of

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interaction between the sick and the healthy. In the process of health care delivery system, both infectious and non-infectious waste is generated.⁵ Around 25% of the waste produced is infectious and creates a threat to the staff and community, while rest of the waste is non-infectious and falls under the category of municipal waste. The knowledge, attitudes and practices regarding IPC, is significantly affected due to lack of facilities in teaching and other hospitals.⁶

Structure, daily patient movement and widespread disinfection practices, all play a key role in spread of infections. Simple measures to stop cross-infection can help to lessen HAIs. Failure to follow the scientific guidelines has caused several outbreaks of infections in various hospitals.⁶

Pakistan is facing huge burden of disease with > 40% prevalence of infectious diseases and preventable morbidity and mortality due to long duration of hospital stay, persistent disability, increased antimicrobial resistance and higher healthcare cost.⁷ Strict observance of standard hospital infection control practices need to be implemented for cost effective healthcare delivery.

Hospital prevention and control of infection is one of the significant areas in healthcare settings where vigorous efforts are required as burden of HAIs is not exactly known. Implementing IPC practices results in decreased hospital stay, disability, antimicrobial resistance, health system cost and cost for patients.

The main objectives of the study was to evaluate the knowledge, attitude and practices of staff nurses regarding prevention & control of infection in Fauji Foundation Hospital (FFH), Rawalpindi and to find gaps in knowledge and practices viz a viz hospital SOP.

PATIENT AND METHODS

An institution based cross-sectional study was conducted from Mar to Aug 2021 at FFH. It is a multi-disciplinary specialized teaching hospital with 837 inpatient beds. Using purposive sampling, the computed sample size was 224 staff nurses with 50% expected prevalence, 95% confidence interval, 5% margin of error. The final sample size was 200. The non response rate was 10%. Staff nurses working at FFH as permanent employees as well as on contract basis who were potentially at high-risk, were available during the data collection period and consented to take part in the study were included.

A validated structured self-administered close ended questionnaire and observation form was used for data

collection. This tool was adapted from an open access article distributed under the terms of Creative Commons (CC).⁷

Four main sections (socio-demographic characteristics, knowledge, attitude and practice) were included in the data collection tool. The tool was pretested on 10% of the study population and finalized. The questionnaire was distributed and data were collected after informed consent.

Data were coded and entered into SPSS version 26 for analysis. Knowledge and practice questions were scored as 1 or 0 for correct and incorrect responses, respectively. Attitude responses were provided 1, 2, or 3 for “Disagree”, “Neutral” and “Agree”, respectively. Summary statistics such as frequencies, proportions and means were computed. Scores below the mean were considered as inadequate knowledge, unfavorable attitude, or inadequate practice; whereas, scores equal to the mean score or above were considered as adequate knowledge, favorable attitude, or adequate practice. To identify the contributing factors affecting the knowledge, attitude and practice score, linear regression analysis was conducted using score as the dependent variable while using gender, age, experience, department and working hours as the independent variables. Furthermore, after assessing non normal distribution of data by Shapiro-Wilk test (p -value < 0.05), Mann-Whitney U test and Kruskal Wallis test with significance of p -value < 0.05 were used to see the differences in knowledge, attitude and practice among the participants.

Ethical approval was obtained from the ERC of Foundation University Islamabad (FUI). Ethical considerations were followed according to the recommendations of ethical review board.

RESULTS

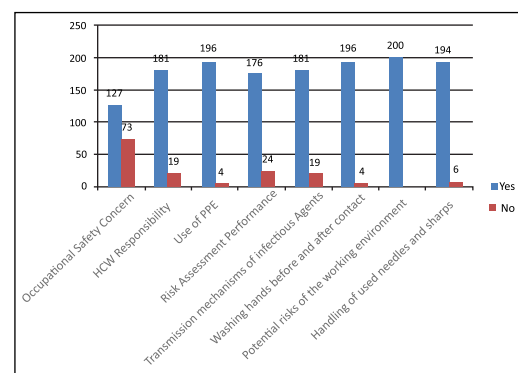


Fig 1:- Knowledge related factors for the evaluation of infection prevention and safety precaution in respondents

Table I: Socio-demographic and Health Facility related Characteristics

Sr. No.	Socio-demographic and HC related factors	Variable category	Frequency n (%)
1.	Gender	Female	184 (92%)
		Male	16 (8%)
2.	Age group	≤ 25 years	67 (33.5%)
		26–30 years	74 (37%)
		≥ 31 years	59 (29.5%)
3.	Department	OPD	159 (79%)
		Ward	2 (1%)
		Emergency	11 (5.5%)
		Others	28 (14%)
4.	Working experience in years	≤ 5 years	76 (38%)
		6 – 10 years	69 (34.5%)
		> 10 years – 20 years	30 (15 %)
		> 20 – 35 years	25 (12.5%)
5.	Working hours per day	6 hours	90 (45%)
		More than 6 hours	110 (55%)
6.	Risk assessment training taken	Yes	130 (65%)
		No	70 (35%)
7.	HBV vaccine taken	Yes	126 (63%)
		No	74 (37%)
8.	No of respondents according to the dose of HBV vaccination	First dose	41 (20.5%)
		Second dose	16 (8%)
		Third dose	69 (34.5%)
		Not vaccinated	74 (37%)
9.	Availability of adequate amount of PPE in the department	Yes	150 (75%)
		No	24 (12%)
		Not sure	26 (13%)
10.	Availability of safety guidelines/manuals in the department	Yes	186 (93%)
		No	14 (7%)
11.	Source of information regarding safety precaution	Training	159 (79.5%)
		Guidance	39 (19.5%)
		Friends	2 (1%)
		Others	-

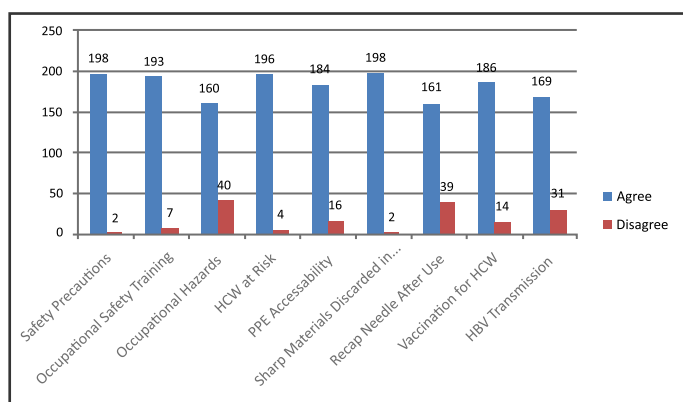


Fig 2 :- Attitude related factors for the evaluation of infection prevention and safety precaution

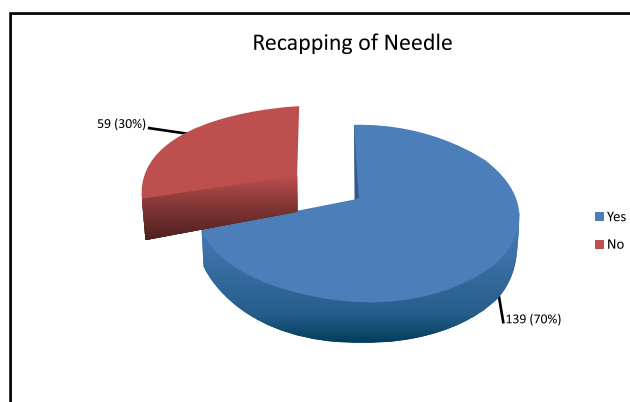


Fig 3 :- Number of persons who practiced recapping of used needles.

Table II: Staff Nurses score for knowledge about IPC against gender, age, experience, department and working hours

Variable	Mean ± SD	p-value
Gender		
Female	11.49 ± 1.21	0.150*
Male	11.18 ± 1.04	
Age in years		
≤ 25 years	11.44 ± 1.13	0.649**
26–30 years	11.59 ± 1.14	
≥ 31 years	11.33 ± 1.35	
Department		
Ward	11.39 ± 1.09	0.017**
OPD	10 ± 4.24	
ER	11.90 ± 0.83	
Others	11.82 ± 1.54	
Experience in years		
1	11.50 ± 1.10	0.106**
2	11.63 ± 1.12	
3	10.96 ± 1.30	
4	11.52 ± 1.47	
Working Hours		
6 hours	11.58 ± 1.20	0.079*
> 6 hours	11.37 ± 1.20	

*Mann-Whitney U test

**Kruskal Wallis test

Among staff nurses the attitude about infection prevention and control did not change considerably with female staff achieving a slightly greater score (12.21 ± 1.70) as compared to the male staff (12.12 ± 0.95). Staff nurses with age between 26 – 30 years have comparatively better attitude score (12.36 ± 1.16) than those ≤ 25 years (12.07 ± 2.35) and those ≥ 31 years (12.16 ± 1.13). There was significant difference between knowledge scores of staff nurses working in different departments of the hospital with ward (12.28 ± 1.21), OPD (1.00 ± 0.00), ER (12 ± 1.54) and other departments.

Table III: Staff Nurses score for Attitude about IPC against gender, age, experience, department and working hours

Variable	Mean ± SD	p-value
Gender		
Female	12.21 ± 1.70	0.286*
Male	12.12 ± 0.95	
Age in years		
≤ 25 years	12.07 ± 2.35	0.264**
26 – 30 years	12.36 ± 1.16	
≥ 31 years	12.16 ± 1.13	
Department		
Ward	12.28 ± 1.21	0.019**
OPD	1.00 ± 0.00	
ER	12 ± 1.54	
Others	12.6 ± 1.02	
Experience in years		
1	12.12 ± 2.22	0.117**
2	12.28 ± 1.28	
3	11.90 ± 1.19	
4	12.64 ± 0.75	
Working Hours		
6 hours	11.95 ± 2.19	0.61*
> 6 hours	12.41 ± 0.98	

*Mann-Whitney U test

**Kruskal Wallis test

Among staff nurses practices about infection prevention and control change considerably with male staff achieving a upper score (13.43 ± 1.03) as compared to the female staff (11.23 ± 2.52). Staff nurses with age between ≥ 31 years have comparatively better practice score (11.93 ± 2.09) than those 25 - 30 years (11.60 ± 2.90) and those ≤ 25 years (10.76 ± 2.24). There was no significant difference between practice scores of staff nurses working in different departments of the hospital with ward (11.50 ± 2.49), OPD (9 ± 0.00), ER (11.18 ± 1.40) and other departments (11.17 ± 2.93).

Table IV: Staff Nurses score for Practice about IPC against gender, age, experience, department and working hours

Variable	Mean ± SD	p-value
Gender		
Female	11.23 ± 2.52	0.001*
Male	13.43 ± 1.03	
Age in years		
≤ 25 years	10.76 ± 2.24	0.007**
26 – 30 years	11.60 ± 2.90	
≥ 31 years	11.93 ± 2.09	
Department		
Ward	11.50 ± 2.49	0.388**
OPD	9 ± 0.00	
ER	11.18 ± 1.40	
Others	11.17 ± 2.93	
Experience in years		
1	11.14 ± 2.29	0.484**
2	11.44 ± 2.97	
3	11.87 ± 1.89	
4	11.56 ± 2.41	
Working Hours		
6 hours	10.50 ± 2.40	0.000*
> 6 hours	12.16 ± 2.34	

*Mann-Whitney U test

**Kruskal Wallis test

Table V: Factors affecting the Practice score of Staff Nurses

Variable	Regression Coefficient s (β) [95% CI]	t	Std. error	p-value
Gender	2.198 [0.94 – 3.4]	3.45	2.44	0.001
Age	0.59 [.165 – 1.034]	2.72	2.46	0.007
Department	-1.24 [-.444 – .195]	-.767	2.51	0.444
Experience	0.202 [-.143 – 0.546]	1.15	2.50	0.250
Working Hours	1.66 [0.998 – 2.32]	4.931	2.37	0.000

Gender, age and working hours were found statistically significant effects on practice.

DISCUSSION

Infections acquired from the hospital are a major issue all over the world. Current and relevant information and nursing support can play an important role in control of infection. Nurses need to have the vision to practice infection control on a day-to-day basis as a vital part of patient care.⁸

Workplace safety is a vital part of all healthcare organizations which ensures quality health care in facilities and is important to protect health care workers, patients and public from health-related risks.⁷

Prevention of infection is one of the most important tasks in the health organizations. In our study, about 57.5% of healthcare workers were knowledgeable about infection prevention. This finding revealed that about 50% of the staff nurses in the hospitals had sufficient understanding on prevention of infections, whereas studies carried out in Zambia and Bahirdar city reported knowledge about infection prevention in 74.4% and 84.5% respondents respectively.^{9,10} In Nepal 22%, Palestine 53.9%, Iran 57% and healthcare facilities of West Arsi District, Southeast Ethiopia, 53.7% of healthcare workers in similar setting displayed good knowledge of IPC.^{11,12,13} The remaining 42.5% of the respondents had poor knowledge about infection prevention and control.

Knowledge of the participants regarding importance of occupational safety in healthcare setting was 63% which is much lower than reported by a similar study which was 73%.⁷

Providing dustbin/bags that are coded confirm appropriate disposal of biomedical wastes which includes used gloves, needles and syringes, and likewise contribute to low rate of spread of infections.¹⁴

In our study 63% participants were vaccinated against hepatitis B virus whereas a similar study held in Eithopia reported it to be 30.7%.¹⁵ In four hospitals affiliated to ministry of health in Palestine the vaccination status of workers was 80.8%.⁸

The attitude towards Hepatitis B Virus (HBV) transmission was also considerably poor as only 169 (84%) of participants opined that HBV is spread through biomedical waste. A similar study at Gondar University Hospital, Ethiopia⁷ reported that 97% of participants had knowledge regarding the spread of HBV.

In current study 186 (93%) participants believed that vaccination is necessary for healthcare workers whereas 163 (81.5%) showed willingness to receiving

vaccination, however, only 60% were found to be vaccinated against HBV.

In this study, the practice scores of the participants were 104 (52%), which is moderately less than similar study held in Ethiopia i.e. 57.4%⁷ and another study held in Palestine i.e. 98.5%.⁸

Around 37% cases incidents of needle sharps' injuries occurred during the previous 12 months, which is greater than a similar studies conducted in Northwest Ethiopia and Southeast Ethiopia (32.4%).^{13, 15}

Our study revealed that 84.5 % participants wash hands with soap after handling the patients whereas 91% stated that they also perform hand washing after removing gloves compared to 12.3% which was reported in a study conducted at Dr. Ruth K.M Pfau Civil Hospital Karachi.¹⁶

Almost 2/3 of study participants were not aware of the World Health Organization's recommendation of not re capping the sharps/needles which is greater than study conducted at Nigeria.¹⁷

Linear regression was applied using practice score as the dependent variable and gender, age, department, experience and working hours as the independent variable. In the present study gender, age and working hours were found to be significant predictors of the total practice score.

Infection prevention is a main issue of all healthcare employees and policy makers of health system. Nursing is critical to the attainment and success of any health related programs especially preventive programs intended to reduce the occurrence of infections in healthcare settings. Hence, staff nurses should have adequate knowledge to achieve this objective.⁸

This study has several limitations. Firstly, there is a likelihood that the staff nurses may have provided socially desirable responses rather than their actual practices.¹⁸

Secondly, the findings cannot be generalized to staff nurses in other hospitals of the country as the study was restricted to a tertiary care hospital in Rawalpindi. Thirdly, as this was a cross-sectional study design, temporal relationship between the explanatory and outcome variable could not formed.¹⁹

CONCLUSION

In spite of adequate knowledge and awareness of universal protocol for the prevention of HAIs, adherence

to protocol is poor among the health workers. The educational interventions need to be executed to address breaches regarding knowledge and practice to ensure that nurses use evidence-based infection prevention measures.

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