

ORIGINAL ARTICLE

KNOWLEDGE AND PRACTICES OF INFECTION CONTROL AMONG HEALTHCARE WORKERS IN A TERTIARY CARE HOSPITAL

Rabia Riasat, Minaal Ahmed Malik, Iftekhhar Yousaf, Kamil Asghar Imam

Department of Physiology, Army Medical College, National University of Medical Sciences, Rawalpindi, Pakistan

Background: Healthcare associated infections (HCAs) pose increasing danger to healthcare service providers and patients. This study was planned to evaluate and compare knowledge and practices of two groups of healthcare workers (doctors and nurses) in a tertiary care hospital and to highlight their role in dissemination of healthcare associated infections. **Methodology:** This cross-sectional analytical study was conducted at Pak-Emirates Military Hospital, Rawalpindi, Pakistan over course of 6 months. A sample of 250 was taken using convenience sampling. Study groups comprised of qualified practicing doctors and nurses. A questionnaire was self-administered amongst the study groups and was filled under supervision after voluntary consent. Data collected were analysed using SPSS-22. **Results:** A total of 198 responses were analysed, 83 being nurses and 115 doctors. Most respondents (83.8%) correctly identified hand washing as the most effective method to prevent HCAs with doctors having better knowledge than nurses (63.1%). Majority (97.5%) agreed that avoiding injury with sharps, use of barrier precaution (97.5%) and hand hygiene (98.0%) effectively prevent HCAs. There were no differences in the infection control practices of doctors and nurses ($p=0.456$). Females had better knowledge ($54.1\% \pm 2.50$) than their male counterparts ($p=0.001$) regarding HCAs. **Conclusion:** Gaps have been identified in knowledge and practices of both groups of healthcare workers highlighting the need for periodic refresher trainings and development of a system for monitoring safe practices. Nurses exhibited greater deficit in knowledge variable than doctors suggesting the need for increased education of nurses through workshops, seminars and/or extensive curricular programmes.

Keywords: Healthcare worker, HCW, Healthcare associated infection, HCAI, Knowledge, Practices

Pak J Physiol 2019;15(4):46–8

INTRODUCTION

Healthcare associated infection (HCAI) can be defined as an infection occurring in a patient during the process of care in hospital or any other healthcare facility which was not present or incubating at the time of admission.¹ As per World Health Organization (WHO) fact sheet HCAs have between 3.5–12% prevalence in high income countries and 5.7–19.1% prevalence in low to middle income countries. These infections have resulted in 99,000 deaths in the USA and 37,000 deaths in Europe with estimated annual financial losses of \$6.5 billion and €7 billion respectively in 2011. Despite paucity of quality data in low income countries, recent analyses have found that HCAs are more frequent in resource limited countries.² The rate of intensive care unit acquired infections was reported 2–3 times higher and the rate of device associated infections was 13 times higher in low income settings.³

The WHO has tested its multi-modal hand hygiene improvement strategy at various pilot sites between 2006–2008 including Pakistan.⁴ Infectious diseases remain paramount cause of mortality in Pakistan. According to a study at Karachi, Pakistan, 29.13% of patients acquired HCAs out of which 30.1% were respiratory tract infections, 39.1% urinary tract infections (UTIs) and 23.7% blood borne infections.⁴

Foregoing in view, our study was planned to highlight the role of healthcare workers in spreading of

HCAs. Previous studies have identified gaps in knowledge of infection control methods and years of experience of healthcare workers.^{5,6} Studies have also shown the advantages of effective infection control and its impact on healthcare systems.^{7–9} Simple components of the standard precautions have shown to reduce the risk of HCAs. These include hand hygiene and adherence to the WHO hand hygiene protocol.^{1,9,10} HCAI prevention can be achieved through multi-dimensional programmes. An Indonesian study found 22% decline in inappropriate antibiotic usage after practice of multi-targeted infection control.¹¹ Foregoing in view, the purpose of our study was to assess gaps in knowledge and practices of healthcare workers with regard to infection control methods.

MATERIAL AND METHODS

The study was conducted at Pakistan-Emirates Military Hospital, Rawalpindi, Pakistan. This cross-sectional analytical study surveyed the knowledge and practices of infection control among two groups of healthcare workers, i.e., doctors and nurses including medical and operation theatre assistants. The data were collected using structured and validated questionnaire. All data were gathered after informed consent and were anonymised. The relevant questions were obtained from valid published literature. Cronbach's alpha internal consistency coefficient of 0.71 confirmed the reliability of questionnaire.^{11–15}

Questionnaire comprised of 40 binary (Yes/No) questions: 24 knowledge-based, 12 practice-based and 4 questions regarding resources used to acquire knowledge by healthcare workers. Percentage scores as per established literature were labelled as follows: 0–69% were categorized as poor and ≥70% were categorized as good.¹²

Convenience sampling method was used. Data were analysed using SPSS-22. Mean and standard deviation were calculated for numerical variables whereas frequency and percentage for categorical variables. Chi-Square test and Student’s *t*-test were used for inferential analysis. Alpha was kept at 0.05.

RESULTS

A total of 250 questionnaires were distributed out of which 198 were returned establishing response rate of 79.2%. Of the 198 respondents, 115 (58.1%) were doctors and 83 (41.9%) nurses, 106 (53.5%) were females and 92 (46.5%) males with an average of 4.2 years of work experience.

Comparison of mean scores of knowledge and practice between the two groups is shown in Table-1 along with *p*-value. Frequency comparisons of knowledge and practice categories between the two groups are shown in Tables-2 and 3.

Table-1: T-test comparison of mean knowledge and practice scores of doctors and nurses

Mean	Occupation		<i>p</i>
	Doctor	Nurse	
Knowledge score	21.0957±2.39	18.4578±2.89	0.001*
Practice score	9.3391±2.11	9.3133±2.13	0.93

*Significant

Table-2: Chi-square cross-tabulation of occupation and knowledge categories

Occupation	Knowledge Category		<i>p</i>
	Good	Poor	
Doctor	5	110	0.001*
Nurse	20	63	

*Significant

Table-3: Chi-square cross tabulation of occupation and practice categories

Occupation	Practice Category		<i>p</i>
	Good	Poor	
Doctor	39	76	0.456
Nurse	24	59	

DISCUSSION

The Centre for Disease Control (CDC) reports that almost 1.7 million hospitalised patients acquire HCAs and more than 98,000 people die annually.¹³ Suspected numbers of HCAs might be greater than documented as shown by a study on infection control policies and practice in Pakistan¹⁶ at Islamabad and on hospital infection control at Karachi.¹⁷

Our study reported gaps in knowledge of doctors and nurses regarding HCAs. It showed that

doctors perhaps due to their extensive curricular study were more knowledgeable compared to nurses. This relative deficiency in knowledge of nurses was not reported in previous studies in Nigeria and Ethiopia.^{12,14} The nursing staff is more intensively and practically engaged with the patients therefore it is important that they have sound knowledge base. A 2015 study conducted at Karachi, Pakistan about nursing education reported that most nursing staff does not fulfil the requirement of Pakistan Nursing Council. Shorter diploma courses and unsupervised bedside practice with lack of appropriate knowledge therefore increase risks of contamination through nurses.¹⁵

Our study also revealed that practices of doctors and nurses showed no significant differences. The scores of both groups of healthcare workers were below satisfactory. These results agreed with previous studies in Nigeria, Italy, Ethiopia, and Pakistan.^{5,12,18,19} Such low scores signify lack of application of knowledge. Reasons for such insufficiency in practices are manifold like careless attitude of healthcare workers, lack of effective policy and programmes for HCAI control, lack of time to observe all relevant precautions, lack of authority overseeing implementation of safety protocols, resource limitation, cost of medical sanitation and equipment etc.

The best attempted questions were regarding transmission of HIV, Hepatitis B, Hepatitis C and needle stick injuries. This can be attributed to the strict protocol regarding needle stick injuries employed by hospital under consideration over the last two decades. This is encouraging especially since the WHO reported that globally 40% of HBV infections among HCWs are because of occupational exposure.^{10,20}

Even though our study has not found variability in doctor and nurse practices regarding hand hygiene various previous studies have shown relatively poor observance of hand hygiene protocols by doctors than nurses.^{21–22} The reasons for higher scores of questions about blood borne pathogens compared to hand hygiene can be related to healthcare workers complacency, indolence, workload, time deficit, skin irritations, allergies to gloves or sanitizer formula etc. A simulation study in Pittsburgh reported that 79.2% of healthcare workers did not know how to use personal protective equipment properly highlighting importance of not only being well equipped but also being well-trained.²³ Knowledge of post exposure prophylaxis and immunization maintenance were also lower than most answers either due to lack of knowledge or the costs of immunization.

CONCLUSION

The areas of knowledge and practices related to hospital acquired infections need improvement. The former more in nurses, and the later both in doctors and nurses.

This highlights the need to train healthcare workers especially nurses in terms of their knowledge.

CONFLICT OF INTEREST

The authors do not declare any conflicts of interest.

REFERENCES

- Pittet D, Allegranzi B, Boyce J. World Health Organization World Alliance for Patient Safety First Global Patient Safety Challenge Core Group of Experts. The World Health Organization guidelines on hand hygiene in health care and their consensus recommendations. *Infect Cont Hosp Epidemiol* 2009;30(7):611–22.
- Organization WHO. Health Care Associated Infection Factsheet. WHO GPSC 2010.
- Allegranzi B. Report on the Burden of Endemic Health-Care Associated Infection Worldwide: A Systemic Literature Review. WHO, 2011.
- Rehmani R. Emergency section and overcrowding in a university hospital of Karachi, Pakistan. *J Pak Med Assoc* 2004;54(5):233.
- Parmeggiani C, Abbate R, Marinelli P, Angelillo IF. Healthcare workers and health care-associated infections: knowledge, attitudes, and behavior in emergency departments in Italy. *BMC Infect Dis* 2010;10:35.
- Ogoina D, Pondei K, Adetunji B, Chima G, Isichei C, Gidado S. Knowledge, attitude and practice of standard precautions of infection control by hospital workers in two tertiary hospitals in Nigeria. *J Infect Prev* 2015;16:16–22.
- D'Agata EM, Horn MA, Ruan S, Webb GF, Wares JR. Efficacy of infection control interventions in reducing the spread of multidrug-resistant organisms in the hospital setting. *PLoS One* 2012;7(2):e30170.
- Chen YC SW, Wang JT, Chang SC, Lin HC, Tien KL, *et al.* Effectiveness and limitations of hand hygiene promotion on decreasing healthcare-associated infections. *PLoS One* 2011;6:e27163.
- Hanmore E, MacLaine G, Garin F, Alonso A, Leroy N, Ruff L. Economic benefits of safety-engineered sharp devices in Belgium—a budget impact model. *BMC Health Serv Res* 2013;13:489.
- Organization WHO. The World Health Report 2002: Reducing Risks, Promoting Healthy Life. WHO, 2002.
- Murni IK, Duke T, Kinney S, Daley AJ, Soenarto Y. Reducing hospital-acquired infections and improving the rational use of antibiotics in a developing country: an effectiveness study. *Arch Dis Child* 2015;100:454–509.
- Ilyasu G, Dayyab FM, Habib ZG, Tihamiyu AB, Abubakar S, Mijinyawa MS, Habib AG. Knowledge and practices of infection control among healthcare workers in a Tertiary Referral Center in North-Western Nigeria. *Ann Afr Med* 2016;15(1):34.
- Haque M, Sartelli M, McKimm J, Bakar MA. Health care-associated infections —an overview. *Infect Drug Resist* 2018;11:2321.
- Reda AA, Fisseha S, Mengistie B, Vandeweerd JM. Standard precautions: occupational exposure and behavior of health care workers in Ethiopia. *PLoS One* 2010;5(12):e14420.
- Huda SU, Alisbinati AS. Nursing Education in Pakistan: challenges and trends in degree program. *Int J Nurs Educ* 2015;7(4):59–62.
- Adinma ED, Ezeama C, Adinma JI, Asuzu MC. Knowledge and practice of universal precautions against blood borne pathogens amongst house officers and nurses in tertiary health institutions in southeast Nigeria. *Niger J Clin Pract* 2009;12:398–402.
- Sadoh WE, Fawole AO, Sadoh AE, Oladimeji AO, Sotiloye OS. Practice of universal precautions among healthcare workers. *J Natl Med Assoc* 2006;98:722–26.
- Ofili AN, Asuzu MC, Okojie OH. Knowledge and practice of universal precautions among nurses in central hospital, Benin-City, Edo State, Nigeria. *Niger Postgrad Med J* 2003;10:26–31.
- Zaidi N, Javed N, Naz S, Mumtaz A. Gaps in knowledge and practices about health care associated infections among health care workers at a tertiary care hospital. *J Islamabad Med Dent Coll* 2016;5(2):84–7.
- Habib F, Khan DK, Bhatti F, Zafar A. Knowledge and beliefs among health care workers regarding hepatitis B infection and needle stick injuries at a tertiary care hospital, Karachi. *J Coll Physicians Surg Pak* 2011;21:317–8.
- Ghabrah TM, Madani TA, Albarrak AM, Alhazmi MA, Alazraqi TA, Alhudaithi MA, *et al.* Assessment of infection control knowledge, attitude and practice among healthcare workers during the Hajj period of the Islamic year 1423 (2003). *Scand J Infect Dis* 2007;39(11–12):1018–24.
- Stein AD, Makarawo TP, Ahmad MF. A survey of doctors' and nurses' knowledge, attitudes and compliance with infection control guidelines in Birmingham teaching hospitals. *J Hosp Infect* 2003;54(1):68–73.
- Kang J, O'Donnell JM, Colaienne B, Bircher N, Ren D, Smith KJ. Use of personal protective equipment among health care personnel: results of clinical observations and simulations. *Am J Infect Cont* 2017;45(1):17–23.

Address for Correspondence:

Dr. Kamil Asghar Imam, Associate Professor, Department of Physiology, Army Medical College, Rawalpindi, Pakistan.

Cell: +92-340-8009304

Email: kamziamam@gmail.com

Received: 21 Oct 2019

Reviewed: 10 Jan 2020

Accepted: 13 Feb 2020