

ORIGINAL RESEARCH

Knowledge and Behavior analysis of Healthcare worker's Hand Hygiene- In the Era of COVID-19 At A Level 3 Centre

Dr. Jyoti Khatri¹, Dr. Sapna Singh², Dr. Saima Siddique³, Dr. Rehana Najam⁴,
Dr. Astha Lalwan⁵, Dr. Prafull⁶

¹P. G, 3rd Year, Department of Obstetrics & Gynaecology, Teerthanker Mahaveer Medical College & Research Center, Moradabad, Uttar Pradesh, India.

²P. G, 3rd Year, Department of Obstetrics & Gynaecology, Teerthanker Mahaveer Medical College & Research Center, Moradabad, Uttar Pradesh, India.

³Consultant at Accidental Care Hospital, Railway Station, Gorakhpur, India.

⁴Consultant at Sunshine Hospital Gandhi Nagar, Moradabad, Uttar Pradesh, India

⁵Professor, Department of Obstetrics & Gynaecology, Teerthanker Mahaveer Hospital & Research Centre, Moradabad, Uttar Pradesh, India.

⁶Pharm D., Department of Pharmacy Practice, Teerthanker Mahaveer Hospital & Research Centre, Moradabad, Uttar Pradesh, India.

Corresponding Author: Dr. Jyoti Khatri, P.G, 3rd Year, Department of Obstetrics & Gynaecology, Teerthanker Mahaveer Medical College & Research Center, Moradabad, Uttar Pradesh, India.

Email: jyoti_khatri@outlook.com

Orcid id - 0000-0001-5134-7053

ABSTRACT

Background: Health-care-associated infection (HCAI) is one of the most important and pervasive problems in the medical field. When the healthcare system first began, maintaining clean hands was thought to play a critical part in reducing hospital acquired illnesses. It has become more important for healthcare professionals to practice good hand hygiene at the outset of the Covid pandemic.

Methods: - A cross-sectional observational research conducted at Teerthanker Mahaveer Medical College & Research Center Hospital in Moradabad by using a convenience sequential sampling method 360 professionals were enrolled then divided into 3 groups for comparison and assess knowledge, attitude, practices (behavior) the WHO knowledge questionnaire, attitude and self-perceived practices via Likert scale.

Results: Of the 360 participants were involved in the study, we found that majority (doctors-60.4%, nurses- 70.8%, ward staff-74.8%) had received knowledge on hand hygiene in last three years but the overall most participants had positive attitude of the respondents towards hand hygiene and more than 70 % of participants considered it as an essential part of their role during practice but still practices lagged situationally.

Conclusion: We concluded that there is lacunae in training leading to differences in attitude and practices when compared to knowledge of the health care worker even after a pandemic. Laying importance on the training of staff of all strata.

Keywords: Attitude, Covid 19, hand hygiene, health care worker, knowledge, practice.

INTRODUCTION

In recent years, patient's safety has become high priority for health-care organizations. To achieve the patient safety goal, health-care providers have focused their efforts on strategies for infection prevention and control. Among many different factors, it has been documented that poor knowledge and compliance of health-care providers toward hand hygiene have contributed to poor patient safety outcomes.^[1]

So proper and good hand hygiene is the simplest proven method which has an undisputed role in reduction of health care associated infections among hundreds of millions of patients. In present situation of rising infection rate and growing antibiotic resistance, there is dire need to reduce the high levels of infections and therefore it is necessary to emphasize the importance of hand hygiene.^[2]

In 2009, the World Health Organization (WHO) launched a global campaign called "SAVE LIVES: Clean Your Hands" as part of a massive global push to promote hand hygiene in healthcare. It was a natural progression from the World Health Organization's First Global Patient Safety Challenge, Clean Care is Safer Care.^[3] WHO is urging policymakers, infection control officers, administrators, healthcare workers (HCWs), and other patient care groups to help adopt Hand hygiene as a cornerstone to enhance healthcare quality as part of the campaign.^[4]

Reducing the risk of healthcare-associated infections is well-known as one of the International Patient Safety Goals (IPSGs) (HCAIs). HCAs, on the other hand, are still a major concern in hospitals across the world, posing a number of health hazards to both patients and healthcare staff.^[5,6] In this context, the World Health Organization stated among 2009 that the prevalence of HCAs in hospitalized patients in affluent nations ranged from 5% to 15%. HCAs were found to be prevalent in 14.8 % to 19.1 % of hospitals in numerous poor nations, according to a recent prevalence survey.^[7,8]

In developing countries like India, the adherence to hand hygiene practices among health care workers has been found to be unacceptably low despite high increase prevalence of Health Care Associate Infections (HCAI's). Therefore, the first step in improvement of hand hygiene is to assess healthcare workers perception of hand hygiene. After the recent magnanimous pandemic of COVID -19, hand hygiene has been one of the cornerstones in the COVID-19 infection prevention strategies and improvement in the practices have played a significant role in reducing the risk of infection transmission between health care persons.^[9] Therefore, the present study had been doneto assess the level of hand hygiene knowledge, compliance, attitude and practices among HCW's of Teerthanker Mahaveer College & Research Center,Moradabad. (U.P).

Aim & Objectives

To assess hand hygiene Knowledge, Attitude, Practices (Behavioral) among health care workers in post covid era.

MATERIAL & METHODS

Study design and setting

This is a hospital-based cross-sectional study, conducted at Teerthanker Mahaveer Medical College and Research Center, which is 1000 bedded tertiary care centre in Uttar Pradesh, India.

Inclusion and Exclusion Criteria

The study included clinical staff working at the hospital including doctors, nurses and ward staff who has worked during COVID-19 pandemic at Level 3 centre.

However, the healthcare workers who were not willing to participate in the study, health workers with injury, administrative staff, engineers and security were excluded.

Sample size calculation

By using below formula

$$n = \frac{Z_{\alpha/2}^l P (100 - P)}{t^2}$$

- $Z_{\alpha/2}^l$: Standard Normal Variate
- P : Prevalence Rate
- E : Margin of error

Values

- $Z_{\alpha/2}^l$: 1.96 at 95% confidence interval
- P : 63.04 %
- E : 5 %

$$n = \frac{(1.96)^2 \times (63.04) \times (100 - 63.04)}{(5)^2}$$

The final calculated sample size consists of 360 subjects which were divided into three groups

Group A- Doctors

Group B- Nurses

Group C- Ward staff

Data collection methods and instruments used

A structured, self-administered questionnaire was distributed to the participants after taking informed verbal consent. A thorough explanation about the study was provided to the participants.

Part A – Socio Demographic Profile Sheet: Gender, age, and profession are few factors that are included under part A of our study.

Part B – Hand Hygiene knowledge questionnaire: A questionnaire based on WHO hand hygiene which was further distributed among the HCWs and their response were recorded for obtaining their knowledge regarding hand hygiene.

The pre-validated World Health Organization (WHO) designed questionnaire on knowledge was used as the survey instrument with a pro-forma of 21 questions which includes multiple choice questions on knowledge of Hand hygiene.^[10]

Part C – Attitude & Practice: Inspired by CDC and All India Institute of Medical Sciences, we established a 7-point Likert scale with 10 and 6 questions linked to attitude and practices toward hand hygiene activities. Respondents were given the option to select on a 7-point Likert scale between strongly agree and strongly disagree. A score of 0 was given for inappropriate attitude and inadequate practices. 1 point will be given for each correct response to positive attitudes and good practices so that maximum score for attitude is 10 and practice is 6. A score of more than 75% will be considered good, 50–74% moderate, and less than 50% will be taken as poor.^[11] For the study, the attitude and practice scale and scoring was confirmed to be valid and reliable through expert validation.

Statistical Analysis

The results obtained were statistically analyzed using Chi square test with the help SPSS 23 software, to assess the various parameters of hand hygiene keeping level of significance at p less than 0.05.

RESULTS

The table 1 depicts socio-demographic, age and profession related information of health care workers. It revealed that 57.2% HCWs were females and 42.8% were male. In terms of professional education of Staff, 20% HCWs were nurses, 6% OT technicians, 38.8% Doctors remaining were ward staff.

Table 1: Shows sociodemographic data of health care workers

VARIABLES		n (%)
GENDER	Male	154 (42.8)
	Female	206 (57.2)
AGE	20 – 25	16 (4.4)
	26 – 30	258 (71.7)
	31 – 35	55 (15.3)
	36 – 40	17 (4.7)
	Above 41	14 (3.9)
PROFESSION	Doctors (Group A)	164 (45.5)
	Nurses (Group B)	72 (20.0)
	Ward Staff (Group C)	124 (34.4)

Knowledge among the three groups of health care workers was assessed and it was found that the overall knowledge on hand hygiene among the participants was moderate. On analyzing the results, it was found that comparing the three groups, doctors had better knowledge on hand hygiene than the other two groups. The responses of participants for an individual question is shown in table 2.

Table 2: Shows assessment of Knowledge among the three groups of health care workers

Question	Options	Group A N (%)	Group B N (%)	Group C N (%)	P value
Did you receive formal training in hand hygiene in the last three years?	Yes	99 (60.4)	51 (70.8)	92 (74.2)	0.036*
	No	65 (39.6)	21 (29.2)	32 (25.8)	
Do you routinely use an alcohol-based handrub for hand hygiene?	Yes	151 (92.6)	66 (91.7)	112 (90.3)	0.868
	No	13 (7.9)	6 (8.3)	12 (9.7)	
Which of the following is the main route of cross-transmission of potentially harmful germs between patients in a health-care facility?	Air circulating in the hospital	7 (4.3)	3 (4.2)	3 (2.4)	0.758
	Health care workers hand when not clean	100 (61)	38 (52.8)	69 (55.6)	
	Patients' exposure to colonised surfaces	31 (18.9)	17 (23.6)	25 (20.2)	
	Sharing non-invasive objects between patients	26 (15.9)	14 (19.4)	27 (21.8)	
What is the most frequent source of germs responsible for health care-associated infections?	Germs already present on or within the patient	50 (30.5)	25 (34.7)	48 (38.7)	0.709

	The hospital air	23 (14)	13 (18.1)	18 (14.5)	
	The hospital environment (surfaces)	78 (47.6)	28 (38.9)	51 (41.1)	
	The hospital's water system	13 (7.9)	6 (8.3)	7 (5.6)	
Which of the following hand hygiene actions prevents transmission of germs to the patient?					
Before touching a patient	Yes	159 (97)	65 (90.3)	120 (96.8)	0.087
	No	5 (3)	7 (9.7)	4 (3.2)	
Immediately after a risk of body fluid exposure	Yes	113 (68.9)	54 (75)	103 (83.1)	0.020*
	No	51 (31.1)	18 (25)	21 (16.9)	
After exposure to the immediate surroundings of a patient	Yes	113 (68.9)	57 (79.2)	103 (83.1)	0.015*
	No	51 (31.1)	15 (20.8)	21 (16.9)	
Immediately before a clean/aseptic procedure	Yes	150 (91.5)	67 (93.1)	114 (91.9)	0.916
	No	14 (8.5)	5 (6.9)	10 (8.1)	
Which of the following hand hygiene actions prevents transmission of germs to the health-care worker?					
After touching a patient	Yes	132 (80.5)	62 (86.1)	104 (83.9)	0.527
	No	32 (19.5)	10 (13.9)	20 (16.1)	
Immediately after a risk of body fluid exposure	Yes	138 (84.1)	67 (93.1)	106 (85.5)	0.136
	No	26 (15.9)	5 (6.9)	18 (14.5)	
After exposure to the immediate surroundings of a patient	Yes	135 (82.3)	63 (87.5)	111 (89.5)	0.198
	No	29 (17.7)	9 (12.5)	13 (10.5)	
Immediately before a clean/aseptic procedure	Yes	135 (82.3)	61 (84.7)	107 (86.3)	0.650
	No	29 (17.7)	11 (15.3)	17 (13.7)	
Which of the following statements on alcohol-based handrub and handwashing with soap and water are true ?					
Handrubbing is more rapid for hand cleansing than handwashing	True	43 (26.2)	20 (27.8)	31 (25)	0.912
	False	121 (73.8)	52 (72.2)	93 (75)	
Hand rubbing causes skin dryness more than handwashing	True	47 (28.7)	23 (31.9)	30 (24.2)	0.476
	False	117 (71.3)	49 (68.1)	94 (75.8)	
Hand rubbing is more effective against germs than handwashing	True	146 (89)	55 (76.4)	109 (87.9)	0.040*
	False	18 (11)	17 (23.6)	15 (12.1)	
Handwashing and hand rubbing are recommended to be performed in sequence	True	112 (68.3)	45 (62.5)	89 (71.8)	0.408
	False	52 (31.7)	27 (37.5)	35 (28.2)	
What is the minimal time needed for alcohol-based hand rub to kill most germs on your hands?	20 seconds	76 (46.3)	41 (56.9)	60 (48.4)	0.528
	3 seconds	12 (7.3)	2 (2.8)	11 (8.9)	
	1 minute	40 (24.4)	14 (19.4)	30 (24.2)	
	10 seconds	36 (22)	15 (20.8)	23 (18.5)	
Which type of hand hygiene method is required in the following situations?					
Before palpation of abdomen	Rubbing	125 (76.2)	50 (69.4)	96 (77.4)	0.439
	Washing	39 (23.8)	22 (30.6)	28 (22.6)	
Before giving an injection	Rubbing	72 (43.9)	31 (43.1)	46 (37.1)	
	Washing	92 (56.1)	41 (56.9)	78 (62.9)	
After emptying a bedpan	Rubbing	25 (15.2)	7 (9.7)	22 (17.7)	0.291
	Washing	139 (84.8)	65 (90.3)	102 (82.3)	
After removing examination gloves	Rubbing	13 (7.9)	6 (8.3)	12 (9.7)	0.869
	Washing	151 (92.1)	66 (91.7)	112 (90.3)	
After making patient bed	Rubbing	9 (5.5)	6 (8.3)	5 (4)	0.465
	Washing	155 (94.5)	66 (91.7)	119 (96)	
After visible exposure to blood	Rubbing	5 (3)	4 (5.6)	8 (6.5)	0.366
	Washing	159 (97)	68 (94.4)	116 (93.5)	
Which of the following should be avoided, associated with increased likelihood of colonization of hands with harmful germs?					
Wearing jewelry	No	7 (4.3)	3 (4.2)	6 (4.8)	0.966
	Yes	157 (95.7)	69 (95.8)	118 (95.2)	
Damaged skin	No	9 (5.5)	2 (2.8)	7 (5.6)	0.586
	Yes	155 (94.5)	70 (97.2)	117 (94.4)	
Artificial fingernails	No	2 (1.2)	3 (4.2)	3 (2.4)	0.382

	Yes	162 (98.8)	69 (95.8)	121 (97.6)	
Regular use of hand cream	No	61 (37.2)	28 (38.9)	30 (24.2)	0.031*
	Yes	103 (62.8)	44 (61.1)	94 (75.8)	

*=statistically significant

The response of the participants to attitude based questions revealed that their attitude towards hand hygiene was not satisfactory. But both doctors and nurses showed positive attitude towards hand hygiene when compared to the ward staff (table 3). The response of the participants to attitude based questions is given in table 3.

Table 3: Shows assessment of Attitude among the three groups of health care workers

Attitude Item Attitude Items s	Health care workers care			P value
	Group A N (%)	Group B N (%)	Group C N (%)	
I adhere to correct hand hygiene practices at all times	80 (48.7)	35 (48.6)	60 (48.3)	0.855
I have sufficient knowledge about hand hygiene	87 (53)	41 (56.9)	66 (53.2)	0.999
Sometimes I have more important things to do than hand hygiene	42 (25.6)	19 (26.3)	31(25)	0.724
Emergencies and other priorities make hygiene more difficult at times	66 (40.2)	31 (72)	44 (35.4)	0.806
Wearing gloves reduces the need for hand hygiene	57 (34.7)	31 (43)	39 (31.4)	0.386
I feel frustrated when others omit hand hygiene	102 (62.1)	48 (66.6)	87 (70)	0.745
I am reluctant to ask others to engage in hand hygiene	57 (34.7)	33 (45.8)	44 (35.4)	0.898
Newly qualified staff has not been properly instructed in hand hygiene in their training	85 (68.5)	42 (58.3)	66 (53.2)	0.954
I feel guilty if I omit hand hygiene	117 (71.3)	55 (76.3)	89 (71.7)	0.000*
Adhering to hand hygiene practices is easy in the current setup	125 (76.2)	55 (76.3)	92 (74.1)	0.995

On analysis of the hand hygiene practice among the participants, most of them exhibited moderate hand hygiene practice. On comparing, doctors and nurses showed better hand hygiene practice than ward staff. Responses to individual question are shown in table 4.

Table 4: Shows assessment of Practice among the three groups of health care workers

Attitude Item Attitude Items s	Health care workers care			P value
	Group A N (%)	Group B N (%)	Group C N (%)	
Sometimes I miss out hand hygiene simply because I forget it	56 (34.1)	22 (30.5)	45 (36.2)	0.889
Hand hygiene is an essential part of my role	138 (84.1)	51 (70.8)	94 (75.8)	0.008*
The frequency of hand hygiene required makes it difficult for me to carry it out as often as necessary	80 (48.7)	37 (51.3)	67 (54.0)	0.823
Infection prevention team have a positive influence on my hand hygiene	92 (56.0)	45 (62.5)	76 (61.2)	0.091
Infection prevention notice boards remind me to do hand hygiene	119 (72.5)	49 (68.0)	89 (71.7)	0.945
It is difficult for me to attend hand hygiene courses due to time pressure	116 (70.7)	51 (72)	90 (72.5)	0.950
Sometimes I miss out hand hygiene simply because I forget it	56 (34.1)	22 (30.5)	45 (36.2)	0.889
Hand hygiene is an essential part of my role	138 (84.1)	51 (70.8)	94 (75.8)	0.008*
The frequency of hand hygiene required makes it difficult for me to carry it out as often as necessary	80 (48.7)	37 (51.3)	67 (54.0)	0.823
Infection prevention team have a positive influence on my hand hygiene	92 (56.0)	45 (62.5)	76 (61.2)	0.091

DISCUSSION

Hand hygiene is the first effective basic action to prevent infection among populations inside and outside of hospitals. The preparations to simplest infection prevention must take place for health-care workers. The present investigation was conducted at Teerthanker Mahaveer Medical College and Research Centre, located in Moradabad, Uttar Pradesh,

India. The aim of this study was to examine the level of knowledge, attitude, and practices (behaviour) towards hand hygiene among a sample of 360 healthcare employees including 164 doctors, 72 nurses and 140 ward staff.

In the present study, the participation of female (57.2%) workers were more as compared to male (42.8%) workers and the highest responders were doctors (45.5%), the results were in accordance to previous studies done by Al kadi A et al and Amin TT et al.^[12,13]

In our study analysis of the responses showed that health care workers had moderate knowledge on hand hygiene, similar to findings in study done by MHJD Ariyaratne.^[14] Though this was a positive finding, major gaps in the knowledge were identified which should be addressed during the future training sessions. For instance some participants were not aware that hand hygiene is to be practiced before patient contact and after contact with patient surroundings. Ward staff exhibited more of such gaps in knowledge than the other two groups. 68.9% of doctors said yes to the statement that “Immediately after a risk of body fluid exposure” following hand hygiene actions prevents transmission of germs to the patient.

The attitude of the participants towards hand hygiene was overall average. Nearly 48.7% of the doctors, 48.6% of nurses & 48.3% of ward staff agreed that they don't adhere to correct hand hygiene practice all the time. This is similar to the finding in a study done by Sasidharan et al where nursing staff dents showed better attitudes (52.1%) than medical students (12.9%).^[15] Nearly 34.7% of doctors, 43% nurses and 34.1% of ward staff had the misconception that wearing gloves obviates the need for practicing hand hygiene. More than 70% of participants in our study felt that following hand hygiene was difficult in the current set up. This could be due to the lack of facilities and this could be overcome by setting up bedside hand rubs, maintaining the patient to sink ratio etc which was studied as direct observation and supportive analysis done as part D is corroborated as separate article.

In the present study few doctors and nursing staff felt that they had sufficient knowledge on hand hygiene as compared to ward staff because they are taught on hand hygiene during the early part of their curriculum. This explains the need to conduct training sessions for all the workers and emphasis on the importance of hand hygiene. The participants also felt that presence of infection control notice boards in the workplace will have a positive influence on adherence to hand hygiene. Nearly 84.1% of doctors, 70.8% of nurses and 75.8% of ward staff agreed that hand hygiene is an essential part of their role as it prevents them from infection.

The current study findings showed some limitations as this was a cross sectional design, which, does not take into account the possible changes in knowledge and compliance of the same cohort of subjects across time. In addition, this study was conducted in a single tertiary hospital. Therefore, the results may not be generalizable to other places without having all the facilities available at hospital.

CONCLUSION

Hand hygiene is the first line in preventing infection in hospitals and in the general community. Hand hygiene knowledge among doctors was generally good. Courses covering hand hygiene increase knowledge scores across all settings. The most recent outbreak of covid 19 is a stark reminder to care center and providers about the significance of hand hygiene and other protective and preventive measures against killer viruses and pathogens. It is now more than ever that the issue of hand hygiene is taken seriously not only in hospitals but also in other settings and within the community.

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