

Baseline assessment of hand hygiene knowledge perception: An observational study at a newly set up teaching hospital

Aroop Mohanty¹, Puneet K. Gupta¹, Priyanka Gupta¹, Neelam Kaistha¹,
Pratima Gupta¹, Ravi Shankar¹, Pradeep Kumar²

¹Department of Microbiology, All India Institute of Medical Sciences (AIIMS), Rishikesh, Uttarakhand, ²Department of Microbiology, Institute of Liver and Biliary Sciences, New Delhi, Delhi, India

ABSTRACT

Background: Hand hygiene plays a crucial role in preventing health-care-associated infections (HCAIs) by reducing the spread of antimicrobial resistance. But, its compliance with optimal practices usually remains low at most of our health-care settings. **Aim:** This study focused on one of the primordial, basic and low-cost practice of infection control. **Materials and Methods:** A cross-sectional observational study was conducted among medical faculty, senior residents, postgraduates, nursing faculty, ward sisters/matron, and staff nurses at All India Institute of Medical Sciences (AIIMS), Rishikesh, Uttarakhand. Data were collected on a pretested structured questionnaire distributed among the participants, which consisted of questions to assess the knowledge and perception toward hand hygiene. **Results:** A total of 171 health-care workers (HCWs) were assessed in this study. Overall response rate observed was $87.8\% \pm 11.6\%$. Majority of the participants were staff nurses. Approximately 55% of them had received formal hand hygiene training in the last 3 years. Overall correct knowledge seen among participants was $66.4\% \pm 27.5\%$. It was observed that in situations requiring hand hygiene, it was performed in approximately 70%–80% of the times. Alcohol-based hand rub was not available at every point of care, whereas single-use towel was not present at every sink. When monitored whether the HCW started hand hygiene activity or not, compliance was seen in only 32% of the total. **Conclusion:** It is now essential for developing countries to formulate the policies for implementation of basic infection control practices. As we are facing an era of multidrug-resistant pathogens that are rapidly increasing globally, and paucity of availability of new antimicrobials, it is been essential to look at the role of basic infection control practices at health-care settings and implement them at priority level.

Keywords: Hand hygiene, health care associated infection, health-care worker

Introduction

According to World Health Organization (WHO), “Hand hygiene is defined as a general term referring to any action of hand cleansing.” Labarraque in the nineteenth century provided the first evidence of hand washing and documented that hand

decontamination could reduce the incidence of puerperal fever and maternal mortality rates.^[1] There have been many studies stating the fact that health-care workers (HCWs) hands play a crucial role in transmission of microorganisms within the health-care environment and ultimately to the patients.^[2] Thus, hand hygiene (HH) is considered one of the most important procedures in preventing health-care-associated infections (HCAIs). It is being recommended that health-care personnel should wash their hands or perform hand rub before and after significant contact with any patient. HCWs

Address for correspondence: Dr. Puneet K. Gupta,
Department of Microbiology, All India Institute of
Medical Sciences (AIIMS), Rishikesh, Uttarakhand, India.
E-mail: drpuneetkumargupta@gmail.com

Received: 03-01-2020

Revised: 11-03-2020

Accepted: 23-03-2020

Published: 31-05-2020

Access this article online

Quick Response Code:



Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_20_20

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How to cite this article: Mohanty A, Gupta PK, Gupta P, Kaistha N, Gupta P, Shankar R, *et al.* Baseline assessment of hand hygiene knowledge perception: An observational study at a newly set up teaching hospital. J Family Med Prim Care 2020;9:2460-4.

can contaminate their hands by touching the patients' skin, body secretions, or environment while performing routine care activities as patients' skin may have colonizing pathogens that are being shed into surroundings leading environmental contamination.^[3]

HCAIs are a major problem for patient safety and its surveillance and control must be of top priority for settings and institutions committed to making health-care safer. The impact of HCAI implies prolonged hospital stay, long-term disability, infection with multidrug resistant (MDR) pathogens, high costs for patients and their families, and thus a massive additional financial burden. Although the risk of acquiring HCAI is universal and a concern for every health-care facility, the actual global burden is still unknown because of the difficulty in getting reliable data. According to WHO, overall estimates indicate that more than 1.4 million patients worldwide in developed and developing countries are affected at any time.^[4] Effective HH behavior compliance rates are quite low and have been reported from both developed and developing countries, rarely exceeding 40% of situations in which HH is indicated.^[5-7] Variable reasons such as the lack of appropriate reagents, the cultural background, behavioral and even religious beliefs can be important hurdles in preventing good HH practices.^[8-10] There are numerous factors that play a role in eventually determining the lack of compliance, perception, and knowledge of the transmission risk and of the impact of HCAI. Lack of hand-washing facilities and hand-rub availability (i.e. sinks, running water, and sewage systems) are major factors for implementation of HH practices.^[11] It is being observed that interactive educational programs along with free availability of hand disinfectants significantly increase the HH compliance.^[12-14]

There is a rapid global spread of MDR infections in health-care setups, which are the leading cause of HCAIs and there are well-documented studies that improved HH can reduce infection rates. Numerous hospital-based studies of the impact of HH on risk of HCAIs have already been published.^[15-17] As WHO stresses on Clean Care is Safer Care as a primary initiative on patient safety programs, it is crucial to focus upon measures that can increase the basic knowledge and perception of HH and to formulate the much-needed policies for implementation of basic infection prevention practices in health-care setups.

Materials and Methods

Approval from ethics committee was obtained. Date of approval is 14 Dec 2016. This was a cross-sectional observational study conducted in 2019 among medical and nursing faculties, senior residents, postgraduates, ward sisters/matron, and staff nurses at All India Institute of Medical Sciences (AIIMS), Rishikesh. This is an 800-bedded, tertiary care, government hospital situated in Rishikesh, Uttarakhand. Its catchment area includes the whole of Uttarakhand and neighboring states of Uttar Pradesh, Himachal Pradesh, and Delhi. The study population included all HCWs including staff nurses, medical faculties, senior and

junior residents, and were fully informed about the design and purpose of the study. Participation in this study by health-care staff was on voluntary basis.

A written informed consent was obtained from each participant and anonymity of the participants was maintained throughout the study. To assess the knowledge and awareness regarding HH practices, a pretested structured questionnaire was distributed among all the participants. Baseline profile regarding gender, age, or name was included in the questionnaire.

Results

A total of 171 HCWs were included in this study. Among the total participants, staff nurses (56%), medical faculties (24%), junior residents (13%), and senior residents (7%) were included. Response rate observed was 87.8% ± 11.6% (range: 32.2%–99.4%), whereas correct knowledge was 66.4% ± 27.5% (range: 23.6%–95.9%). It was found that 55% HCWs had received formal HH training in previous 3 years but majority of them (93%) were using alcohol-based sanitizers for HH. Majority of the participants were males (53%) as compared with females (47%). Most of them who responded belonged to age group 20–30 years (71%) followed by age group 31–40 (21%) and >40 years (8%), respectively. A total of 49 questions were asked in the form, of which 12% were on basic profile, 51% on knowledge assessment, and 37% were perception-based questions.

In knowledge-based questions, variable responses were observed from participants [Tables 1–6]. A total of 152 participants responded to the main route of cross-transmission of potentially harmful germs between patients in a health-care facility, of which 134 (88%) correctly responded as unclean hands of health-care workers. Others responded air, environmental exposure, and sharing noninvasive objects as the main route of transmission. A total of 166 participants responded to the question regarding

Table 1

Which of the following is the main route of cross-transmission of potentially harmful germs between patients in a health-care facility?

Unclean hands of health-care workers	87%
Air circulating in the hospital	3%
Patients' exposure to colonized surfaces (i.e., beds, chairs, tables, floors)	2%
Sharing non-invasive objects (i.e., stethoscopes, pressure cuffs, etc.) between patients	8%

Table 2

What is the most frequent source of germs responsible for health-care-associated infections? (response given by 96.5%)

The hospital's water system	1.2%
Hospital air	4.2%
Germs already present on or within the patient.	23.6%
The hospital environment (surfaces)	40.9%

minimal time needed for alcohol-based hand rub to kill most germs on your hands, of which 90 (54%) knew the right duration and correctly answered 20 s.

Similarly, in baseline perception assessment a wide range of variable results were observed. The average percentage of hospitalized patients was 41% ± 26% (range 0%–100%), and who will develop a health-care-associated infection was answered by only 60% of participants. Eighty-nine participants responded that 69.5% ± 30% (3%–100%) average number of times that HCWs do HH. However, 149 participants responded that they usually do HH in 78% ± 20.4% of situations requiring HH. Baseline perception-based answers are shown in Tables 7–10. Questions on structural assessment are shown below Table 11 and 12.

Discussion

The knowledge regarding good hand washing practices and compliance of the same among HCWs is mandatory for decreasing the health-care-associated infections and to improve patient and provider safety. In this study, an attempt was made to assess the knowledge and awareness regarding HH among the medical residents and faculties along with the staff nurses of a tertiary care teaching hospital in Uttarakhand. This was in contrast to other studies conducted in different parts of the country where HH compliance was measured in selective locations of the hospital. It also determined the association with some sociodemographic features and provided us with significant findings. The existing knowledge and awareness were assessed by administering a structured questionnaire as pretest to all the participants. Majority of the study participants were males and belonged to the age group of 21–30 years. In total, 87% respondents answered correctly when asked about the main route of transmission of potentially harmful germs between patients. In a study conducted by Sreejith Nair *et al.*,^[18] 75.6% and by Glad Mahesh *et al.*^[19] 48.6% medical students were able to acknowledge this fact. However, only 23% of participants knew that the most frequent source of germs responsible for HCAs were the germs already present on or within the patient, which was similar to study by Shinde *et al.*^[20] on nursing students (26%) and by Kudavidnange *et al.*^[21] on intensive care unit staff (25%).

As per WHO, alcohol-based hand rub is more effective for antisepsis as it increases the compliance by making the process faster and also due to the fact that it shows broad spectrum microbicidal activity. But in majority of the hospitals these hand rubs are either not available or are out of stock, thus making it very difficult to adhere to. On the contrary, in our study, majority of the respondents (67%) believed that hand wash is a more effective way than hand rub to kill germs. Approximately 54% were aware about the minimum time needed for effective for HH as mentioned in the WHO guidelines. Compared to similar studies in India, our participants had better knowledge.^[22] The participants answered above satisfaction level regarding type of HH method required before palpation of abdomen (80%), emptying the patient’s bed pan (89%), and after visible exposure

Table 3

Which of the following hand hygiene actions prevents transmission of germs to the patient? (response given by 68.1%)

	Yes	No
Before touching a patient	94.3%	5.7%
Immediately after a risk of body fluid exposure	47.3%	52.7% ^o
After exposure to the immediate surroundings	73.3%	26.7% ^o
Immediately before a clean/aseptic procedure	94.7%	5.3%

Table 4

Which of the following hand hygiene actions prevents transmission of germs to the health-care worker? (response given by 76.5%)

	Yes	No
After touching a patient	95.9%	4.1%
Immediately after a risk of body fluid exposure	93.2%	6.8%
Immediately before a clean/aseptic procedure	68.3%	31.7%
After exposure to the immediate surroundings of a patient	88.4%	11.6%

Table 5

Which of the following statements on alcohol-based hand rub (HR) and hand washing (HW) with soap and water are true? (response given by 78.2%)

	True	False
HR is more rapid for hand cleansing than HW	84.3%	15.7%
HR causes skin dryness more than HW	58.5%	41.5%
HR is more effective against germs than HW	32.8%	67.2%
HW and HR are recommended to performed in sequence	76.4%	23.6%

Table 6

Which type of hand hygiene method is required in the following situations? (response given by 95%)

	Hand rub	Hand wash	None
Before palpation of abdomen	79.9%	17.7%	2.4%
Before giving injection	48.4%	47.8%	3.7%
After emptying a bed pan	10.9%	88.5	0.6%
After removing examination gloves	23.6%	72%	4.3%
After making patient’s bed	28.5%	70.3%	1.2%
After visible exposure to blood	15.1%	78.0%	6.9%

Table 7

Characteristics	Response	Response rate
Average % of hospitalized patients who will develop a health-care associated infection (between 0 and 100%)	41% ± 26% (range 0%-100%)	60.2%
Average % of situations requiring HH do HCW in your hospital actually perform HH, either by HW or HR	69.5% ± 30% (range 3%-100%)	52%
Average % of situations requiring HH do you actually perform HH, either by HR or HW	78% ± 20.4% (range 0%-100%)	87.1%

to blood (78%). They had poor knowledge regarding the method to be used after removal of examination gloves (72%)

Table 8

	Very low	Low	High	Very high
In general, what is the impact of a health-care-associated infection on a patient's clinical outcome?	3.6	23.5	59.6	13.3
What is the effectiveness of hand hygiene in preventing health-care-associated infection?	0.6	4.8	42.3	52.4
Among all patient safety issues, how important is hand hygiene at your institution?	1.2	4.2	23.6	70.9

Table 9

% Effectiveness of various strategies to improve HH practices (response given by 95.5%)

	1 (not effective)	2	3	4	5	6	7 (very effective)
Support and promotion of HH by administration	4.8	1.8	3	8.5	13.9	19.4	48.5
Always available alcohol-based HR at point of care	2.4	1.8	4.3	6.1	11	25	49.4
Poster reminder	5.5	5.5	5.5	16.0	9.8	19	38.7
Education on HH	5.5	4.2	1.2	9.7	12.1	14.5	52.7

Table 10

% Effectiveness of various strategies to improve HH practices (response given by 95.5%)

Clear and simple visible instructions	3.7	4.3	2.4	10.4	12.8	22	44.5
Providing regular Feedback	8	3.7	7.4	8.6	11.7	25.3	35.2
Good example as a role model	1.9	2.5	1.9	6.2	16.1	26.1	45.3
Reminder by patients	8.0	7.4	11	16.6	12.9	15.3	28.8

Table 11

Importance given by different person toward your optimal HH (response given by 96.7%)

Head of department	0.6	4.8	9.7	13.3	7.3	28.5	35.8
Colleagues	3.0	2.4	7.2	16.3	12.7	27.1	31.3
Patients	6.7	8.5	9.1	13.9	14.5	23.6	23.6

Table 12

Which of the following hand hygiene actions prevents transmission of germs to the health-care worker? (response given by 76.5%)

	OPD	IPD
Easy availability of alcohol-based HR	67%	Yes
At every point of care		No (at trolley)
Sink availability	Yes	Majority wards Available: 8, not in: one (eye ward)
Continuous supply of clean, running water	Yes	Majority wards Available: 6, not available in: 2 (Gen Medicine and Surgery)
Soap at every sink	74%	Yes
Single-use towels available at each sink	No	No
Sink to bed ratio	-	1:12.7

and before giving injection (48%). However, in general the knowledge regarding the type of HH method desired in the required clinical setting was disappointing and thus this study helped us to identify gaps in their knowledge and areas needed for further improvement. One of the reasons may be the inaccessibility of hand-rub solutions and sink areas for hand

wash by soap and water for residents and staff nurses in the wards and even in some of the outpatient departments of the hospital.

It was seen that in 70%–80% of situations requiring HH do the HCW actually perform HH either by hand rub or hand wash. Educational sessions on HH were found to be the most effective strategy to improve HH practices. Like in most previous studies, our study showed that the overall compliance on HH by HCWs was 32%.

This study is of great relevance in the current scenario when the whole world is trying to control the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic. Till date (March 11, 2020), 118326 confirmed cases have been reported by WHO, of which 4292 deaths have occurred.^[23] In India alone, 60 cases of SARS-CoV-2 have been confirmed and till now no deaths have been reported. WHO has assigned this disease under “Very High Risk category.” It still has no definitive treatment and vaccination except hope of some new antivirals.^[24] Therefore, prevention and control is the key to fight this public health problem. Role of proper HH cannot be overemphasized in this context of prevention of transmission effectively but implementation and adherence to HH is still lacking in health-care setups due to various reasons. Thus, regular knowledge attitude practice assessment with gap analysis and continual training is pertinent to improve these health-care practices.

Limitations of study

HH training and its compliance study to correlate appropriate results could not be conducted in this study, which could further improve the results.

Conclusion

HH is an important tool to prevent HCAI and HH should be considered as a major patient safety issue. The HCWs need to inculcate the simple, basic though effective practices of HH in their day-to-day patient care activities. Effective support by administration, continuous surveillance measures, routine

educational and interactive sessions with the staff, and taking feedback may improve effectiveness of HH measures. Emphasis on alcohol-based hand rubs for visibly nonsoiled hands and hand washing with soap and water for soiled hands also play a major role in preventing HCAs. It should be mandatory to place alcohol-based hand rubs at every point of care.

There should be a well-developed and organized hospital infection control committee (HICC) with adequate staff to give evidence-based demonstration to all HCWs at periodic intervals. Thus being simple, HH is most effective basic measure to control HCAs, which should become a national priority to look upon. An effective strategy to implement knowledge into practices to enhance HH compliance is the need of the hour.

There are few challenges in improving HH: Dedicated trained staff for infection control committee and difficulty in time coordination to educate HCWs.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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