

Knowledge, Attitude and Practice of Infection Control Practices among Health Care Workers**Sheta Mehul M¹, Shah Khushi S², Mehta Sanjay J³, Kikani Kunjan M⁴, Oza Sweta S⁵, Panjwani Dipak⁶**¹Consultant Microbiologist, Cure Laboratories, Surat.²Assistant Professor, Department of Microbiology, C U Shah Medical College, Surendranagar.³Professor and Head, Department of Microbiology, Swaminarayn Institute of Medical Science and Research.⁴Professor and Head, Department of Microbiology, C U Shah Medical College, Surendranagar.⁵Professor and Head, Department of Microbiology, Gmers Vadnagar.⁶Associate Professor, Department of Microbiology, C U Shah Medical College, Surendranagar.

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Abstract:**Background:** Most nosocomial infections are transmitted by health care workers (HCWs) who fail to practice proper infection control measures. Paramedical HCWs are at higher risk of various infections in the hospital.**Objectives:** This study was done to assess knowledge, attitude and practices of paramedical HCWs about the attributes of hospital infection and control.**Method:** The study was conducted at a tertiary care teaching hospital in India. Total 181 HCWs volunteered for the study. Permission was obtained from ethics committee.

The survey was conducted using predesigned and pretested questionnaire comprising of 35 questions encompassing different attributes like hospital infection control, standard precautions, post exposure prophylaxis (PEP), vaccination and biomedical waste management (BMW). The responses were obtained, recorded and statistically analyzed.

Result: Study population was 181 HCWs (139 nurses, 42 laboratory technicians). Out of 181, 162 HCWs responded to the questionnaire. For Hospital infection and control, Knowledge, Attitude and Practices were 75.10%, 68.67% and 33.33% respectively. For Standard precautions, Knowledge, Attitude and Practices were 80.86%, 68.36% and 75.93% respectively. For PEP, Knowledge, Attitude and Practices were 55.56%, 73.15% and 24.07% respectively. For Vaccination, they were 88.27%, 70.37% and 70.37% respectively. For BMW, they were 83.95%, 71.76% and 13.58% respectively.**Conclusion:** HCWs had a good knowledge about most of the attributes except PEP. HCWs had a good/favorable attitude towards all attributes. HCWs were good in practices of standard precautions and vaccination while poor in hospital infection control, PEP and BMW.**Keywords:** KAP Study, Health care workers, Infection control, Standard Precautions, Post exposure prophylaxis.

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Introduction

Healthcare associated infection (HCAI) is defined as an infection occurring in a Health Care Worker(HCW) / patient during the process of care in a hospital or other healthcare facility which was not present or incubating at the time of admission. It also includes infections that become symptomatic after discharge [1]. Most of the HCAI are transmitted by health care personnel who fail to practice proper infection control measures [2].

Paramedical HCWs are at the risk of various infections in the hospital, including exposure to blood borne infections such as HIV, Hepatitis B and Hepatitis C virus (HBV and HCV) which can

be encountered from sharps injuries and contact with body fluids [3-5]. Worldwide, 3 million HCWs experience percutaneous exposure to bloodborne viruses each year (2 million hepatitis B, 9 lakh hepatitis C and 170,000 HIV). These exposure leads to 70000 HBV, 15000 HCV and 500 HIV infections [6]. It has been reported by the WHO that amongst the HCWs, 2.5% of HIV cases and about 40% of HBV and HCV infection cases are because of needle stick injuries [7].

Because of the lack of immunization or vaccine against HIV and HCV, it is very important to prevent these infections.

The term standard precaution is based on the fact that everything including blood, body fluids, secretions, excretions, non-intact skin and mucous membranes may contain transmissible infectious agents. Standard precaution is replacing 'universal precautions' as it expands the coverage of universal precautions by recognizing that any body fluid may contain contagious and harmful microorganisms [8]. Standard precautions include hand hygiene, use of appropriate personal protective equipment (PPE), use of aseptic technique to reduce patient exposure to microorganism and management of sharps, blood spills and waste to maintain a safe environment [9-11]. Standard precautions forms major part of Hospital Infection Control and is the basic requirement to reduce HCAI. As identification of patients infected with these pathogens cannot be made by medical history and physical examination, the Centers for Disease Control (CDC) has recommended that standard precautions be used on all patients, regardless of knowledge about their infection status [12].

Knowledge of standard precautions among paramedical staff may be influenced by their type of training [13-16]. Paramedical staff faces professional hazards such as needle stick injuries and blood born infections in their day to day activities in the hospital.

This study was done to assess the knowledge, attitude and practices about infection control among paramedical HCWs in a tertiary care teaching hospital. The results of this study can guide the development and implementation of infection prevention and control activities in the hospital.

Objectives

To assess the knowledge, attitude and practice of Infection control practices among paramedical HCW.

Method

An institutional based cross-sectional study was conducted among paramedical staff engaged in health care duties at a tertiary care teaching hospital in India. This is a 570 bedded multispecialty teaching hospital involved in both undergraduate and postgraduate teaching and training. Total 181 HCWs were voluntarily included in the study amongst which 139 were nurses and 42 were laboratory technicians.

A questionnaire with 35 questions was designed, which was guided by the research objectives, considering the target study population. The

questionnaire was developed in English and also in one regional language, using simple basic questions and statements to enhance clarity. The questionnaire was designed to get general information, the perception and feeling of study population. There were questions related to knowledge, attitude and practice of health care workers on infection control. Special instructions were provided which were necessary for easy understanding. The questionnaire was prepared after a thorough peer review.

The purpose of the study was explained to the study population before giving them the questionnaire. Informed consent was also taken for the participation.

In this study, Knowledge is defined as a clear awareness and understanding of paramedical HCWs on infection prevention activities when caring patients. Attitude is a personal view of paramedical HCW on infection prevention activities when caring patients. And Practice is a skill of paramedical HCW on infection prevention activities when caring patients.

The data from the questionnaire were coded and entered into a Microsoft office 2016 Excel spreadsheet and analysis was done using SPSS version 17. Level of significance was determined by chi square test. Chi square test was used for comparing proportions and statistical significance was taken as $p < 0.05$.

Result

From all paramedical HCWs engaged with patient care, 181 HCWs were voluntarily included in the study amongst which 139 were nurses and 42 were laboratory technicians. Amongst these 181 HCWs, 162 (response rate 89.50%) HCWs from different departments responded to the questionnaires. Out of these 162 HCWs, 72 (44.44%) were male and 90 (55.56%) were females.

Out of total 162, 13.58% of paramedical HCWs were freshers having work experience of less than 1 year, 44.44% had experience of 1 – 5 years, 10.63% had experience of 6 – 10 years and 31.48% had experience of more than 10 years.

The number of nurses who had taken infection control training during their work experience was 54, and 5 technicians had taken infection control training during their work experience. Total accounting for 33.33%.

Response from study about knowledge variable is shown in table 1.

Table 1: Knowledge variable.

		HIC	SP	Hand Wash Steps	PPE	Needle Injury - PEP	HCAI	Air borne infections	Vaccine (HBV)	BMW management
Knows	%	37.04	33.95	56.79	58.02	32.10	16.67	71.60	88.27	17.28
	No.	60	55	92	94	52	27	116	143	28
Partially Knows	%	33.95	42.59	22.22	29	23.46	46.30	19.75	-	66.67
	No.	55	69	36	47	38	75	32	-	108
Don't Know	%	14.20	12.4	9.26	3.09	25.31	20.37	1.23	4.32	1.85
	No.	23	20	15	5	41	33	2	7	3
Not Responder	%	14.8	11.1	11.73	9.88	19.14	16.67	7.41	7.41	14.20
	No.	24	18	19	16	31	27	12	12	23

Abbreviations

HIC – Hospital Infection Control

SP – Standard Precaution

PPE – Personal Protective Equipment

PEP – Post Exposure Prophylaxis

HCAI – Health Care Associated Infection

BMW – Bio Medical Waste

There were 112 (69.14%) HCWs who knew that hand washing is most important, cost effective and easy way to control spread of infection.

There were 90 (55.56%) HCWs who knew about blood borne infection transmitted by needle stick / sharp injuries to health care provider.

Attitude of target HCWs towards different variable is given in table 2.

Table 2: Attitude variable.

		HIC	SP	Hand Wash	PPE	Needle Injury - PEP	HCAI	Air borne infections	Vaccine	BMW management	Infection Control Training
Un favorable	%	0.63	0	0	0	0	0	0	0	0	0
	No.	1	0	0	0	0	0	0	0	0	0
Less favorable	%	0.63	0.63	0	0	0	0.68	0	0	0	0
	No.	1	1	0	0	0	1	0	0	0	0
Neutral	%	3.77	3.77	1.24	7.74	4.83	5.48	3.18	3.92	3.16	5.23
	No.	6	6	2	12	7	8	5	6	5	8
Favorable	%	15.1	17	14.91	27.1	23.45	22.6	21.02	16.99	15.82	32.68
	No.	24	27	24	42	34	33	33	26	25	50
Highly favorable	%	79.9	78.6	83.85	65.2	71.72	71.2	75.8	79.08	81.01	62.09
	No.	127	125	135	101	104	104	119	121	128	95

Total 144 HCWs have suggested for regular time interval with a mean period of 4.85 months to conduct Training for Infection Control Practices.

Table 3 shows response for practice about different variables.

Table 3: Practice variable.

No.	Topic	Question	Response	No.	%
1	SP	Which SP you are taking care off?	No Response	1	0.62
			Hand Wash, Antiseptics	150	92.59
			Use of PPE	129	79.63
			Handling patients surrounding with caution	121	74.69
			Preventing Needle/Sharp Injuries	145	89.51
			All	105	64.81
		When to follow SPs?	No Response	6	3.70
			some times	3	1.85
			during OT/Procedure	3	1.85
			While handling Sero +ve Patients	27	16.67
			Every time for all patients	123	75.93

2	Hand Wash	When to wash hands?	No Response	2	1.23
			Before touching patient	118	72.84
			Before any procedure / intervention	144	88.89
			After any procedure / intervention	147	90.74
			After touching patient	133	82.10
			After handling patients surrounding	102	62.96
			All	90	55.56
			Difficulties in hand washing?	No Response	3
		limited resources	69	42.59	
		patient over load or more patient / staff ratio	52	32.10	
		Allergy to soap or hand rub	6	3.70	
		No knowledge of Ideal Hand Wash technique	6	3.70	
		feeling boring	4	2.47	
		No problem	133	82.10	
3	PPE	Which PPEs you are using?	No Response	3	1.85
			Gloves	157	96.91
			Cap	112	69.14
			Mask	150	92.59
			Apron	126	77.78
			Gown	81	50.00
			Goggles	45	27.78
			Book / shoe covers	73	45.06
		Difficulties in using PPEs?	No Response	2	1.23
		limited resources	88	54.32	
		patient over load or more patient / staff ratio	46	28.40	
		Allergy to material used in PPEs	3	1.85	
		No knowledge of correct technique of using PPEs	5	3.09	
		feeling boring	6	3.70	
No problem	58	35.80			
4	Vaccination	Which vaccine you have taken?	No Response	10	6.17
			Not taken	38	23.46
			Taken	114	70.37
			5	BMW	How you dispose needle after use?
Not practicing	7	4.32			
Partially practicing	119	73.46			
Practicing	22	13.58			

Discussion

The use of Standard precautions is majorly for prevention of transmission of blood born infections.

It was observed by Kermodé et al. in a study conducted in rural north India, that the knowledge of standard precautions was correct amongst 56% of respondents [17]. While in the present study, 67.54% of the respondents had knowledge about Standard precautions.

A study conducted in Nigeria had shown that 34.2% nurses had knowledge about standard precautions [18]. While in the present study, almost all the nurses had knowledge of standard precautions and 61.2% of them agreed that the blood and body fluids of all patients were

potentially infectious irrespective of their diagnostic status.

Study done by Anupam K et al. showed that use of gloves, apron, mask, and hand washing among nurses is 80, 20, 48 and 64% respectively [19]. Our study shows it as 96.91, 77.78, 92.59 and 55.56% respectively, except hand washing, our study shows good compliance in use of PPE.

Study done in Kerala by Benzy Paul et al. showed knowledge of patient isolation and of vaccination for HBV was 44% and 98% respectively [20], while in our study it is 71.6% and 88.27%. Though only 70.37% have taken vaccine for HBV.

Conclusion

For HCAI, knowledge was good, attitude was fair but the practice was poor. For Standard

precautions, knowledge was good, attitude was fair and practice was good. For PEP, knowledge was poor, attitude was fair and practice was poor. For vaccination, knowledge, attitude and practices were good. For BMW management, knowledge and attitude were good but practice was poor.

HCWs had a good knowledge about most of the attributes except PEP. HCWs had a good/favorable attitude towards all attributes. HCWs were good in practices of standard precautions and vaccination while poor in hospital infection control, PEP and BMW. It was also noted that, many respondents were having proper knowledge of infection control, but not putting it in proper practice. These can be achieved by periodic hands on training and workshops.

Recommendations: Performance feedback on hand hygiene behavior is critical to improve compliance with hand hygiene among HCWs by strict observation of nurses during work and correction of poor practices.

A protocol for universal blood precautions, needle-stick injuries, and infection control should be used in the unit, e.g. as wall charts, handouts and bundling. The infection control committee should develop and update annually all relevant protocols as new information becomes available on the best practice.

Training HCWs (preservice and in service) about bloodborne infections and standard precautions through regular scientific meetings. Training programs and information sessions should be provided on initial employment and at appropriate intervals thereafter.

There should be availability of all facilities and equipment that are required for applying standard precautions.

References

- World Health Organization. Report on the burden of Endemic Healthcare- Associated Infection Worldwide. WHO: Geneva. 2011.
- Delaune SC, Ladner PK Fundamental of nursing Standards and Practice. (4th ed) Delmar Cengage Learning, 2010.
- Gerberding J L. Incidence and prevalence of human immunodeficiency virus, hepatitis B virus, hepatitis C virus, and cytomegalovirus among health care personnel at risk for blood exposure: final report from a longitudinal study. Journal of Infectious Diseases, 1994; 170:1410–7.
- Ramos-Gomez F et al. Accidental exposures to blood and body fluids among health care workers in dental teaching clinics: a prospective study. Journal of the American Dental Association, 1997; 128:1253–61.
- Ruben FL et al. Epidemiology of accidental needle-puncture wounds in hospital workers. American Journal of the Medical Sciences, 1983; 286:26–30.
- World Health Organization. Aide-memoire for a strategy to protect health workers from infection with bloodborne viruses. Geneva: World Health Organization. 2003. <http://www.who.int/iris/handle/10665/68354>. [Last accessed on 2019Feb].
- The world health report 2002: reducing risks, promoting health life. Geneva, World Health Organization, 2002.
- Sridhar MR, Boopathi S, Lodha R, Kabra SK. Standard precautions and post exposure prophylaxis for preventing infections. Indian J Pediatr 2004; 71:617–25
- World Health Organization. Guidelines on Prevention and Control of Hospital Associated Infections. WHO: Geneva. 2002a.
- World Health Organization. Prevention of Hospital-acquired Infections. A Practical Guide. 2nd ed. WHO: Geneva. 2002b.
- World Health Organization. Practical Guidelines for Infection Control in Health Care Facilities. WHO: Geneva. 2004.
- Update: universal precautions for prevention of transmission of human immunodeficiency virus, hepatitis B virus, and other blood borne pathogens in health - care settings. Morbidity and Mortality Weekly Report, 1988; 37(24):377–88.
- Askarian M, McLaws M L, Meylan M. Knowledge, attitude and practices related to standard precautions of surgeons and physicians in university-affiliated hospitals of Shiraz, Iran. International Journal of Infectious Diseases, 2007; 11(3):213–9.
- Gershon R R et al. Compliance with universal precautions among health care workers at three regional hospitals. American Journal of Infection Control, 1995; 23(4):225–36
- Michalsen A et al. Compliance with universal precautions among physicians. Journal of Occupational and Environmental Medicine, 1977; 39(2):130–7.
- Oliveria A C et al. Knowledge and attitude regarding standard precautions in a Brazilian public emergency service: a cross sectional study. Revista da Escola de Enfermagem da USP, 2009; 43(2):313–9.
- Kermode M et al. Compliance with Universal/Standard Precautions among health care workers in rural north India. American Journal of Infection Control, 2005; 33:27-33.
- Ofili AN, Asuzu MC, Okojie OH. Knowledge and practice of Universal Precautions among nurses in central hospital, benin-city, Edo State, Nigeria. Nigerian Postgraduate Medical Journal, 2003;10:26-31

19. Anupam K, DK Taneja. Health Care Workers and Universal Precautions: Perceptions and Determinants of Non-compliance. *IJCM*, 2010; 35:526-8.
20. Benzy P et al. A Study on Knowledge, Attitude and Practice of Universal Precautions among Medical and Nursing Students. *Sch. J. App. Med. Sci.*, 2014; 2(5E): 1821-3.