

A Study to Assess Knowledge and Attitude Regarding Hand Hygiene amongst Residents and Nursing Staff in a Tertiary Health Care Setting of Bhopal City

VEENA MAHESHWARI¹, NAVIN CHANDRA M KAORE², VIJAY KUMAR RAMNANI³, SANJAY KUMAR GUPTA⁴, AMOD BORLE⁵, RITUJA KAUSHAL⁶

ABSTRACT

Background: Infection due to hospital-acquired microbes is an evolving problem worldwide, and horizontal transmission of bacterial organism continues to cause a high nosocomial infection rate in health care settings. Most nosocomial infections are thought to be transmitted by the hands of health care workers. The application of hand hygiene is effective in reducing infection rates.

Objectives: To assess the level of knowledge and attitude regarding hand hygiene practices amongst the health care professionals and to identify areas of gaps in their knowledge and attitude.

Materials and Methods: A cross-sectional study.

Result: A total 160 respondents were studied about their knowledge and attitude towards hand hygiene practices and

significant difference with a p-value of 0.0025 was observed regarding most frequent source of germs responsible for health care associated infections among resident and nurses. A significant difference with p-value of 0.0001 & 0.04 was observed in colonization due to jewellery and artificial nail among the study groups. The attitude regarding correct hand hygiene practices to be followed at all times was found to be better among nurses (62.5%) as compared to residents (21.3%) which was found to be highly significant with p-value <0.001.

Conclusion: Present study highlights the need of repeated training sessions regarding hand hygiene practices among the health care workers to provide the current knowledge in the area with a behavioral change in attitudes and practices leading to reduction of nosocomial infections.

Keywords: Hand washing practices, Health care associated infections (HCAI), Health care workers, Nosocomial infection, Hospital acquired microbes

INTRODUCTION

Infection caused due to hospital acquired microbes is an evolving problem worldwide, and horizontal transmission of bacterial organisms continues to cause a high nosocomial infection rate in health care settings. Nosocomial infections due to poor hand hygiene are a major cause of increasing morbidity, mortality and health care costs among hospitalized patients worldwide [1].

The high prevalence of these infections, as high as 19%, in developing countries poses a challenge to health care providers [2]. Hand hygiene is considered the single most cost-effective public health measure for preventing health care associated infection (HCAI) [3].

Transmission of healthcare-associated pathogens generally occurs via the contaminated hands of healthcare workers often transmitting virulent and multi-drug resistant strains. Though preventable with a simple hand washing, health care workers are reluctant to adopt recommended practices to curb these infections [4].

The World Health Organisation (WHO) has issued guidelines for procedural hand washing in order to reduce the prevalence of hospital associated infections but lack of knowledge amongst health care workers is associated with poor compliance [5]. An alarming revelation was that compliance was found to be worst before high risk procedures [6,7].

Despite evidence and expert opinion that hand hygiene reduces transmission of potential pathogens or antimicrobial-resistant organisms, sustained improvements in adherence to hand hygiene recommendations and proper hand washing technique among

health care workers are uncommon [8], even after educational efforts. At the same time, some hospitals there is not even proper training of the employees regarding hand hygiene practices. This is shown by the lack of even basic awareness about hand washing guidelines among the hospital personnel. With this background, the present study was undertaken to assess the level of knowledge and attitude among residents and staff nurses of PCMS & RC, Bhopal regarding hand hygiene practices and also to identify gaps in knowledge and poor attitudes regarding hand hygiene practices among residents and staff nurses to enhance good practices and working ethics in future.

MATERIALS AND METHODS

The study was carried out for a period of three months from June to August 2013 to assess the knowledge and attitude regarding hand hygiene amongst residents and staff nurses of a tertiary care hospital in Bhopal, India after obtaining ethical clearance from the institutional ethical committee. The principal investigator visited both the groups and explained the nature of the study. Verbal consent was obtained from those who volunteered to participate.

A total of 160 respondents were included in the study (80 Resident and 80 nurses) and a pre-validated questionnaires were administered to respondents. Their level of knowledge was assessed on the basis of the Hand Hygiene Knowledge Questionnaires for Health-Care Workers designed by WHO and revised August 2009, which was modified and this included 49 questions carrying both multiple choice and 'yes' or 'no' questions in the knowledge section. Measurement of attitude was done on the basis of 13 questions

		Residents n = 80		Nurses n = 80		P value
K1	Which of the following is the main route of transmission of potentially harmful germs between patients (Health care workers hands when not clean)	60	75.0%	60	75.0%	NS
K2	What is the most frequent source of germs responsible for health care associated infections? (Germs already present on or within the patient)	36	45%	22	27.5%	**0.0025
K3	According to WHO how many steps of hand washing, do you know? (7)	48	60%	52	65.0%	NS
K4	Do you think wearing gloves replaces the need for hand washing practices (N)	65	81%	67	83.8%	NS
The most appropriate timing for performing Hand hygiene actions that prevent transmission of germs to the patient?						
K5	Before touching a patient (yes)	75	93.8%	79	98.8%	NS
K6	Immediately after risk of body fluid exposure (yes)	64	80%	67	83.8%	NS
K7	After exposure to immediate surroundings of a patient (no)	24	30%	24	30%	NS
K8	Immediately before a clean / aseptic procedure (yes)	68	85%	72	90%	NS
The most appropriate timing for performing hand hygiene actions that prevent transmission of germs to the health care worker?						
K9	After touching a patient (yes)	76	95%	80	100%	*0.02
K10	Immediately after a risk of body fluid exposure (yes)	72	90%	73	91.3%	NS
K11	Immediately before a clean / aseptic procedure (no)	39	48.8%	49	61.3%	*0.05
K12	After exposure to the immediate surroundings of a patient (yes)	62	77.5%	65	81.3%	NS
With respect to Hand cleansing which of the following statements on alcohol-based hand rub and hand washing with soap and water are true?						
K13	Hand rubbing is more rapid for hand cleansing than hand washing (true)	58	72.5%	65	81.3%	NS
K14	Hand rubbing causes skin dryness more than hand washing (false)	25	31.3%	16	20%	NS
K15	Hand rubbing is more effective against germs than hand washing (false)	37	46.3%	28	35%	*0.01
K16	Hand washing and hand rubbing are recommended to be performed in sequence (false)	29	36.3%	11	13.8%	NS
K17	What is the minimal time needed for alcohol based rub to kill most germs on your hands? (20 seconds)	28	35%	20	25%	NS
Which type of hand hygiene method is required in the following situations?						
K18	Before palpation of the abdomen (rubbing)	22	27.5%	31	38.8%	*0.02
K19	Before giving an injection (rubbing)	19	23.8%	24	30%	NS
K20	After emptying a bed pan (washing)	55	68.8%	64	80%	*0.02
K21	After removing examination gloves (rubbing/washing)	56	70%	66	82.5%	NS
K22	After making a patients bed (rubbing)	24	30%	10	12.5%	**0.0005
K23	After visible exposure to blood (washing)	38	47.5%	46	57.5%	*0.03
Which of the following should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?						
K24	Wearing jewellery (yes)	62	77.5%	77	96.3%	**0.0001
K25	Damaged skin (yes)	75	93.8%	74	92.5%	NS
K26	Artificial fingernails (yes)	64	80%	72	90%	*0.04

K27	Regular use of a hand cream (no)	47	58.8%	58	72.5%	NS
What type of cleansing agent is used in your healthcare setting ?						
K28	Soap bar	37	46%	35	43.8%	NS
K29	Alcohol based hand rub	40	50%	42	52.5%	x2
K30	Liquid soap	33	41%	33	41.3%	0.154
K31	Antiseptic	35	44%	35	43.8%	NS
K32	Are WHO recommended hand washing instructions displayed at your set up	62	78%	65	81.3%	NS
Where are the hand washing facilities located at your workplace?						
K33	Throughout the healthcare setting	55	69%	58	72.5%	NS
K34	Conveniently located	42	53%	47	58.8%	
K35	In Conveniently located	30	38%	28	35.0%	
K36	Don't know	15	19%	12	15.0%	
What do you think are the reasons for poor hand washing compliance?						
K37	Lack of knowledge of guidelines/ protocols	72	90%	68	85.0%	NS
K38	Wearing gloves/ gowns	10	13%	12	15.0%	
K39	Lack of role models among colleagues/ superiors	60	75%	58	72.5%	
K40	Understaffing and Overcrowding	45	56%	50	62.5%	
K41	Poor access to hand washing facilities	50	63%	48	60.0%	
K42	Non availability of alcohol based hand rubs	55	69%	56	70.0%	
K43	Non availability of soap and water	52	65%	57	71.3%	
K44	Hand washing agents cause irritation and dryness	30	38%	32	40.0%	
What is the best approach to improve handwashing compliance?						
K45	Motivation	72	90%	75	93.8%	NS
K46	Availability of alcohol based hand rubs	40	50%	45	56.3%	
K47	Training and education of HCW	63	79%	67	83.8%	
K48	Need for automated soap dispensers	15	19%	18	22.5%	
K49	Instructions demonstrating correct hand washing techniques to be displayed	55	69%	45	56.3%	

[Table/Fig-1]: Comparison of knowledge in resident and nursing students regarding various aspects of hand hygiene practices
Significance calculated using student T-test
*p<0.05 (Significant), **p<0.001 (highly significant), NS (Not Significant)

where the subjects had to give their opinion on a 1 to 5 point Likert scale ranging from strongly disagrees to strongly agree.

For scoring, 1 point was given for each correct response to good level of knowledge and positive attitude and 0 point was given for poor level of knowledge and negative attitude, 75% and above was considered good, a score between 50-74% was moderate/ average/ fair and below 50% was considered poor. Data analysis and management was done using Microsoft EXCEL 2010 software. Appropriate statistical tests were applied as and when required. p-value less than 0.05 were considered significant.

RESULTS

No significant difference was observed in study group regarding knowledge about routes of transmission of infection, WHO recommended steps of hand washing and whether gloves can replace the hand washing. Significant difference 36(45%) and 22 (27.5%) were observed regarding most frequent source of germs responsible for health care associated infections among resident and nurses respectively [Table/Fig-1].

		Residents n = 80		Staff n = 80		p-value
A1	Correct hand hygiene practices should be followed at all times	17	21.3%	50	62.5%	**<0.001
A2	A health care personnel should have sufficient knowledge and training about hand hygiene	29	36.3%	60	75%	**<0.001
A3	You feel guilty when you omit hand hygiene	31	38.8%	56	70.0%	**<0.001
A4	You feel uncomfortable when others omit hand hygiene	22	27.5%	45	56%	**<0.001
A5	Hand washing is cumbersome in case of emergencies	8	10%	7	8.8%	NS
A6	A health care personnel should act as a role model for others	22	27.5%	37	46%	
A7	A health care personnel should enrol in regular training sessions regarding hand hygiene practices	21	26%	39	49%	
What is your perception of the dirty areas of the hands?						
A8	Palm	62	77.5%	64	80.0%	X ² =
A9	Finger	61	76.3%	59	73.8%	0.997
A10	Finger tips	59	73.8%	56	70.0%	p-value
A11	Dorsum of Hands	36	45.0%	39	48.8%	NS
A12	Nails	57	71.3%	60	75.0%	
A13	Web spaces	55	68.8%	57	71.3%	

[Table/Fig-2]: Distribution of respondents according to their attitudes towards various aspects of hand hygiene practices

Significance calculated using student T-test

*p<0.05 (Significant), **p<0.001 (highly significant), NS (Not Significant)

Knowledge about most appropriate timing for performing hand hygiene actions that prevent transmission of germs to the patient and to the health care worker was found to be same in both the groups.

Significant knowledge difference 37(46%) and 28(35%) regarding effectiveness of alcoholic hand rubs being more effective against germs than hand washing were observed in study groups [Table/Fig-1].

Though knowledge about type of hand hygiene method required to be used in situations like before giving an injection and after removing examination gloves was not significantly different but significant difference was found regarding situations like palpation of the abdomen, after emptying a bed pan, after making a patients bed and after visible exposure to blood with 22(27.5%), 55(68.8%), 24(30%),38(47.5%) and 31(38.8%), 64(80%), 10(12.5%), 46(57.5%) among the residents and nurses respectively [Table/Fig-1].

As regards what need to be avoided for increased colonization, a significant difference of knowledge was observed regarding use of jewellery i.e. 62(77.5%) against 77(96.3%) and artificial nails 64(80%) against 72(90%) amongst residents and nurses respectively. Both the groups were equally aware about type of cleaning agents used, location of hand washing facilities, reasons for poor hand washing compliance and approaches for improving the same [Table/Fig-1].

The attitude regarding correct hand hygiene practices to be followed at all times, sufficient knowledge and training with respect to hand hygiene, feeling of guilt after omitting a hand hygiene by self and feeling of uncomfot when others omit hand hygiene as well as perception of the dirty areas of the hands was good in nurses as against residents which was not statistically significant [Table/Fig-2].

DISCUSSION

The knowledge about good hand washing practices and compliance of the same according to WHO guidelines amongst health care workers is essential for lowering the health care associated infections.

In this study, both residents and nurses had average knowledge on hand hygiene. Seventy five respondents answered correctly when asked about the main route of transmission of potentially harmful germs between patients. Our results are comparable with other studies [9] which reported that 72% of participants knew that unhygienic hands of health care workers were the main route of transmission.

However, only 45% of residents & 27% of nurses knew that the most frequent source of germs responsible for HCAI's were the germs already present on or within the patient, with residents having significantly better knowledge in this aspect.

WHO recommends alcohol based hand rubs for hand antiseptis based on its intrinsic advantages of fast acting, broad spectrum microbicidal activity and to improve compliance by making the process faster, but due to its non-availability in some of the hospitals, adherence is doubtful. In this study, knowledge that alcohol free hand rub is more rapid and more effective against germs than handwashing was better among residents. However, only some of the residents and nurses (35% and 25% respectively) were aware about the minimum time needed for effective hand hygiene as mentioned in WHO guidelines. Our findings were similar to a study carried out by Khaled M. AbdElaziz [10] at Ain Shams University, Cairo. Wherein 23.2% of observed candidates showed inappropriate hand washing due to both short contact time (less than 30 sec) and improper drying after hand washing.

A study done by W.E Trick [8] have shown that 40% of the nurses harbored the gram negative bacilli, *Acinetobacter spp.* on the skin under the rings and some of them carried the same organism under their rings for months.

Both groups had answered below satisfaction level regarding type of hand hygiene method required before palpation of abdomen (33%), before giving an injection (27%), and after making a patients bed (21%).Comparative values given in study of MHID Ariyaratne in Srilanka [9] are 31%, 26% & 25% respectively.

Both the groups were aware of the type of hand hygiene method required after removing examination gloves (70% and 82.5%) and also after emptying a bed pan (68.8% and 80%) respectively and thus showed good knowledge in this respect. Kim et al., had found a positive association between glove use and subsequent hand disinfection [11]. 22.5%,38.6% and 70.4% of the nurses in Khaled M., Abd Elaziz [10] study performed hand washing after removing gloves, patients contact and after body fluid contact in comparison to 61.4%, 43.9% and 39.8% of the observed opportunities among health care workers in study done at Cairo.

However, overall knowledge regarding the type of hand hygiene method needed in the required clinical situation was unsatisfactory and thus this study identified gaps in their knowledge & areas needed for improvement. One of the reasons may be unavailability of hand rub solution and even soap and water in the hospital for residents

and staff nurses as shown in [Table/Fig-1]. Previous studies showed increase in compliance and correlated it with the availability of hand rub solutions at the bedside of the patient [9].

The best way to improve handwashing compliance based on the finding of this study was motivation, training and education of health care workers followed by availability of alcohol based hand rubs. Nurses showed more positive attitudes towards hand hygiene. In a study conducted by JB Suchitra [12] at Department of Microbiology, Mysore University it was revealed that compliance for hand washing was maximum among nurses, intermediate for technicians and the least for doctors. Barriers to practice hand hygiene was attributed to lack of education, high work load, understaffing, working in critical care units, lack of encouragement, lack of role model among senior staff & lack of knowledge of guidelines set by the institution.

A majority of the nurses (62.5%) agreed that correct hand hygiene practices should be followed at all times compared to (21.3%) residents. Further, a significantly higher percentage of nurses thought that health care personnel should have sufficient knowledge and training about hand hygiene as well as enroll in regular training sessions regarding hand hygiene practices (75% and 49% respectively).

More nurses felt guilty about omitting hand hygiene and also felt uncomfortable when others omit hand hygiene (70% & 56% respectively) as compared with residents. Furthermore, our results are comparable with other studies and reports. Corresponding values for MHID Ariyaratne in Sri Lanka are 69% & 39% respectively.

CONCLUSION

Present study highlights the importance of training sessions regarding hand hygiene practices among the residents and staff nurses to provide the current and updated knowledge in the area of nosocomial infections and prevention of infections. It would also translate in a behavioral change of attitudes and practices that

would help in reducing the incidence of nosocomial infections. The World Health Organization (WHO) contributes to this effort through the Patient Safety Program with its First Global Patient Safety Challenge "Clean Care is Safer Care" (CCISC), launched in 2005 and dedicated to the prevention of HCAI.

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PARTICULARS OF CONTRIBUTORS:

1. Post Graduate Resident, Department of Microbiology, Peoples College of Medical Sciences and Research Centre, Bhopal, India.
2. Associate Professor, Department of Microbiology, Peoples College of Medical Sciences and Research Centre, Bhopal, India.
3. Professor, Department of Microbiology, Peoples College of Medical Sciences and Research Centre, Bhopal, India.
4. Associate Professor, Department of Community Medicine, Peoples College of Medical Sciences and Research Centre, Bhopal, India.
5. Assistant Professor, Department of Community Medicine, Peoples College of Medical Sciences and Research Centre, Bhopal, India.
6. Post Graduate Resident, Department of Community Medicine, Peoples College of Medical Sciences and Research Centre, Bhopal, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Veena Maheshwari,
Post Graduate Resident, Department of Microbiology,
Peoples College of Medical Sciences and Research, Peoples University
Bhanpur, Bhopal MP-462037, India.
Phone (O) 0755-4005115, +917354755531, E-mail : Veenamaheshwari2@gmail.com

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