

Knowledge, Attitude, and Practices of Hand Hygiene among 3rd year Medical and Nursing Students at Indira Gandhi Institute of Medical Sciences, Patna: A Cross-sectional Study

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Abstract

Background: Hand hygiene is a fundamental element of patient safety for the prevention of healthcare-associated infections (HCAIs) and the spread of anti-microbial resistance. Hand hygiene is the most effective means to reduce nosocomial infection. The objective of the study was to assess the knowledge, attitude, and practices of hand hygiene among 3rd year medical and nursing students studying at IGIMS, Patna.

Materials and Methods: Study design – This was a cross-sectional study. Tools used– A pre-designed self-administered questionnaire based on Centre for Disease Control and Prevention's Hand hygiene guidelines. Study period - The duration of the study was 3 months (September–November 2023). Study population – A total of 130 (86 medical students and 44 nursing students) were enrolled in the study. Statistical test - The results obtained were statistically analyzed using the Chi-square test with the help of EPI info data analysis V7.2.0.1, to assess the various parameters of hand hygiene practices. $P \leq 0.05$ was measured to be statistically significant.

Results: A total of 130 students participated in this study, we found that the majority (medical – 64.9% and nursing – 57.3%) had moderate knowledge on hand hygiene. However, the overall attitude of the respondents toward hand hygiene was not satisfactory and most of them exhibited poor hand hygiene practice (medical – 29.8% and nursing – 43.1%). Overall satisfaction with facilities available for hand hygiene levels was reported as poor by 48.8% of medical students and 59% of nursing students.

Conclusion: There is a necessity to consider the basic knowledge, attitude, and practices of hand hygiene are crucial for all healthcare professionals and the need for conducting regular training program.

Key words: Attitude, Hand hygiene, Knowledge, Medical and nursing students, Practice

INTRODUCTION

Hand hygiene is a fundamental element of patient safety for the prevention of healthcare-associated infections (HCAIs) and the spread of anti-microbial resistance. Hand

hygiene prohibits cross infection in hospitals, but healthcare workers (HCWs) adherence to hand hygiene guidelines is poor, cheap, timely access to both hand hygiene and skin protection is necessary for good hand hygiene behavior. Alcohol-based hand rub may be superior than traditional hand washing as they require less time, acts faster, are less irritating, and contribute to sustained improvement in compliance associated with decreased infection rates.^[1] To overcome these factors, Centre for Disease Control and prevention's (CDC) Health-care Infection Control Practices Advisory Committee published comprehensive guidelines for hand hygiene in healthcare setting in 2002.

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According to WHO, the prevalence of these nosocomial infections is as high as 19% in developing countries posing a challenge to healthcare providers.^[2] The World Health Organization (WHO) suggested “My five moments for hand washing” to minimize problems related to hand washing. These five moments before touching a patient, before performing aseptic and clean procedures, after being at risk of exposure to body fluids, after touching a patient, and after touching the patient surroundings.^[3-5] The previous studies have shown that hand hygiene compliance among HCWs is generally low.^[5] Furthermore, many studies done to assess the knowledge, attitudes, and compliance with hand hygiene protocols by HCWs are poor^[6-8] due to several constraints including heavy workload, high number of clinical procedures, and skin conditions of the HCWs.^[9,10] Various studies shown that effective hand hygiene can lower the prevalence of hospital-acquired infections. However, the compliance to it among health-care providers is as low 40%.^[11,12] The objective of the study was to assess the knowledge, attitude, and practices of hand hygiene among 3rd year medical and nursing students studying at India Gandhi Institute of Medical Sciences, Patna.

MATERIALS AND METHODS

Study Design

This was a cross-sectional study.

Study Area

This study was at IGIMS, Patna.

Tools Used

A pre-designed self-administered questionnaire based on CDC Hand hygiene guidelines.

Study Period

The duration of the study was 3 months (September–November 2023).

Study Population

A total of 130 (86 medical students and 44 nursing students) were enrolled in the study.

Inclusion Criteria

Those medical and nursing students who were willing to participate were included in the study.

Exclusion Criteria

Those medical and nursing students who were not willing to participate were excluded from the study.

Methodology

The present study was carried out among 3rd year medical and nursing students studying at IGIMS, Patna. A total

of 130 participants, which included 86 medical students and 44 nursing students, were enrolled in the study. The participants were briefed about the study subjects and their verbal consent was obtained from those who volunteered to participate. The information was collected from a pre-designed, self-administered questionnaire based on CDC Hand hygiene guidelines. It consisted of five parts such as demographic information, assessment of knowledge, attitude, practices, and satisfaction with availability of facilities. Knowledge was assessed using 18 questions which included multiple choice and “Yes” or “No” questions. Attitudes were measured using eight statements, where the respondents were given the option to select on a 1–5-point scale between strongly agree or strongly disagree to it. Practices and facility were also assessed in a similar way using six and seven questions, respectively. A grading system was used where 1 point was given for each correct response to knowledge, positive attitudes, good practices, and satisfaction with facilities. Zero (0) was given for incorrect knowledge, negative attitudes, poor practices, and dissatisfaction with facilities. Hence, a grade of more than 75% was considered good, 50–74% moderate, and <50% poor.

Statistical Analysis

All data were compiled and tabulated in Microsoft Excel 2013 software, and descriptive statistics were analyzed using EPI info data analysis V7.2.0.1 in the percentage and proportions. $P \leq 0.05$ was measured to be statistically significant. The comparison of the responses among medical and nursing students was done using the Chi-square test.

RESULTS

A total of 130 study participants 86 (66.1%) medical students and 44 (33.9%) nursing students were enrolled in the study. Among these 36 (27.6%) were male and 94 (72.4%) were female participated in the study subjects. Nearly 53 participants had received a formal training in hand washing technique, 28 (out of 86, 32.5%) medical students and 25 (out of 44, 56.8%) nursing students [Table 1].

Table 1: Distribution of study population

Study population (n=130)	Number	Percentage
Occupation		
Medical students	86	66.1
Nursing students	44	33.9
Sex		
Male	36	27.6
Female	94	72.4
Formal training on hand hygiene		
Medical students	28	32.5
Nursing students	25	56.8

Knowledge on Hand Hygiene

The overall knowledge on hand hygiene among the participants was moderate (medical students 64.9%, and nursing students 57.3%). On analyzing the results based on the scoring system, only a few students (14.6%) score good, while 78% score moderate, and a few (7.4%) score poor. Hence, comparing the two groups, medical students had better knowledge on hand hygiene practices than nursing students ($P = 0.000$, significant). The responses of participated students to the individual questions in given in Table 2.

Attitude to Hand Hygiene

On the analysis of attitude to hand hygiene, among the medical and nursing students were (43.2% and 53.6%), respectively. The feedback of the participated students to attitude-based questions revealed that their attitude toward hand hygiene was not satisfactory. However, nurses showed positive attitude toward hand hygiene when compared to the medical students. The response of the participants to attitude-based questions is given in Table 3.

Practices of Hand Hygiene

On the analysis of hand hygiene practice among the medical and nursing students, most of them exhibited poor hand hygiene practice (medical – 29.8%, nursing – 43.1%). Hence, nursing students had significantly ($P < 0.05$) better

practices compared to medical students. The proportion of correct responses of the two groups of students to the individual questions on hand hygiene practices is given in Table 4.

Satisfaction Regarding Facilities Available for Hand Hygiene

Altogether the satisfaction of medical and nursing students regarding the facilities available for hand hygiene was reported as poor by 48.8% of medical students and 59% of nursing students. However, the nursing students had more significant satisfaction with the facilities than the medical students ($P = 0.004$). The proportions of correct responses of the two groups of students to the questions regarding satisfaction with facilities are given in Table 5.

DISCUSSION

Hand hygiene practices are the most fundamental tool in preventing the transmission of hospital-acquired infection, leading to shorter hospital stay, reduction in patient morbidity, and decreased health care costs. Factors that contribute to poor adherence to hand hygiene include poor access to hand washing facilities (sinks), time required to perform standard hand washing, irritant contact dermatitis associated with frequent exposure to soap and water, high workloads, knowledge deficits among HCWs, and the

Table 2: Comparison of knowledge on hand hygiene among medical and nursing students

Q. No.	Responses	Medical students (n=86)		Nursing students (n=44)		P-value
		n	%	n	%	
K1	Which is the main route of transmission of potentially harmful germs between patients (Healthcare workers hands when not clean)?	72	83.7	18	40.9	0.000
K2	What is the most frequent source of germs responsible for health-care-associated infections? (Germs already present on or within the patients)	34	39.5	10	22.7	0.055
	When should hand washing be done to prevent the transmission of germs to the patients?					
K3	Before touching a patient (Yes)	78	90.6	15	34.0	0.000
K4	Immediately after the risk of body fluid exposure (Yes)	63	73.2	36	81.8	0.278
K5	After exposure to the immediate surroundings of a patient (No)	27	31.3	10	22.7	0.300
	Which of the following hand hygiene actions prevent transmission of germs to the health care workers?					
K6	After touching a patient (Yes)	77	89.5	41	93.0	0.496
K7	Immediately after a risk of body fluid exposure Yes)	73	84.8	38	86.3	0.821
K8	Immediately before a clean/aseptic procedure (No)	42	48.6	26	59.0	0.268
K9	After exposure to the immediate surroundings of a patient (Yes)	63	73.2	34	77.2	0.618
	Which of the following statements on alcohol-based hand rub and hand washing with soap and water are true?					
K10	Hand rubbing is more rapid for hand cleansing than hand washing (True)	68	79.0	18	40.9	0.000
K11	Hand rubbing is more effective against germs than hand washing (False)	65	75.5	23	52.2	0.007
K12	Hand rubbing causes skin dryness more than hand washing (False)	20	23.2	17	38.6	0.065
K13	Minimal time needed for alcohol-based hand rubs	18	20.9	14	31.8	0.172
K14	How many steps are there in correct hand washing technique? (7 steps)	45	52.3	19	43.1	0.323
	Which of the following should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?					
K15	Wearing Jewelry (Yes)	66	76.7	42	95.4	0.007
K16	Damaged skin (Yes)	81	94.1	41	93.1	0.821
K17	Long fingernails (Yes)	69	80.2	40	90.9	0.117
K18	Regular use of hand cream (NO)	46	53.4	30	68.1	0.107
	Average		64.9		57.3	

Significant $P < 0.001$

Table 3: Comparison of attitudes on hand hygiene among medical and nursing students

Q. No.	Responses	Medical students (n=86)		Nursing students (n=44)		P-value
		n	%	n	%	
A1	I adhere to correct hand hygiene practices at all times	19	22.0	27	61.3	0.000
A2	I have sufficient knowledge to properly practice hand hygiene	30	34.8	33	75.0	0.000
A3	Wearing gloves reduce the need for hand hygiene	23	26.7	16	36.3	0.630
A4	Emergencies and other priorities make hygiene more difficult at times	08	9.3	03	6.8	0.006
A5	I feel safe and secure from getting any infection after practicing hand hygiene	52	60.4	37	84.0	0.547
A6	Infection prevention team will have a positive influence on my hand hygiene	79	91.8	39	88.6	0.012
A7	Newly qualified staff has not been properly instructed in hand hygiene in their training	24	27.9	22	50.0	0.000
A8	Before starting my clinical training, I reviewed the respective WHO and CDC guidelines for hand hygiene	63	73.2	12	27.2	0.000
	Average		43.2		53.6	

Significant $P < 0.001$ **Table 4: Comparison of the correct responses to hand hygiene practices of medical and nursing students**

Q. No.	Responses	Medical students (n=86)		Nursing students (n=44)		P-value
		n	%	n	%	
P1	Sometimes I miss out hand hygiene simply because I forget it	13	15.1	20	45.4	0.000
P2	Hand hygiene is an essential part of my role	39	45.3	36	81.8	0.000
P3	It is difficult for me to attend hand hygiene course/workshop/seminar due to time pressure	10	11.6	14	31.8	0.004
P4	The frequency of hand hygiene required makes it difficult for me to carry it out as often as necessary	06	6.9	12	27.2	0.001
P5	Infection prevention team has a positive influence on my hand hygiene	17	19.7	23	52.2	0.000
P6	I wash my hands before performing the aseptic and clean procedure	69	80.2	09	20.4	0.000
	Average		29.8		43.1	

Significant $P < 0.001$ **Table 5: Comparison of satisfaction of facilities between medical and nursing students**

Q. No.	Responses	Medical students (n=86)		Nursing students (n=44)		P-value
		n	%	n	%	
F1	Are you satisfied with the facilities available for hand hygiene (Yes)	42	48.8	26	59.0	0.817
F2	Are facilities for hand washing/hand rub available in your work area? (Yes)	67	77.9	38	86.3	0.247
	Satisfaction with the availability of facilities					
F3	Soap/antiseptic and water for hand washing	20	23.2	21	47.7	0.004
F4	Alcohol rub	13	15.1	12	27.2	0.096
F5	Paper/clothes for drying hands	11	12.7	11	25.0	0.078
F6	Availability of gloves	29	33.7	14	31.8	0.827
F7	Training programs on hand hygiene conducted by the hospital	09	10.4	13	29.5	0.006
	Average		31.6		43.7	

Significant $P < 0.001$

failure of administrative leaders to make hand hygiene an institutional priority.^[13]

In our study, analysis of responses showed that knowledge about hand hygiene was found to be moderate in medical students (64.9%) and nursing students (57.3%), respectively. The results were marginally better than the other studies done in Saudi Arabia.^[14,15] Similarly, another study done among medical and nursing students also found moderate knowledge in the majority of them.^[16] Some other researchers have also reported knowledge to be moderate

among medical and nursing students.^[17] On the other hand, in the study from South-west Nigeria, majority of respondents (83%) had good knowledge of hand hygiene, which could have been due to greater number of training activities been provided to the students in Nigeria than in our study.^[18] Several studies state that there is a need for further improvement of clinical year medical students knowledge, attitude, and practice of hand hygiene.^[16] Other worldwide studies have shown similar results as in India, China, and Brazil.^[19,20] According to the WHO guidelines on hand hygiene, the most frequent source of germ

responsible for health-care-associated infections is that germs are already present on or within the patients.^[21] In our study, only 34 (39.5%) medical students and 10 (22.7%) nursing students answered the question correctly. The majority answered that the hospital's environment was the leading cause.

Therefore, this was a positive finding, major gap in the knowledge between medical and nursing students was identified which should be addressed during the future training session. After all the participants were not aware that hand hygiene is to be practiced before patient contact and after contact with the patient surrounding. Nursing students exhibited more of such gaps in knowledge than medical students.

Another finding in our study was that most of the medical and nursing students did not know the minimal time required for alcohol-based hand rubs to kill the germs [medical – 79.1% and nursing – 68.2%, Table 2]. In another study that was also conducted in India,^[22] only 189 (36.1%) students answered this question correctly. This necessitates the further need for improvement of the existing hand hygiene programs which is of almost importance in preventing HCAI. However, all-inclusive analysis showed that medical students had better knowledge on hand hygiene than nursing students.

The attitude of the participants toward hand hygiene was mostly poor. In our study, about 88% of the medical students and 38.7% of nursing students do not adhere to correct hand hygiene practices all the time, disregarding of the knowledge of this group on hand hygiene being good. The participants also agreed to numerous reasons for not adhering to hand hygiene such as forgetfulness and emergency cases. Therefore, in our study poor attitude was seen more among medical students than nursing students. Similarly, another study was done by Nair *et al.* where nursing students showed better attitudes (52.1%) than medical students (12.9%).^[17] In our study, about 26.7% of medical students and 36.3% of the nursing students had the misconception that wearing gloves obviates the need for practicing hand hygiene. In our study, only a few medical students (34.8%) felt that they have sufficient knowledge on hand hygiene compared to nursing students (75%) similar to other studies.^[16,17] This shows the need to conduct hand hygiene training sessions for medical students regularly and emphasize the importance of hand hygiene at least during their internship period. In our study, more nursing students (84%) claimed they felt safe and secure from getting any infection after practicing hand hygiene compared with medical students (60.4%). In our study, only 24 (22.9%) medical students and 22 (50%) nursing students claimed that the newly qualified staffs in

the hospital have not been properly instructed on hand hygiene in their training. Another study that was done in Taif, 90 HCWs (25.9%) have also agreed that newly qualified staff have not been properly instructed in hand hygiene in their training.^[23] Overall these nursing students had a better attitude regarding hand hygiene compare to medical students. They did not recognize important practical aspects such as the importance of hand hygiene after preparing a patient's bed.

In our study, as responses to assess the practices of hand hygiene in medical students (45.3%) and nursing students (81.8%) considered hand hygiene to be an essential part of their role but at the same time about (15.1%) of medical students and (45.4%) nursing students also admitted to miss out hand hygiene simply due to forgetfulness. Nursing students found it more difficult than medical students (31.8% and 11.6%, respectively) to attend hand hygiene course/workshop/seminar due to time pressure. Incorporating the hand hygiene practices more elaborately and objectively into the curriculum itself rather than going for separate course/workshops may help in removing this bottleneck. Another study has also reported that nursing students had better practices than medical students and the difference was found to be statistically significant.^[16,24,25] Hence, being a doctor rather than a nurse has been implicated to be a risk factor for poor hand hygiene practices.^[26] The training and behavior change communication for hand hygiene practices need to be emphasized more among medical students. Another study in Kenya reported that there was a significant improvement in medical students' knowledge about hand hygiene after applying the program to be part of their curriculum.^[27] However, having regular hand hygiene campaigns, displaying posters, and encouraging peers to remind colleagues of hand hygiene has been shown to improve the compliance of HCWs significantly.^[28]

Overall majority of both medical and nursing students had moderate knowledge on hand hygiene. Attitude and practices on hand hygiene were found to be better among nursing students than medical students. The study highlights the need for improving the existing hand hygiene training programs/curriculum to address the gaps in knowledge, attitude, and practices of hand hygiene. The previous studies have shown that self-reported compliance of hand hygiene is higher than the actual compliance during the working shift.

In our study, satisfaction with the existing facilities for hand hygiene was poor among both the medical and nursing students (48.8% and 59%, respectively). Improvement of the facilities for hand hygiene is pre-requisite to ensure good hand hygiene practices.

CONCLUSION

Our study shows that there was a wide gap in the knowledge and practice of hand hygiene among the medical and nursing students. Improvement of facilities for hand hygiene is a pre-requisite to ensure good hygiene practices. Hence, it is essential to conduct more frequent and adequate training programs can go a long way in addressing the gaps in knowledge and improving adherence to better practices in medical and nursing students with continuous monitoring and performance feedback.

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