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Research Article

Hand hygiene practices among nursing students: importance of improving current training programs

Syed Esam Mahmood[1]*, Rakhee Verma[2], Mohammad Bilal Khan[3]

[1]Department of Community Medicine, Government Medical College, Ambedkarnagar, U.P., India
[2]Department of Community Medicine, Rama Medical College & Hospital, Hapur road, Ghaziabad
[3]MBBS student, Rohilkhand Medical College & Hospital, Bareilly, U.P., India

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***Correspondence:**
Dr. Syed Esam Mahmood,
E-mail: semahmood@gmail.com

ABSTRACT

Background: Although numerous studies have demonstrated that hand hygiene reduces health care–associated infection rates, adherence to hand hygiene guidelines remains uniformly low among health care workers. The present study was undertaken to assess the hand hygiene practices among the nursing students of Bareilly and to suggest the suitable corrective and preventive measures to be taken in future.
Methods: These six months cross sectional study was carried out among the nursing students of Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India. A total of 50 students participated in the study. A structured, self-administered pretested questionnaire was used to collect detailed information about the subjects' self-reported hand washing practices. Knowledge was assessed using 25 questions which included multiple choice and "yes" or "no" questions. A scoring system was used where 1 point was given for each correct response to knowledge, positive attitudes and practices and 0 was given for incorrect knowledge, negative attitudes, and poor practices. Data entry and statistical analysis were performed using the Microsoft Excel and SPSS windows version 14.0 software.
Results: Majority of the healthcare workers were females (72.0%), were aged between 31-40 years (60.0%) and had received formal training in hand hygiene in the last 3 years (90.0%). A higher proportion of them routinely used alcohol based hand rub (52.0%). Nearly 28% had poor knowledge and 72% had moderate knowledge regarding hand hygiene.
Conclusions: 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. Our study shows the importance of improving the current training programs targeting hand hygiene practices among nursing students.

Keywords: Hand hygiene, Nursing students, Training program

INTRODUCTION

The practice of hand hygiene by health care workers, through the use of either soap and water or an alcohol-based hand sanitizer, is widely considered to be the most important and effective means of preventing health care–associated infections. Although numerous studies have demonstrated that hand hygiene reduces health care-associated infection rates, adherence to hand hygiene guidelines remains uniformly low among health care workers.[1] According to WHO, the prevalence of these nosocomial infections, is as high as 19%, in developing countries posing a challenge to health care providers.[2] Proper training and basic awareness about hand washing guidelines among the hospital personnel is required to reduce this burden of nosocomial infections. With this background, the present study was undertaken to assess the hand hygiene practices among the nursing students of

Rohilkhand Medical College and Hospital, Bareilly and to suggest the suitable corrective and preventive measures to be taken in future.

METHODS

These six months (January –June 2012) cross sectional study was carried out among the nursing students of Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India. The approval for this study was obtained from the institutional ethical committee and the consent of all the students was taken. All the nursing students who were present in the respective departments were surveyed and they comprised the study unit. A total of 50 students participated in the study. A structured, self-administered pretested questionnaire was used to collect detailed information about the subjects' self-reported hand washing practices. Information was collected on the basis of the Hand Hygiene Knowledge Questionnaires for Health-Care Workers designed by WHO and revised August 2009, which was further modified and this included questions carrying both multiple choice and "yes" or "no" questions. The students were assured confidentiality of their responses.

Knowledge was assessed using 25 questions which included multiple choice and "yes" or "no" questions. A scoring system was used where 1 point was given for each correct response to knowledge, positive attitudes and practices and 0 was given for incorrect knowledge, negative attitudes, and poor practices. On the basis of this formula score%=(total correct responses/25)* 100, a score of more than 75% was considered good, 50-74% moderate and less than 50% poor.

The suitable corrective and preventive measures to be taken for the study population were suggested. Data entry and statistical analysis were performed using the Microsoft Excel and SPSS windows version 14.0 software.

RESULTS

Majority of the healthcare workers were females (72.0%), were aged between 31-40 years (60.0%) and had received formal training in hand hygiene in the last 3 years (90.0%). A higher proportion of them routinely used alcohol based hand rub (52.0%) (Table 1).

Majority (76.0%) correctly opined that the unclean hands of health care worker were the main route of cross-transmission of potentially harmful germs between patients in a health care facility. The most frequent source of germs responsible for health care-associated infections was hospital's air (70.0%) (Table 2).

Table 1: General Information.

Variable	Frequency	
	N	%
Gender		
Male	14	28.0
Female	36	72.0
Age Group		
18 - 30	20	40.0
31 - 40	30	60.0
Departments		
Emergency	3	6.0
ENT	5	10.0
Opthal	5	10.0
Medicine	4	8.0
Surgery	10	20.0
ICU	9	18.0
Gynae	6	12.0
Chest & TB	5	10.0
Ortho	3	6.0
Received Formal Training in hand hygiene in last years		
Yes	45	90.0
No	5	10.0
Routinely use alcohol based hand rub		
Yes	26	52.0
No	24	48.0

Table 2: Opinion about Infections.

Opinion about Infections	Frequency (Yes)	
	N	%
Main route of cross-transmission of potentially harmful germs between patients in a health care facility		
Health care worker hands not clean	38	76.0
Exposure to colonized surfaces	11	22.0
Sharing non-invasive objects	1	2.0
Source of germs responsible for health care-associated infections		
Hospital's Water System	2	4.0
Hospital's air	35	70.0
Hospital's Environment (surfaces)	13	26.0

Table 3: Opinion about Hand hygiene actions.

Hand hygiene actions	Frequency (Yes)	
	N	%
Hand hygiene actions prevents transmission of germs to the patient		
Before touching a patient	1	2.0
Immediately after a risk of body fluid exposure	48	96.0
After exposure to the immediate surroundings of a patient	36	72.0
Immediately before a clean/aseptic procedure	24	48.0
Hand hygiene actions prevents transmission of germs to the health worker		
After touching a patient	46	92.0
Immediately after a risk of body fluid exposure	39	78.0
Immediately before a clean/aseptic procedure	16	32.0
After exposure to the immediate surroundings of a patient	50	100.0
Opinion on alcohol-based hand rub and hand washing with soap and water (%True)		
Hand rubbing is more rapid for hand cleansing than hand washing	50	100.0
Hand rubbing causes skin dryness more than hand washing	36	72.0
Hand rubbing is more effective against germs than hand washing	45	90.0
Hand washing and hand rubbing are recommended to be performed in sequence	36	72.0
Minimal time needed for alcohol-based hand rub to kill most germs		
20 sec	37	74.0
10 sec	12	24.0
5 sec	1	2.0

Majority opined that hand hygiene actions immediately after a risk of body fluid exposure (96.0%) prevents transmission of germs to the patient. Majority opined that hand hygiene actions after exposure to the immediate surroundings of a patient (100%) prevents transmission of germs to the health care worker. Majority (100%) said that hand rubbing (using alcohol based hand rub) is more rapid for hand cleansing than hand washing with soap and water while 72.0 % said hand rubbing causes skin dryness more than hand washing. 90.0% said hand rubbing is more effective against germs than hand washing while 72.0% said hand washing and hand rubbing are recommended to be performed in sequence. Majority (72.0%) said minimal time needed for alcohol-based handrub to kill most germs was 20 seconds (Table 3).

Majority thought no hand hygiene method is required before palpation of the abdomen (72.0%) and before giving an injection (70.0%). A higher proportion of them thought rubbing is required after emptying a bedpan (58.0%). All of them said washing was required after removing examination gloves (100.0%). A higher proportion of them thought rubbing is required after making a patient's bed (52.0%) while washing is required after visible exposure to blood (62.0%) (Table 4).

Table 4: Type of hand hygiene method required in the following situations.

Situation	Rubbing		Washing		None	
	N	%	N	%	N	%
Before palpation of the abdomen	2	4.0	12	24.0	36	72.0
Before giving an injection	10	20.0	5	10.0	35	70.0
After emptying a bedpan	29	58	1	2	20	40
After removing examination gloves	0	0	50	100	0	0
After making a patient's bed	26	52	1	2	23	46
After visible exposure to blood	7	14	31	62	12	24

Majority (90.0%) correctly thought that touching damaged skin should be avoided, as associated with increased likelihood of colonisation of hands with harmful germs (Table 5).

Table 5: Associated with increased likelihood of colonisation of hands with harmful germs.

Property	Frequency (Yes)	
	N	%
Wearing jewelry	33	66.0
Damaged skin	45	90.0
Artificial fingernails	19	38.0
Regular use of a hand cream	21	42.0

Table 6: Associated with increased likelihood of colonisation of hands with harmful germs.

Knowledge about hand hygeine	Frequency	Percent
Poor	14	28.0
Moderate	36	72.0
Total	50	100.0

Nearly 28% had poor knowledge and 72% had moderate knowledge.

DISCUSSION

Hand hygiene is most often associated with hand washing in the health care field. A health care provider can wash their hands with anti-microbial soap or an alcohol based hand sanitizer. Majority (90.0%) of the healthcare workers had received formal training in hand hygiene in the last 3 years in this study. Training sessions regarding hand hygiene practices among the health care workers are required to provide the correct knowledge in the area of nosocomial infections and prevention of infections. A higher proportion of respondents routinely used alcohol based hand rub (52.0%) in this study. Similar findings were reported by Maheshwari et al. (2014)[3] among staff nurses in a tertiary care hospital in Bhopal. Majority (76.0%) correctly opined that the unclean hands of health care worker were the main route of cross-transmission of potentially harmful germs between patients in a health care facility. Our finding is in agreement to the study by Nair et al (2014)[4] among nursing students of tertiary medical college at Raichur. In this study the most frequent source of germs responsible for health care-associated infections was hospital's air (70.0%). However germs already present on or within the patient was the most frequent source perceived in other studies.[3,4] Majority (96.0%) opined that hand hygiene actions immediately after a risk of body fluid exposure prevents transmission of germs to the patient. Similar findings were reported in previous studies.[3-6] All the students opined that hand hygiene actions after exposure to the immediate surroundings of a patient prevents transmission of germs to the health care worker. However only one third of nursing students at the University of Sri Jayewardenepura opined that hand hygiene actions after exposure to the immediate surrounding prevents transmission of germs to the health care worker.[5] Majority opined hand hygiene actions after touching a patient prevents transmission of germs to the health care worker. This is in agreement to the findings observed by other studies.[3-6] All mentioned that hand rubbing (using alcohol based hand rub) is more rapid for hand cleansing than handwashing with soap and water. Similar observations have been observed by other studies.[3-5] Majority (72.0%) said minimal time needed for alcohol-based handrub to kill most germs was 20 seconds. Poor awareness regarding minimal needed for alcohol-based handrub to kill most germs (20 seconds) was reported by previous studies.[3-6] Our findings were similar to a study carried out by AbdElaziz et al. in Cairo wherein a quarter of respondents showed inappropriate hand washing due to both short contact time (less than 30 sec).[7] Bargellini et al.[8] reported hand hygiene practices and knowledge were significantly higher in nursing compared to medical students in Italy. The most effective procedure in reducing bacterial contamination was the alternate use of hand washing and hand rubbing compared to only one practice and the absence of hand hygiene ($p<0.001$).

Majority thought no hand hygiene method is required before palpation of the abdomen (72.0%) and before giving an injection (70.0%) in this study. This is in contrast to the study findings reported by Maheshwari et al. where about one third of respondents thought rubbing was required before palpation of abdomen and before giving an injection.[3] A higher proportion of students thought rubbing is required after emptying a bedpan (58.0%) in our study. Dissimilar findings were reported by the previous studies[3-6] where majority thought washing was required after emptying a bedpan. All of the respondents said washing was required after removing examination gloves (100.0%). Similar findings have been reported by other studies.[3-6] About half of the nursing students thought rubbing is required after making a patient's bed in our study. Lower percentage of respondents thought rubbing is required after making a patient's bed in the study by Maheshwari et al.[3] (12.6%) and Ariyaratne et al. (12.9%).[5] A higher proportion (62.0%) of respondents thought washing is required after visible exposure to blood in this study. Similar findings have been reported by the previous studies.[3-6] Nearly two thirds opined that wearing jewelry should be avoided, as associated with increased likelihood of colonization of hands with harmful germs. Higher percentage of respondents (nearly 96.0%) thought wearing jewelry should be avoided in the studies conducted in Bhopal, Raichur, Srilanka and Karad.[3-6] Majority (90.0%) correctly thought that touching damaged skin should be avoided, as associated with increased likelihood of colonisation of hands with harmful germs. Similar findings have been reported by the other studies.[3-6] Only about one third thought artificial fingernails was associated with increased likelihood of colonisation of hands with harmful germs. Higher percentage of respondents thought artificial fingernails was associated with increased likelihood of colonization of hands with harmful germs in Srilanka[5] (90.3%) and Karad[6] (90.0%).

A study done by Sande et al.[9] showed growth in 107 (71.3%) out of total 150 samples collected before hand washing among nursing staff in a tertiary hospital. Apart from skin commensals, Staphylococcus aureus, Enterococcus faecalis, Klebsiella pneumoniae, E.coli and Pseudomonas aeruginosa were detected. Methicillin Resistant Staphylococcus aureus strains were also isolated from hand swabs collected before hand washing. Growth was observed in only 22 (14.7%) samples after hand washing. In another study by Carradine et al.[10], only 37% of nursing students self reported to wash their hands 100% of the time during clinical rotation.

KuKanich et al.[1] conducted a study in two outpatient health care clinics. The frequency of hand hygiene was poor at baseline (11% and 21%) but improved significantly after intervention (36% and 54%) and was maintained through the follow-up period (32% and 51%). Throughout the study, post-contact hand hygiene was observed significantly more than pre-contact hand hygiene.

The majority of the Malaysian medical science students mentioned that they frequently washed their hands using soap while some of the participants washed the hands only with plain water. Laziness was their main barrier of frequent hand washing, followed by lack of nearby water supply and then the feeling that their hands are not dirty enough to be infected.[11] An overuse of gloves and underuse of gel was demonstrated among final year nursing students and infection prevention and control nurses by Lee et al (2013).[12] In another study by Barrett et al.[13] among nursing students', hand hygiene compliance was perceived to be effected by specific barriers which included: time and busyness; clinical procedure; skin condition; lack of knowledge and glove use. In another study by Kumar et al (2013)[14], health care workers perceived that high work load, shortage of time & not enough sinks are some important barriers for practicing hand washing. Akyol et al.[15] in their study revealed that nurses in Turkey had a poor level of knowledge concerning quality of hand washing and were not able to wash their hands often because of dense working conditions, insufficiency of necessary materials and drying and sore of hands after frequent washing.

Nearly 28% had poor knowledge and 72% had moderate knowledge about hand hygiene in our study. The knowledge on hand hygiene was moderate (144 out of 200, 74%) among 100 nursing staff and 100 nursing students in a tertiary medical college in Karad.[6] Knowledge was 'good' about hand washing (75.5%) among nursing students in Mangolore as reported by Chacko et al.[16] Participants had moderate knowledge (77%) but attitudes, practices and satisfaction of facilities of all the participants was overall poor (<50%) in the study conducted in Sri Lanka.[5]

Although majority had received formal training in hand hygiene in the last 3 years still none had good knowledge. 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. Our study shows the importance of improving the current training programs targeting hand hygiene practices among nursing students. Hand hygiene training sessions may need to be conducted more frequently for students with continuous monitoring and performance feedback to encourage them to follow correct hand hygiene practices.

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REFERENCES

1. KuKanich KS, Kaur R, Freeman LC, Powell DA. Evaluation of a Hand Hygiene Campaign in Outpatient Health Care Clinics. AJN 2013;(113)3:36-42
2. WHO: The Burden of health care-associated infection worldwide. A Summary [cited 2010 Apr 30].Available from: http://www.who.int/gpsc/country_work/summary_20100430_en.pdf.
3. Maheshwari V, Kaore NCM, Ramnani VK, Gupta SK, Borle A, Kaushal R. A Study to Assess Knowledge and Attitude Regarding Hand Hygiene amongst Residents and Nursing Staff in a Tertiary Health Care Setting of Bhopal City. Journal of Clinical and Diagnostic Research. 2014;8(8):4-7.
4. Nair SS, Hanumantappa R, Shashidhar Gurushantswamy Hiremath, Mohammed Asaduddin Siraj, and Pooja Raghunath. Knowledge, Attitude, and Practice of Hand Hygiene among Medical and Nursing Students at a Tertiary Health Care Centre in Raichur, India. ISRN Preventive Medicine 2014,1-4.
5. Ariyaratne MHJD, Gunasekara TDCP, Weerasekara MM, Kottahachchi J, Kudavidanage BP, Fernando SSN. Knowledge, attitudes and practices of hand hygiene among final year medical and nursing students at the University of Sri Jayewardenepura. Sri Lankan Journal of Infectious Diseases. 2013;3(1):15-25.
6. Shinde MB, Mohite VR. A Study to assess knowledge, attitude and practices of five moments of hand hygiene among nursing staff and students at a tertiary care hospital at Karad. International Journal of Science and Research. 2014;3(2):311-21.
7. Khaled M, Elaziz A, Bakr IM. Assessment of knowledge, attitude and practice of hand washing among health care workers in Ain Shams University hospitals in Cairo. The Egyptian Journal of Community Medicine. 2008;26(2):1-12.
8. Bargellini A, Ferranti G, Santangelo M, Venturelli F, Borella P, Marchesi I. Hand Hygiene Knowledge, Hand Contamination and Practice of Italian Nursing and Medical Students. Epidemiology Biostatistics and Public Health. 2014;11(4):1-9.
9. Sande S, Basak S, Tawade V. Effect of hand washing among nursing staffs in tertiary care hospital: a study. Int J Cur Res Rev. 2013;5 (24):34-40
10. Carradine, Charika R., "Does Knowledge Make a Difference? Assessing nursing students' knowledge of proper hand hygiene techniques in correlation with their progression through nursing school" (2014). Honors Theses. Paper 245.
11. Al-Naggar RA, Al-Jashamy K. Perceptions and Barriers of Hands Hygiene Practice among Medical Science Students in a Medical School in Malaysia. Perceptions and Barriers of Hands Hygiene Practice among Medical Science Students in a Medical School in Malaysia. The International Medical Journal Malaysia. 2013;12(2):11-4.
12. Lee K. Student and infection prevention and control nurses' hand hygiene decision making in simulated clinical scenarios: a qualitative research study of

hand washing, gel and glove use choices. Journal of Infection Prevention. 2013;14(3):96-103.
13. Barrett R, Randle J. Hand hygiene practices: nursing students' perceptions. J Clin Nurs. 2008;17(14):1851-7.
14. Harsha Kumar HN, Dileep D. An epidemiological study on hand washing practices among Health Care Workers in Hospitals of Mangalore City. Natl J Community Med. 2013;4(2):261-6.
15. Akyol AD. Hand hygiene among nurses in Turkey: opinions and practices. Journal of Clinical Nursing. 2007;16(3):431–7.
16. Chacko LK. Knowledge of hand hygiene and its self-reported practice among nursing students during clinical experience at a teaching hospital in Mangalore. Journal of patient safety and infection control. 2014;(2):55–7.

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