KAP STUDY

CONTROLLING NOSOCOMIAL INFECTION THROUGH CLINICAL STAFF EDUCATION

Sana Ansari[1], UzmaGhori[2],Nida Hussain[3], Rabel Gul[4], Farzana Aslam[5]
[1]Department of Quality Assurance,Ziauddin University
[2]Department of Medicine and Allied, Ziauddin University
[3]Director, Faculty Affairs, Ziauddin University
[4]3rd Year MBBS, Ziauddin University
[5]Infection Control Officer, Ziauddin Hospital, Clifton

ABSTRACT

Background: With the growing incidence of multi-drug resistant organisms, Infection Control programs in hospitals need to be more vigilant regarding staff practices and targeted training should be provided to ensure clinical staff is aware of their role in breaking the chain of infection.
The objective of this study was to identify gaps in the knowledge, attitude and practices of clinical staff with regard to infection control protocols, in order to develop comprehensive training programs for the implementation of these protocols in routine duties.

Methods: A descriptive, cross sectional study was conducted on 246 clinical staff in a tertiary-care teaching hospital, through a structured questionnaire developed to assess the knowledge, attitude and practices of clinical staff. Statistical analysis was performed through SPSS(Ver. 20.0)

Results: A staff of 246 participated in the survey (151 nurses, 72 doctors and 23 paramedical staff). Respondents considered bed sores, respiratory and urinary tract infections as common hospital acquired infections, but only 14% included sepsis and infected venous access in this category. 219 (89%) staff acknowledged receiving Infection Control training and 167 (68%) staff always performed hand hygiene but 69 of 246 participants (28%) did not consider recapping to be a risk factor for infections and145 (59%) were unaware of vaccination schedules.

Conclusion: Results show that clinical staff has basic knowledge of transmission routes and personal protective equipment, but concepts are not clear regarding vaccination schedules and post-exposure prophylaxis. Additionally, compliance with Infection Control guidelines should be monitored through audits for further enforcement.

KEYWORDS: infection control, surveys, education

Corresponding Author
Dr. Sana Ansari
Department of Quality Assurance
Dr. ZiauddinHospital,Clifton, Block 2, Karachi
Email address: sana.ansari@ziauddinhospital.co

INTRODUCTION

Hospital acquired infections are a paradox in itself as hospitals are considered a means to control and prevent infections rather than becoming a source of spreading infection.

CDC reports state that about 75,000 patients with hospital acquired infections died during their stay.[1] Frequently encountered infectious agents include Acinetobacter, Methicillin-Resistant Staphylococcus aureas (MRSA) and Clostridium difficle which is the leading cause of death due to nosocomial diarrhea in the US.[2]

Clinical staff are often reservoirs of pathogenic bacteria and have to take precautions to prevent cross-infection of patients. Studies show that one third of all hospital acquired infections are preventable by simple measures like hand hygiene and use

of protective personal equipment. Common reasons of non compliance vary in different settings ranging from skin irritation to forgetfulness, with the number one reason being the urgency to attend to the patient.[3] Other studies from lower income settings showed that lack of availability of personal protective equipment was a major reason of non compliance.[4]

In Pakistan, hospital acquired infections are often underestimated. A study performed in Abbotabad looked at MRSA infection in skin and soft tissue lesions. It was noted that around 28% of cases were community-acquired whereas, more than 48% were hospital acquired. [5]

A similar study focused on the importance of recognizing fomites. In this study torniquets were cultured and it was seen that 90% of all elastic and 41% of all rubber tourniquets harbored microorganisms, including MRSA.[6]

Apart from proper dissemination of information, it is essential to focus on the healthcare worker's beliefs and perceptions as well. An Infection Control program focused on in depth training of the Hospital Housekeeping department through focus groups which laid emphasis on "Employee appreciation" and "Taking pride in one's work". Rate of environmental contamination was assessed before and after the intervention and was seen to improve significantly.[7]

Our objective was to improve the Infection Control training program in our hospital by performing an in-depth analysis of the factors leading to non-compliance. In order to implement international procedures, we need to evaluate whether the problem lies in staff education, attitude or habits.

Once a comprehensive plan is tailor-made according to the identified needs, compliance can be strictly monitored by instituting new strategies and evaluating positive behavior changes.

METHODS

A descriptive cross-sectional study was conducted at two campuses of a tertiary care teaching hospital, from December 2016 to May 2017. The study population consisted of 246 clinical staff including doctors, nurses and paramedical staff. Prevalence was taken at 86%and the bond of error is taken at 5% with 95% confidence interval.

The study was reviewed by the Clinical Review Committee (CRC No. 0050216MED) and Ethics Review Committee (ERC No. 00170516SAHR) of Dr. Ziauddin Hospital, before beginning the research project.

Sampling was done by simple random technique. Participation in the study was voluntary and none of the respondents were directly or indirectly forced to participate. Staffs that were not in direct contact with patients were excluded from the study.

Data was collected through a self-administered three page questionnaire, prepared after review of relevant literature and routine problems encountered by clinical staff, with regard to compliance with infection control protocols.

Questionnaire was distributed by authors of the study and respondents were requested to return the survey after completion. Average time taken to complete survey was 15 to 20 minutes.

Demographic profile was documented and questions were asked regarding the knowledge, attitude and practices of clinical staff with regard to infection control.Names of participants were optional, thereby retaining confidentiality of participants who wanted to remain anonymous.

Statistical analysis was carried out through SPSS (Version 20) and results were expressed as frequencies and percentages for qualitative data.

RESULTS

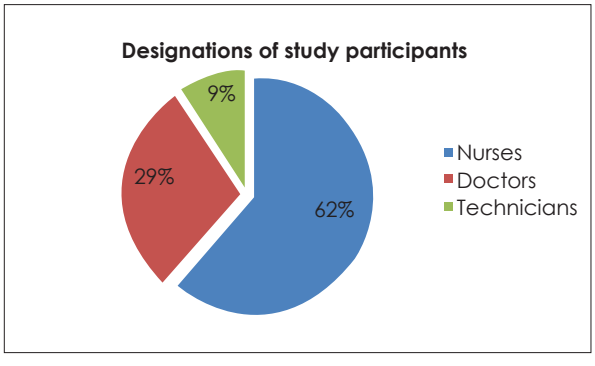

Figure 1: Number of respondents according to designation

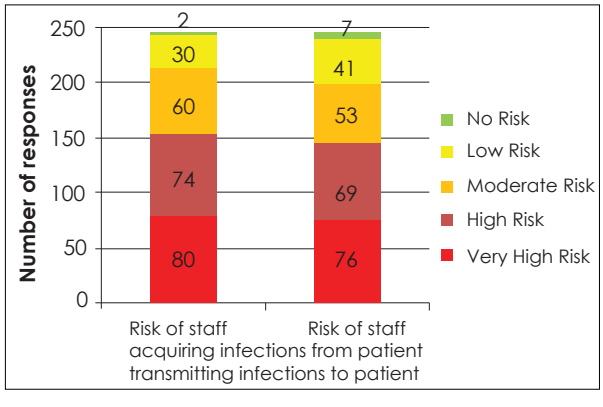

Figure 2: Staff perception of infectious risk acquired from or transmitted to patients

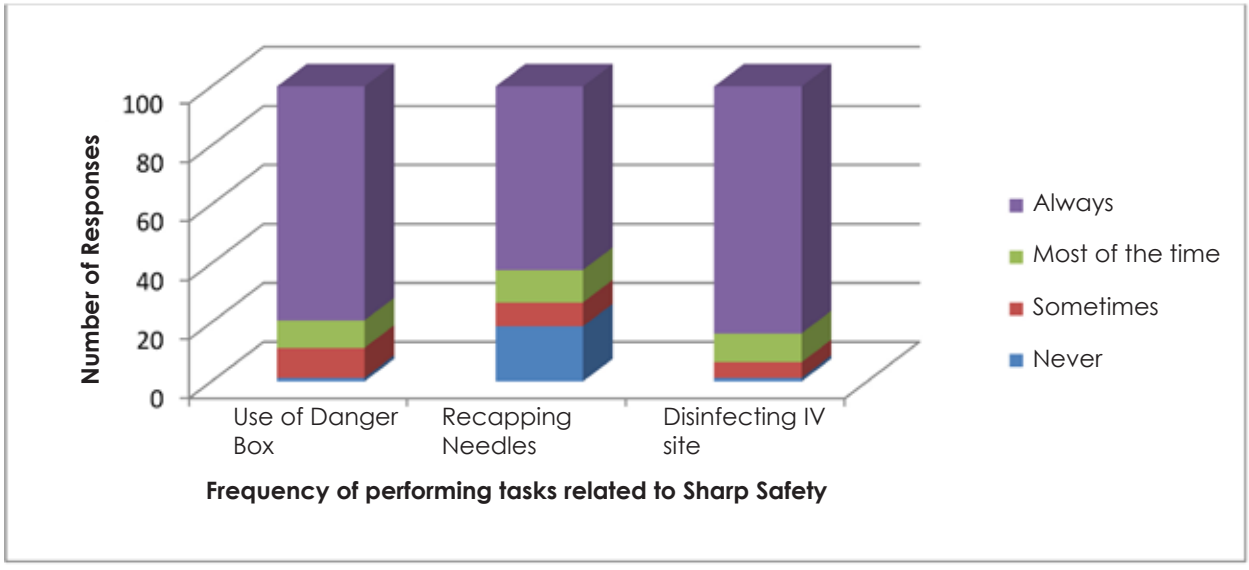

Figure 2: Respondent's practices related to Sharp Safety

Table 1: Staff's practices with regard to frequency of using Personal Protective Equipment

	Participants Responses							
	Never		Sometimes		Most of the time		Always	
		%	n	%	n	%	n	%
Appropriatic use of gowns	10	4	83	33	49	20	104	42
Appropriatic use of masks	11	4.5	63	26	60	24	112	46
Appropriatic use of gloves	3	1	27	11	40	16	175	71

Results shows that more than half the respondents recognized the need for a strong Infection Control Program as the risk of getting an infection and transmitting an infection was stated as "high" and "very high" by over 62.6% and 58.9% of respondents, respectively.

Around 44.7% of staff considered the existing Infection Control program to be good. About 89% of staff acknowledged receiving training on Hand Hygiene of which 59% claimed to have been trained on vaccination schedules. Out of 246 participants only 13 did not feel that the training on PPE and Waste Management was enough. 192 staff felt they received adequate training on Sharp Safety whereas 45 participants denied receiving any such training.

Although over 90% of the respondents were aware that hospital acquired infections are transmitted through blood and body fluid contact as well as contaminated needle and sharps, some aspects still remain unclear as 62% and 77% of staff believed that nosocomial infections can be transmitted through mosquito bites and shaking hands respectively.

Respiratory tract infections, urinary tract infections and bed sores were identified as common nosocomial infections by 50% of the staff, but only 27% of respondents included surgical site infections in this category whereas, 14% considered sepsis and infected venous access to be frequently encountered hospital acquired infections. 28% of participants didn't consider recapping of needles to be a risk for getting infected whereas, 73% of staff overestimated the risk of sharing utensils. 89% of the staff had been given formal education on Hand Hygiene and 68% of staff claimed to wash their hands before touching patients. 28% of staff who

didn't perform hand hygiene blamed it on unavailability of hand washing facilities while 4.5% did not consider hand hygiene necessary. In the same way, although 69% of staff acknowledged receiving training on the use of Personal Protective Equipment, only 42 % of staff claimed to wear gowns and 46% of staff agreed to wearing masks when needed.

Needle stick injuries are a major risk factor for hospital acquired infections, but in our study 71.5% of respondents had never experienced a needle stick injury. They believed that needle stick injuries should be washed with water, alcohol and pressure should be applied, but an unexpectedly small proportion of the participants believed that each needle stick injury should be reported to the Infection Control Department.

DISCUSSION

Infection Control training has always been considered as part of the curriculum in all health-care related fields, whether medicine, nursing or allied health sciences. Unfortunately, correct knowledge is not always followed by correct practices, which is why there is a dire need for constant reminders and revision of Infection Control protocols.

When compared with similar studies conducted in other countries, our respondents had better results which proves that the existing Infection Control program has succeeded in providing basic knowledge. One of these studies, conducted in India showed that 97% of nurses had poor knowledge about standard precautions and 64.5% of nurses had inadequate knowledge about the transmission of blood-borne pathogens.[8] Whereas, a study conducted in Italy showed that only 29% acknowledged that urinary and respiratory tract infections were the two most common hospital acquired infections.[9]

Hospitals ensure availability of personal protective equipment for staff use, but often healthcare workers do not use them in the correct way, which defeats their purpose. Putting on and taking off personal protective equipment should also be clearly defined as it has been reported that risk of contamination is highest during removal of personal protective equipment [10] and another study which was part of the Canadian Nosocomial Infection Surveillance Program showed that 46% of healthcare workers removed their personal protective equipment in the incorrect sequence. [11] A simulated health care environment to assess HCWs' technique when implementing standard airborne and contact isolation precautions and results showed various inconsistencies within the healthcare workers' approach. [12].

Personal protective equipment plays an important role in preventing nosocomial infections. This has been established by other researchers including Tiemersma etal[13] who stated that decreasing incidence of tuberculosis in healthcare workers could be linked to an increase in availability of personal protective equipment during the same time period. The focus on personal protective equipment has increased during the past few years as research is now being conducted on the manufacturing aspects including breathability of the mask [14], fabric of the gown [15] and recommended methods of cleaning and disinfecting uniforms [16].

The existing Infection Control program focuses mainly on the nursing department and therefore, doctors and other paramedical staff may not be aware of the basic principles regarding hand washing, personal protective equipment and injection safety precautions. Training planners for the Infection Control Department should include all staff who are directly involved in patient care, including medical technicians and doctors. During these training sessions more emphasis should be laid on the proper use of personal protective equipment and the perils of not following the recommended protocols of putting on and taking off the personal protective equipment.

Commonly discussed hospital acquired infections were easily identified by all respondents but some participants were unsure whether infection transmitted through insect bites or sharing utensils can also be considered as hospital acquired. It should be made clear that although infections transmitted through feco-oral routes such as Hepatitis A or norovirus have been linked to saliva, the viral count of Hepatitis B and C in saliva is too low to spread disease and sharing utensils is not a risk factor.[17] Another concept which needs to be further clarified is the risk of transmission of disease from healthcare worker to patient was underestimated by our study respondents. A study conducted in Sri Lanka showed that more than one tenth of nursing staff were MRSA carriers.[18] Which is why critical care staff are recommended to undergo screening and treatment if they are proven to be MRSA carriers.

The number of reported needle stick injuries is suspiciously low. This could be attributed to underreporting which is an issue to be tackled. In a recent study,

conducted on under reporting of percutaneous injuries, the authors concluded that an intensified reporting system and continuous education are the only ways to combat this problem.[19] In another study conducted in Ethopia, it was seen that nearly six out of ten injuries are not reported to the concerned body and 35% of staff mentioned time constraint as the main reasons for not reporting the injury.[20]

Compliance with hand hygiene protocols is also at acceptable levels, but this self-reported data needs to be followed up with observational audits to ensure authenticity of data. Audits should also be performed for clinical staff dealing with patients requiring airborne or contact precautions as the proportion of staff who always wears gloves and gowns when needed is less than the number of staff who have been given training on usage of personal protective equipment. Audits to monitor compliance always improve hand hygiene practices as seen in a recent study where audits boosted the level of compliance from 87% to over 95% within 9 months.[21] Whereas, a similar study conducted in South India showed that complete compliance with hand hygiene had a significant decrease in device associated infection rate. [22]

With the recent outbreaks of life threatening infections, the protection of healthcare workers has become a top priority and prophylactic vaccinations are under discussion for infections like Ebola [23]. In the future, these vaccinations may become mandatory as a moral imperative for healthcare organizations[24] to protect the wellbeing of their staff, so that the staff feels safe when caring for infected patients.

CONCLUSION

Continuous improvement is an integral part of quality assurance. The first step is always to analyze the current situation and the next step is to redesign the system with targeted improvements. Through this study we have highlighted the gaps in staff knowledge and have made recommendations to enhance the content and expand the audience for the Infection Control training program. Regular audits also need to be introduced into the Infection Control program for stricter enforcement of infection control guidelines.

AUTHOR CONTRIBUTIONS

Article content was conceptualized by U.G and N.H whereas, R.S and F.A collected the data and S.A wrote the manuscript. All authors have read and approved the final article.

REFERENCES

1. Magill SS, Edwards JR, Bamberg W, et al. Multistate Point-Prevalence Survey of Health Care–Associated Infections.NEngl J Med 2014; 370:1198-208
2. Surawicz CM. Clostridium Difficile Infection: Risk Factors, Diagnosis and Management. Curr Treat Options Gastroenterol. 2015; 9.
3. Patarakul K, Tan-Khum A, Kanha S. Cross-sectional survey of hand-hygiene compliance and attitudes of health care workers and visitors in the intensive care units at King Chulalongkorn Memorial Hospita.J Med Assoc Thai. 2005; 4:S287-93.
4. Chughtai AA, Seale H, Chi Dung T. Current practices and barriers to the use of facemasks and respirators among hospital-based health care workers in Vietnam. Am J Infect Control. 2015 1;43(1):72-7.
5. Ahmad MK, Asrar A. Prevalence of methicillin resistant Staphylococcus aureus in pyogenic community and hospital acquired skin and soft tissues infections. J Pak Med Assoc. 2014; 64(8):892-5.
6. Mehmood Z, Mubeen SM, Afzal MS. Potential risk of cross-infection by tourniquets: a need for effective control practices in Pakistan. Int J Prev Med. 2014;5 (9):1119-24.
7. Matlow AG, Wray R, Richardson SE. Attitudes and beliefs, not just knowledge, influence the effectiveness of environmental cleaning by environmental service workers. Am J Infect Control. 2012 ;40(3):260-2.
8. E) Acharya AS, Khandekar J, Sharma A, Tilak HR, Kataria A. Awareness and practices of standard precautions for infection control among nurses in a tertiary care hospital.
Nurs J India. 2013;104(6):275-9
9. Sessa A, Di Giusepersonal protective equipment G, Albano L, Angelillo IF; Collaborative Working Group..An investigation of nurses' knowledge, attitudes, and practices regarding disinfection procedures in Italy. BMC Infect Dis. 2011 25;11:148.
10. Honda H, Iwata K. Personal protective equipment and improving compliance among healthcare workers in high-risk settings.CurrOpin Infect Dis. 2016;29(4):400-6.
11. Mitchell R, Roth V, Gravel D, Astrakianakis G, Bryce E, Forgie S, et al. Are health care workers protected? An observational study of selection and removal of personal protective equipment in Canadian acute care hospitals.Am J Infect Control. 2013;41(3):240-4.
12. Beam EL, Gibbs SG, Boulter KC, Beckerdite ME, Smith PW. A method for evaluating health care workers' personal protective equipment techniqueAm J Infect Control. 2011;39(5):415-20.

13.Tiemersma EW, Huong NT, Yen PH, Tinh BT, Thuy TT, Van Hung N et al Infection control and tuberculosis among health care workers in Viet Nam, 2009-2013: a cross-sectional survey. BMC Infect Dis. 2016; 10;16(1):664.

14. Verbeek JH, Ijaz S, Mischke C, Ruotsalainen JH, Mäkelä E, Neuvonen K et al Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff. Cochrane Database Syst Rev. 2016; 19;4:CD011621

15. Kilinc FS. A Review of Isolation Gowns in Healthcare: Fabric and Gown Properties.J Eng Fiber Fabr. 2015;10(3):180-190

16. Potter YC, Justham D. Washing and changing uniforms: is guidance being adhered to?
Br J Nurs. 2012; 14-27;21(11):649-50, 652-3

17. www.cdc.gov/hepatitis/HBV/PDFs/HepBWhen-SomeoneClose.pdf

18. Mahalingam U, Thirunavukarasu K, Muruganantha K Methicillin resistant Staphylococcus aureus among nurses in a tertiary care hospital in northern Sri Lanka. Ceylon Med J. 2014 ;59(2):63-5.

19. Fritzsche C, Heine M, Loebermann M, Klammt S, Podbielski A, Mittlmeier T, Reisinger EC Reducing the underreporting of percutaneous exposure incidents: A single-center experience. Am J Infect Control. 2016 ; 1;44(8):941-3.

20. Bekele T, Gebremariam A, Kaso M, Ahmed K Attitude, reporting behavour and management practice of occupational needle stick and sharps injuries among hospital healthcare workers in Bale zone, Southeast Ethiopia: a cross-sectional study.-JOccup Med Toxicol. 2015; 3;10:42.

21. McLean HS, Carriker C, Bordley WC. Good to Great: Quality-Improvement Initiative Increases and Sustains Pediatric Health Care Worker Hand Hygiene Compliance. HospPediatr. 2017 ;7(4):189-196

22. Sastry AS, R D, BhatP.Impact of a hand hygiene audit on hand hygiene compliance in a tertiary care public sector teaching hospital in South India. Am J Infect Control. 2017 ; 1;45(5):498-501

23. Galanakis E, Jansen A, Lopalco PL, Giesecke J. Ethics of mandatory vaccination for healthcare workers.Euro Surveill. 2013 ; 7;18(45):20627.

24. Coltart CE, Johnson AM, Whitty CJ . Role of healthcare workers in early epidemic spread of Ebola: policy implications of prophylactic compared to reactive vaccination policy in outbreak prevention and control. BMC Med. 2015 ; 19;13:271.

25. Yamini, Jain A, Mandella C, Jaryam S. Perception and practice regarding infection control measures amongst healthcare workers in district government hospitals of Manglore, India. IntJ Health Allied Sci 2012;1:68-73