

Original Article

A cross-sectional survey on hand hygiene among nursing students working in an eastern Indian hospital.

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Abstract

Background: Proper hand hygiene practices by healthcare providers are critical to prevent healthcare-associated infections (HCAIs). This study aimed to assess the hand hygiene knowledge and practices of nursing students in various departments and operation theatres of a tertiary care hospital in Eastern India.

Methodology: A cross-sectional survey based on WHO questions was conducted in March-April 2022 to evaluate the hand hygiene knowledge and practices of 105 nursing students. The study included nursing students from different departments, including medicine, surgery, pediatrics, obstetrics and gynecology, eye, different ICUs (adult, NICU, and PICU), and different OTs. The collected data were analyzed according to the STROBE guidelines.

Results: Of the 105 nursing students, 42.86% had no training in hand hygiene practices, highlighting the need for additional training. However, due to the COVID-19 pandemic, most students (86%) were familiar with using alcohol-based hand rubs. Most students preferred hand rubbing before giving an injection (65.74%), while hand washing was preferred after vacating a bedpan (91.42%) or being exposed to blood (89.52%). Comparing the pre-and post-workshop questionnaires showed a significant improvement in hand hygiene knowledge. However, more training is required to understand the importance of infection spread from the infected hands of HCWs. Additionally, gloves are not a substitute for hand hygiene practices, and wearing jewelry and artificial nails should be avoided. Regular training and workshops can increase awareness among nursing students.

Conclusion: The findings indicate a need for ongoing training to improve hand hygiene practices among nursing students. Regular training and workshops can increase awareness and knowledge, leading to decreased incidence of HCAIs.

Keywords

Antibiotic Resistance, Hospital-Associated Infections, Hand Hygiene, Hand Rub, Hand Wash.



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Introduction

In both affluent and poor nations worldwide, healthcare-associated infections (HCAIs) caused by healthcare providers increase antibiotic resistance, mortality, and treatment costs¹. Healthcare-associated infections (HCAIs) are a significant public health concern worldwide, and hand hygiene is a critical measure for preventing HCAIs². In healthcare settings, healthcare workers (HCWs), including nursing students, are at risk of HCAIs due to frequent exposure to infected patients, contaminated surfaces, and medical devices^{3,4}. Therefore, the proper hand hygiene practices of HCWs, including nursing students, are crucial to prevent the spread of HCAIs.

Studies have shown that hand hygiene compliance among HCWs, including nursing students, is often inadequate⁵. Inadequate hand hygiene practices can lead to the transmission of HCAIs, including antibiotic-resistant infections⁶. Hand hygiene education and training programs have been shown to improve hand hygiene compliance among HCWs⁷.

Proper hand hygiene is the most effective measure that, if correctly practiced, can decrease HCAIs. Worldwide, over 1.4 million people develop different types of HCAIs frequently. According to the World Health Organization (WHO), the prevalence of HCAIs in different developing countries is approximately 40%, while in developed countries, it is around 5-10%¹. If the hands of HCWs, especially nurses, are contaminated with infectious pathogens, these microbes can be transmitted from one patient to another, leading to increased hospital stays, morbidity, and mortality of patients⁸. This ultimately results in an increased financial burden on the patient and society³.

WHO's "My Five Moments for Hand Hygiene" has successfully reduced HCAIs¹. However, the compliance for hand hygiene practices amongst healthcare providers is only 40%⁹, and different studies have confirmed this decreased compliance, especially amongst nurses, the backbone of the healthcare system¹⁰. Therefore the present study was designed to assess the safe hand hygiene

procedures practiced daily by nursing students working in different wards and operation theatres. They were supervised using the WHO questionnaire on hand hygiene practices.

Methodology

Study design

This hospital-based cross-sectional study was conducted among 105 nursing students working in different wards (surgical, medical, pediatrics, obstetrics and gynecology, eye, different ICUs (adult, NICU, and PICU), and different OTs) of a tertiary hospital in West Bengal during March-April 2022. The study was designed to assess nursing students' hand hygiene knowledge and practices.

Ethical clearance

Ethical clearance was obtained from the institutional ethics committee before conducting the study.

Participants

Nursing students who provided verbal consent to participate in the survey were included in the study. Nursing students who refused to participate or pursued undergraduate MBBS, dental, technical courses, or postgraduate trainees were excluded.

Data collection

The WHO hand hygiene questionnaire was administered to the students at the beginning of the workshop. The workshop was designed to teach the WHO "5 MOMENTS OF HAND HYGIENE" through lectures, videos, practical demonstrations, and active participation. Attitude towards hand hygiene practices was assessed using a 10-question attitude questionnaire, and hygienic practices were evaluated using a six-question questionnaire selected from the study of Paudel et al¹⁰. A scoring system was used to award one mark for every correct response, and a score of 0 was assigned for erroneous information, unfavorable attitudes, and bad behavior. Marks above 75% were considered satisfactory, marks between 50-74% as average, and marks less than 50% as poor, similar to the Paudel et al. study¹⁰.

Data analysis

Data were collected, studied, and analyzed using descriptive statistics. The knowledge obtained post-test was evaluated based on the same set of questions from WHO at the end of the workshop.

Results

Most nursing students (87/105; 82.86%) were familiar with using alcohol-based hand sanitizer due to the COVID-19 pandemic, but most of them (45/105; 42.86%) were not trained in safe hand

wash/rub practices. Hand rub was preferred over hand washing before giving an injection (65.74%), while students preferred to wash their hands after a bedpan was emptied (91.42%) or when their hands were contaminated with blood (89.52%). However, they were unaware that hand hygiene was required after the removal of gloves or after making a patient's bed. The main reasons for non-adherence to hand hygiene were being too busy and having dry skin due to frequent hand washing. The availability of good hand washing facilities and alcohol hand rub was also a concern (Table 1).

Table 1: WHO questionnaire on Hand Hygiene (n=105).

Questions	N (%)
Did you receive any formal training in hand hygiene in the last 3 years	45(42.86)
Do you routinely use an alcohol-based hand rub for hand hygiene	87(82.86)
Which is the main route of cross-transmission of germs between patients in a health care facility? (HCWs unclean hands)	29(27.62)
What is the most frequent source of germs responsible for healthcare associated infections? (Germs already present on /within the patient)	27(25.71)
Which of the following hand hygiene actions prevents the transmission of germs to the patient?	
a. Before touching a patient (True)	91(86.66)
b. Immediately after a risk of body fluid exposure (True)	81(77.11)
c. After exposure to the immediate surroundings of a patient (True)	43(40.95)
d. Immediately before a clean/aseptic procedure (True)	93(88.57)
Which of the following hand hygiene actions prevents the transmission of germs to the healthcare worker?	
a. After touching a patient (True)	97(92.38)
b. Immediately after a risk of body fluid exposure (True)	96(91.42)
c. Immediately before a clean/aseptic procedure (False)	31(29.52)
d. After exposure to the immediate surroundings of a patient (True)	81(77.14)
Which of the following statements on alcohol-based hand rub and hand washing with soap and water are true	
a. Hand rubbing is more rapid for hand cleansing than hand washing (True)	91(86.66)
b. Hand rubbing causes skin dryness more than hand washing (False)	67(63.81)
c. Hand rubbing is more effective against germs than hand washing (False)	57(54.28)
d. Hand rubbing and hand washing are recommended to be performed in sequence (False)	41(39.04)
What is the minimum time required for alcohol-based hand rub to kill most of the germs present in our hands (20 secs)	63(60)
Which type of hand hygiene method is required in the following situations	
a. Before palpating the abdomen (hand rub)	55(52.38)
b. Before giving an injection (hand rub)	69(65.74)
c. After emptying a bedpan (hand washing)	96(91.42)
d. After removing examination gloves (hand rub/hand washing)	55(52.38)
e. After making a patient's bed(hand rub)	23(21.90)

f. After visible exposure to blood (hand washing)	94(89.52)
Which of the following should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?	
a. Wearing jewelry (Yes)	57(73.33)
b. Damaged skin (Yes)	101(96.19)
c. Artificial fingernails (Yes)	54(82.52)
d. Regular use of hand cream (No)	47(73.33)

Of the 105 students, 77(74%) had satisfactory hand hygiene knowledge. Regarding the attitude towards hand hygiene, some students thought they already had good knowledge and refused to learn, while most students (64/105; 60.95%) wanted to follow hand hygiene at all times. In terms of practice, 94/105 students agreed that hand hygiene was a key factor in their task, but they forgot to follow it in emergencies and different situations. This highlights the need for constant monitoring by an infection control team and continuous learning to ingrain proper hand hygiene practices (Table 2 & 3).

The majority of nursing students in the study were familiar with using alcohol-based hand sanitizer due to the COVID-19 pandemic, but many were not trained in safe hand wash/rub practices. Although most students had satisfactory knowledge of hand hygiene, there were gaps in their practice and attitude. Proper hand hygiene practices can be reinforced through continuous learning and the presence of an infection control team.

Table 2: Attitude toward Hand hygiene.

Questions	N(%)
I stick to correct hand hygiene practices and always	61(58.1)
Think I have good knowledge of correct hand hygiene	64(60.95)
Occasionally there are more important chores to attend	89(84.76)
In emergency situations, very difficult to follow hand hygiene	94(89.5)
Gloves are the substitute for hand rub/wash	95(90.5)
I suffer mentally if hand rub/wash is not followed by others	65(61.9)
I appeal to others to follow hand hygiene	98(98.33)
Hand hygiene should be made a part of everyday life.	75(71.42)
I blame myself if I do not follow hand hygiene	81(77.14)
Proper hand hygiene reduces medical costs and HCAI	77(73.33)

Table 3: Practice Hand hygiene.

Questions	N(%)
Sometimes I forget to follow hand hygiene	79(75.23)
Hand hygiene practices are important to my job	94(89.5)
Following hand hygiene for every patient is difficult	89(84.76)
Constant attention from the infection control team would help me be more compliant in following hand hygiene	101(96.19)
Hand hygiene posters remind me to follow hand hygiene	102(97.14)
Due to time constraints and a busy schedule, difficult to always attend hand hygiene classes.	96(91.4)

Discussion

Hand hygiene is crucial in reducing HCAs^{11,12}. However, compliance with proper hand hygiene practices among HCWs remains low³⁻⁶. Our study aimed to assess the knowledge and practice of hand hygiene among nursing students handling various laboratory samples. We found that only 42.86% of the participants followed proper hand hygiene practices. The main reasons for non-compliance were the low availability of alcohol-based rubs and concerns about skin dryness. Furthermore, we observed a lack of knowledge regarding the common causes of HCAs among nursing students, with only 25.26% correctly identifying microorganisms as the main cause. The same fact was also noted in the study of Mohesh et al., where they noted that only 26.3% of students were aware of safe hand hygiene practices¹³.

Our findings are consistent with previous studies that have reported low compliance with hand hygiene practices among HCWs¹⁴⁻¹⁶. Regular training sessions and workshops on hand hygiene are crucial to improving compliance¹⁷. These training sessions should focus on educating HCWs on advanced techniques of patient care, including proper hand hygiene practices^{18,19}. Our study found that after training, there was a significant improvement in the knowledge of safe hand hygiene practices among nursing students.

Our study also revealed a lack of understanding among nursing students regarding the causes of HCAs. This is a concern since HCWs' lack of knowledge regarding HCAs can spread infections^{20,21}. Therefore, educational programs should emphasize the importance of identifying the causes of HCAs and the role of proper hand hygiene practices in preventing their spread.

In conclusion, our study highlights the need for regular training programs to improve compliance with hand hygiene practices among HCWs. Educational programs should also emphasize the importance of identifying the causes of HCAs and the role of proper hand hygiene practices in preventing their spread. Our findings contribute to the growing body of evidence that emphasizes the

need for ongoing efforts to improve hand hygiene practices among HCWs.

Limitations

The study has several limitations that should be considered. First, it was conducted on a small sample size, which may not represent all nursing students. Second, the study was conducted in a single institution, which may limit the generalizability of the findings to other settings. Third, the study relied on self-reported data, possibly subject to social desirability bias. Finally, the study did not assess the effectiveness of interventions to improve hand hygiene practices among nursing students.

Conclusion

The study highlights that while most nursing students have a basic understanding of hand hygiene, there are gaps in their practice and attitude. The findings indicate the need for regular monitoring by an infection control team and continuous learning to reinforce proper hand hygiene practices. Additionally, the availability of good hand washing facilities and alcohol hand rub should be improved.

Conflicts of Interest

The authors declare no conflict of interests.

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