

Original Research Article

Study of knowledge and perception of hand hygiene among nursing staff in a tertiary care hospital

Archana P. Nikam*, Pramod R. Bhise, Mukta M. Deshmukh

Department of Microbiology, Dr. Panjabrao Alias Bhausaheb Deshmukh Memorial Medical College, Amravati Maharashtra, India

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*Correspondence:

Dr. Archana P. Nikam,

E-mail: dr.archanapnikam24@gmail.com

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ABSTRACT

Background: Health care-associated infections (HAIs) are a major cause of morbidity and mortality, significantly impacting hospitalized patients. Poor hand hygiene among healthcare workers is a primary contributor to these infections, leading to longer hospital stays, increased antibiotic resistance, and substantial financial burdens. Nurses, being the largest group of healthcare workers with extensive patient contact, play a crucial role in preventing HAIs through proper hand hygiene. This study aimed to assess nurses' knowledge and perceptions of hand hygiene to inform strategies for promoting effective practices.

Methods: This cross-sectional, questionnaire-based study was conducted at a tertiary care hospital, involving 234 nursing staff. Participants provided verbal consent. The study utilized the WHO hand hygiene knowledge questionnaires. Scores were converted to percentages and categorized as good (>75%), moderate (50-75%), or poor (<50%). Incomplete questionnaires were excluded. Data was kept confidential, validated by a pilot test, and analysed using SPSS version 23.

Results: The study included 234 predominantly female (92.73%) and young (62.39% aged 20-30) nursing staff; 96% had received formal hand hygiene training. Regarding knowledge, 62.82% had moderate knowledge, 32.90% had poor knowledge, and only 4.27% demonstrated good knowledge. For perception, a significant majority (80.34%) showed good perception, with 12.39% moderate and 7.26% poor. Gaps were identified in understanding germ sources and the effective use of hand rubs/washes.

Conclusions: The study findings highlight the critical need for tailored, ongoing training programs focusing on practical demonstrations, clarification of germ sources, and effective application methods.

Keywords: Hand hygiene, Healthcare-associated infections, Nurses, Knowledge, Perception, Infection control

INTRODUCTION

Hand hygiene refers to any method used to cleanse the hands, such as washing with soap and water or applying an alcohol-based hand sanitizer, to eliminate transient microorganisms.¹ Practicing effective hand hygiene is the simplest way to lower healthcare-associated infections. Even though hand hygiene is a relatively simple procedure, compliance among healthcare providers is surprisingly low, at just 40%.²⁻⁴ HAIs are a significant cause of morbidity and mortality among hospitalized

patients, accounting for 7-10% of all hospital admissions.⁵ Poor hand hygiene among healthcare workers is a major cause of infections in healthcare settings.⁶ Good hand hygiene practices not only decrease the number of hospital-acquired infections but also lessen their significant impact, which includes, longer hospital stays, long-term disability, increased resistance to antibiotics, massive financial burdens on patients and their families and excess deaths.⁷ Nurses make up the largest group of healthcare workers and spend more time with patients than anyone else. This makes their adherence to hand hygiene

guidelines vital for preventing healthcare-associated infections. Hence this study was conducted at our institute with the aim to assess nurses' knowledge and perceptions of hand hygiene, which will help us develop strategies to promote proper handwashing practices.

METHODS

This cross-sectional, questionnaire-based study was conducted at Dr. Panjabrao alias Bhausaheb Deshmukh Memorial Medical College and Hospital, Amravati, from October 2024 to December 2024 after receiving approval from the institutional ethics committee. We included 234 nursing staff working in different department, who willing to participate and are available during the period of data collection. Verbal consent to participate in the study was taken. The study used the WHO hand hygiene knowledge and perception questionnaire for health care workers to assess participants' knowledge and perception regarding hand hygiene.⁸ Before administering the questionnaire, we provided a brief introduction to the study's purpose and benefits. The survey was completed by participants on-site. We excluded any incomplete questionnaires from our analysis to ensure data quality. The questionnaire was divided into three sections: demographics and occupational details, knowledge, and perception. The knowledge section had 25 statements and was scored from 0 to 25. Score obtained for each participant, were converted into percentage and categorized as good (more than 75%), moderate (50-75%), or poor (<50%). The perception section used a five-point Likert scale to assess 15 statements, with a total score ranging from 15 to 75. Scores were also converted to a percentage and categorized as good (more than 75%), moderate (50-75%), or poor (<50%). The data was kept confidential, validated through a pilot test (those participants were not included in the main study), and then entered into an MS-excel sheet. We used SPSS version 23 for all statistical analysis.

RESULTS

This study assessed 234 nursing staff using a knowledge and perception questionnaire. Participants predominantly female (92.73% vs. 7.26% male) and young, with the largest age group being 20-30 years old (62.39%). Other age groups included 31-40 years (26.06%) and 41-58 years (23.07%), Table 1 shows demographic details of the participants. A high percentage of participants (96%) had received formal hand hygiene training. Table 2 details their responses to the knowledge questionnaire.

A significant portion of participants 147 (62.82%) fell into the moderate knowledge category, with nearly a third 77 (32.90%) exhibiting poor knowledge. Just 10 (4.27%) had good knowledge is shown Figure 1.

The results of the perception questionnaire are displayed in Table 3.

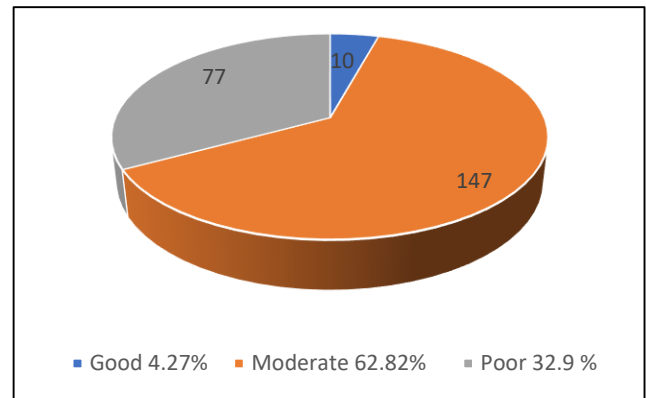


Figure 1: Knowledge score of the participants.

The results of the perception questionnaire are displayed in Table 3.

Most participants 188 (80.34%) showed good perception regarding hand hygiene, while 29 (12.39%) had moderate perception, and 17 (7.26%) had poor perception as shown in Figure 2.

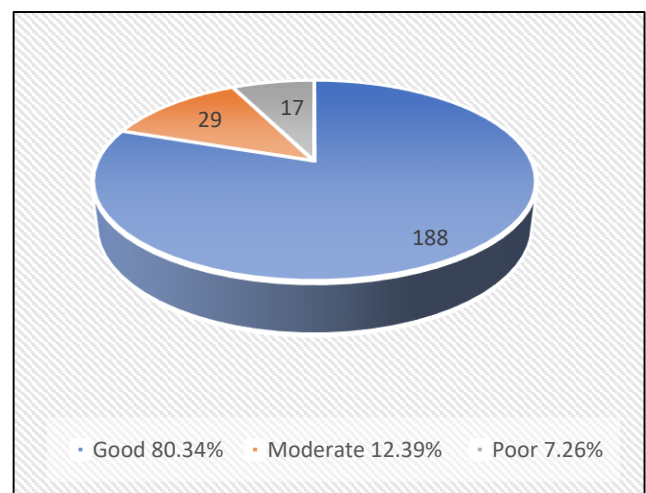


Figure 2: Knowledge score of the participants.

Table 1: Demographic and other details of the participants.

Variables		N	Percentage (%)
Gender	Male	17	7.26
	Female	217	92.73
Age (in years)	20-30	146	62.39
	31-40	61	26.06
	41-50	19	8.11
	51-58	08	3.41

Continued.

Variables	N	Percentage (%)
Level of education	Diploma in nursing	213
	Graduation in nursing	21
Work experience (in years)	<1	14
	1 to 5	164
	6 to 10	39
	>10	17
Received formal training on hand hygiene	225	96.15

Table 2: Responses of health care workers on knowledge questionnaire.

Questions	Correct answer	Correct response, N (%)	Incorrect response, N (%)
Which of the following is the main route of cross-transmission of potentially harmful germs between patients in a health-care facility?	Health care workers hand not clean	170 (72.65)	64 (27.35)
What is the most frequent source of germs responsible for HAIs?	Germs already present on or within the patient	54 (23.07)	180 (76.92)
Which of the following hand hygiene actions prevents transmission of germs to the patient?			
Before touching a patient	Yes	199 (85.04)	35 (14.95)
Immediately after a risk of body fluid exposure	Yes	162 (69.23)	72 (30.76)
After exposure to the immediate surroundings of a patient	No	13 (5.5)	221 (94.44)
Immediately before a clean/aseptic procedure	Yes	164 (70.08)	70 (29.91)
Which of the following hand hygiene actions prevents transmission of germs to the health-care worker?			
After touching a patient	Yes	205 (87.60)	29 (12.39)
Immediately after a risk of body fluid exposure	Yes	180 (76.92)	54 (23.07)
Immediately before a clean/aseptic procedure	No	14 (5.98)	220 (94.01)
After exposure to the immediate surroundings of a patient	Yes	170 (72.64)	64 (27.35)
Which of the following statements on alcohol-based handrub and handwashing with the soap and water are true?			
Hand-rubbing is more rapid for hand cleansing than handwashing	True	131 (55.98)	103 (44.01)
Hand-rubbing causes skin dryness more than handwashing	False	26 (11.11)	208 (88.88)
Hand-rubbing is more effective against germs than handwashing	False	73 (31.19)	161 (68.80)
Handwashing and hand-rubbing are recommended to be done in sequence	False	13 (5.55)	221 (94.44)
What is the minimal time needed for alcohol-based handrub to kill most germs on your hands?	20 sec	188 (80.34)	46 (19.65)
Which type of hand hygiene method is required in the following situations?			
Before palpation of the abdomen	Rubbing	127 (54.04)	107 (45.72)
Before giving an injection	Rubbing	86 (36.75)	148 (63.24)
After emptying a bedpan	Washing	179 (76.49)	55 (23.50)
After removing examination gloves	Rubbing or washing	206 (88.03)	28 (11.96)
After making a patient's bed	Rubbing	53 (22.64)	181 (77.35)
After visible exposure to blood	Washing	164 (70.08)	70 (29.92)
Which of the following should be avoided, as associated with increased likelihood of colonisation of hands with harmful germs?			
Wearing jewellery	Yes	143 (61.11)	91 (38.88)
Damaged skin	Yes	168 (71.79)	66 (28.20)
Artificial fingernails	Yes	147 (62.82)	87 (37.17)
Regular use of a hand cream	No	78 (33.33)	156 (66.66)

Table 3: Responses of health care workers on perception questionnaire.

Questions	Response	N	Percentage (%)
In general, what is the impact of a health care-associated infection on a patient's clinical outcome?	Very low	15	6.41
	Low	16	6.83
	Moderate	67	28.63
	High	18	7.69
	Very high	118	50.42
What is the effectiveness of hand hygiene in preventing health care-associated infection?	Very low	6	2.56
	Low	8	3.41
	Moderate	38	16.23
	High	14	5.98
	Very high	168	71.79
Among all patient safety issues, how important is hand hygiene at your institution?	Very low priority	9	3.84
	low priority	17	7.26
	Moderate priority	26	11.11
	High priority	14	5.98
	Very high priority	168	71.79
In your opinion, how effective would the following actions be to improve hand hygiene permanently in your institution? Leaders and senior managers at your institution support and openly promote hand hygiene	Not effective	8	3.41
	Effective	14	5.98
	Moderately effective	24	10.25
	Very effective	13	5.55
	Very much effective	175	74.78
The health-care facility makes alcohol-based handrub always available at each point of care.	Not effective	8	3.41
	Effective	20	8.54
	Moderately effective	12	5.12
	Very effective	13	5.55
	Very much effective	181	77.35
Hand hygiene posters are displayed at point of care as reminders	Not effective	8	3.41
	Effective	12	5.12
	Moderately effective	30	12.82
	Very effective	8	3.41
	Very much effective	176	75.21
Each health-care worker receives education on hand hygiene.	Not effective	6	2.56
	Effective	22	9.40
	Moderately effective	16	6.83
	Very effective	8	3.41
	Very much effective	182	77.77
Clear and simple instructions for hand hygiene are made visible for every health-care worker.	Not effective	12	5.12
	Effective	12	5.12
	Moderately effective	26	11.11
	Very effective	10	4.27
	Very much effective	174	74.35
Health-care workers regularly receive feedback on their hand hygiene performance.	Not effective	4	1.7
	Effective	21	8.97
	Moderately effective	37	15.81
	Very effective	15	6.83
	Very much effective	157	67.09
You always perform hand hygiene as recommended (being a good example for your colleagues).	Not effective	7	2.99
	Effective	11	4.70
	Moderately effective	30	12.82
	Very effective	11	4.70
	Very much effective	175	74.78
Patients are invited to remind health-care workers to perform hand hygiene.	Not effective	11	4.70
	Effective	20	8.54
	Moderately effective	21	8.97
	Very effective	42	17.94
	Very much effective	140	59.82

Continued.

Questions	Response	N	Percentage (%)
What importance does the head of your department attach to the fact that you perform optimal hand hygiene?	Not at all important	15	6.41
	Of little importance	09	3.84
	Of average importance	27	11.53
	Important	29	12.39
	Very important	154	65.81
What importance does your colleagues attach to the fact that you perform optimal hand hygiene?	Not at all important	13	5.55
	Of little importance	11	4.70
	Of average importance	24	10.25
	Important	19	8.11
	Very important	167	71.36
What importance does patients attach to the fact that you perform optimal hand hygiene?	Not at all important	9	3.84
	Of little importance	12	5.12
	Of average importance	25	10.68
	Important	23	9.82
	Very important	165	70.51
How do you consider the effort required by you to perform good hand hygiene when caring for patients?	No effort	26	11.11
	Very little effort	7	2.99
	Some effort	19	8.11
	Significant effort	32	13.67
	Big effort	150	64.10

DISCUSSION

Hand hygiene is recognized as the most effective strategy to prevent cross-transmission of microorganisms and to reduce the incidence of health care associated infections.⁹ Even though hand hygiene is crucial for preventing hospital-acquired infections, past research shows healthcare workers globally have maintained poor hand hygiene practices, with the average worldwide compliance rate reported at just 40%.²⁻⁴ Research from different countries indicates that poor knowledge and a negative attitude toward hand hygiene are common reasons for non-compliance.¹⁰⁻¹¹ Hence the present study was conducted to assess the knowledge and perception regarding hand hygiene.

Table 2 illustrates, a significant majority of participants (72.65%) correctly identified unclean hands of healthcare workers as the primary route for cross-transmission of harmful germs between patients. However, only 23.07% of nursing staff could pinpoint the main source of germs responsible for healthcare-associated infections, with the rest mistakenly attributing these infections to microorganisms from the hospital environment or surfaces rather than those found on or within the patient. Knowledge about when to perform hand hygiene to prevent germ transmission to patients was generally good. Approximately 85.04% of nursing staff knew that infections could be avoided by performing hand hygiene before touching a patient, and 69.23% knew to do so after exposure to patient body fluids. Additionally, 70.08% of participants understood the importance of hand hygiene before clean or aseptic procedures to prevent infection spread. Notably, only 5.5% were aware that hand hygiene should be performed after exposure to the immediate patient surroundings. Knowledge regarding hand hygiene actions to prevent patient-to-healthcare worker

transmission was also good. However, nursing staff demonstrated poor knowledge about the use and effectiveness of hand rub and hand wash, highlighting a key area for improvement. Despite this, 80.34% of nursing staff knew the correct time needed to perform hand rub. Knowledge concerning the method of hand hygiene to be performed after patient care was satisfactory; 76.49% of participants knew to wash hands after emptying a bedpan, and 70.08% and 88.03% correctly identified hand washing as necessary after visible exposure to blood and after removing examination gloves, respectively. Furthermore, about 60-70% of nursing staff were aware that wearing jewellery during patient care, artificial fingernails, and damaged skin increase the risk of hands being colonized with harmful germs.

This study effectively identified critical gaps in the nursing staff's knowledge of hand hygiene, pinpointing specific areas where educational and training interventions are needed.

Figure 1 reveals that the majority of participants (62.82%) possessed moderate knowledge, with a significant portion (32.90%) having poor knowledge, and only a small percentage (4.27%) demonstrating good knowledge. These findings highlight the need for both initial and regular training for healthcare workers. This training should specifically emphasize the effective use of hand rubs and washes, identify germ sources linked to healthcare-associated infections, and provide demonstrations of proper hand rubbing and washing techniques.

A study by Deepak et al in Solan, Himachal Pradesh, India, similarly found that nursing staff had moderate knowledge, attitude, and practice regarding hand washing.¹² The authors concluded that understanding the

current state of hand hygiene is crucial for addressing deficiencies through targeted training programs. Another relevant study by Shinde et al also observed moderate hand hygiene knowledge among nursing staff, with only 9% demonstrating good knowledge and 12% showing a good attitude.¹³

The study's findings on hand hygiene perception (Figure 2) revealed that a significant majority (80.34%) of participants had a good perception, with 12.39% showing moderate, and 7.26% exhibiting poor perception. Approximately half of the participants understood that healthcare-associated infections severely impact patient clinical outcomes. Furthermore, 71.79% of nursing staff recognized hand hygiene's high effectiveness in preventing these infections and considered it a high-priority issue at our institution. The nursing staff largely believed that several factors could improve hand hygiene practices. These included support from institute leaders (74.78%), the availability of alcohol-based hand rub at each point of care (77.35%), displaying reminder posters (75.21%), receiving hand hygiene training (77.77%), simple and clear instructions (74.35%), and feedback on performance (67.09%). Many (74.78%) also saw their role as a model for colleagues. Additionally, about 60-70% of nursing staff felt that authorities, colleagues, and patients considered optimal hand hygiene very important. These findings align with a study by Goodarzi et al at Iran university of medical sciences, which reported good knowledge (56.6%) and high perception of hand hygiene practice among healthcare workers.¹⁴ Goodarzi et al also found a statistically significant relationship between knowledge and education, and perception with age range, work experience, and workplace ward.¹⁴

This study reinforces that while hand hygiene is widely acknowledged as the cornerstone of infection control, substantial knowledge gaps persist among healthcare workers. Despite a strong perception of its importance, overall knowledge levels were predominantly moderate or poor, especially concerning the main sources of healthcare-associated infections and the effective application of hand rubs and washes. These findings corroborate similar studies globally, indicating a systemic challenge in translating awareness into comprehensive understanding and consistent practice. To bridge these identified gaps, our study strongly advocates for tailored, ongoing training programs. These programs should specifically address the effective use of hand rubs and washes, clarify the sources of healthcare-associated infections, and provide practical demonstrations of correct hand hygiene techniques. Furthermore, strategies should focus on reinforcing key moments for hand hygiene, as well as addressing factors like jewellery and skin integrity that impact effectiveness. By implementing such targeted interventions, coupled with leadership support, readily available resources, and continuous feedback mechanisms, our institute can significantly improve hand hygiene compliance, thereby mitigate the risk of cross-transmission and enhance patient safety.

The limitation of the study is reliance on self-reported data, which may not accurately reflect actual behaviour. The questionnaire-based design did not include direct observation of the nurses, so it couldn't measure their hand hygiene compliance. This means the study couldn't account for the gap that often exists between a person's knowledge or beliefs and their actions.

CONCLUSION

Assessing hand hygiene knowledge and perception is a proactive approach to infection control, enabling healthcare organizations to optimize their strategies for preventing the spread of infections and promoting patient safety.

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