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### RESEARCH ARTICLE

#### ANALYSING HAND HYGIENE KNOWLEDGE AND ATTITUDE AMONG MEDICAL STUDENTS AND NURSING STAFF: IDENTIFYING THE GAPS

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#### Abstract

**Background:** Hand hygiene is regarded as the cornerstone of infection control practices to reduce the cross-transmission of microorganisms, healthcare-associated infections, and the spread of antimicrobial resistance across all healthcare settings. Assessment of knowledge and attitude towards hand hygiene among healthcare workers is essential to plan interventions to improve adherence to hand hygiene.

**Objective:** The present study aimed to study the knowledge and attitude towards hand hygiene among medical students and nursing staff of a newly established tertiary care academic institute in central India.

**Materials and methods:** This Cross-sectional study included 247 participants comprising undergraduate medical students and nursing staff. They were assessed for knowledge and attitude on hand hygiene using a questionnaire. The data were analyzed using the software SPSS (version 21).

**Result:** In the present study, both the group of participants, nursing staff and medical students, had a fair knowledge of many aspects of hand hygiene which was a positive sign. Nursing staff had significantly better knowledge than undergraduate medical students on hand hygiene ( $p < 0.001$ ). The majority of students and nursing staff had positive attitudes about hand hygiene.

**Conclusion:** Though the participants had general knowledge about hand hygiene, they differed in certain areas, like the type of hand hygiene method required in different situations. Identifying the gaps in knowledge regarding hand hygiene helps to plan interventions to improve compliance with hand hygiene.

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**Introduction:-**

Healthcare-associated infections (HAIs) are of global concern due to associated morbidity, mortality, and economic loss.<sup>1</sup> According to WHO, the prevalence of these nosocomial infections, is as high as 19%, in developing countries posing a challenge to healthcare providers.<sup>2</sup> Hand hygiene (HH) is a way of cleaning one's hands that substantially reduces potential pathogens on hands.<sup>3</sup> It is regarded as one of the most important and basic elements of infection control activities as established by many scientific studies which state if properly implemented, hand hygiene alone can significantly reduce cross-transmission of microorganisms, healthcare-associated infections, and the spread of antimicrobial resistance across all healthcare settings.<sup>4,5,6,7</sup> WHO has introduced "My five moments with hand hygiene" to create awareness about hand hygiene among healthcare workers (HCWs). To further emphasize the importance of hand hygiene, the 15<sup>th</sup> of October of each year is observed as Global Handwashing Day, reminding us of the importance of hand washing.<sup>8</sup>

Hand hygiene is a potent weapon in the nurse's arsenal against infection and is the single most important nursing intervention to prevent infection. It is quite essential that healthcare students must possess requisite knowledge regarding standard infection prevention practices so that they can work in collaboration with other healthcare providers to create a safe environment for patients. Nursing staff and medical students' knowledge and positive attitude towards HH can play a pivotal role in preventing HAIs and thereby decreasing infection-related burdens on the hospital and governmental budgets.

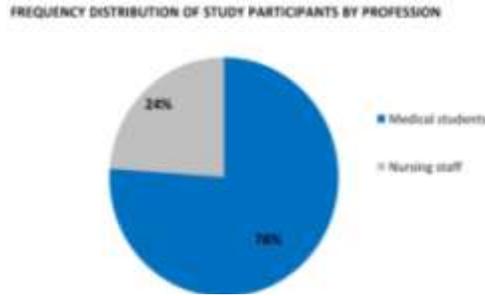
Understanding hand hygiene awareness and attitudes among HCWs is essential in planning interventions in health care. Ours is a newly established tertiary care institute providing outpatient and inpatient patient care services to the patients from Vidarbha region in Maharashtra and adjoining states. This study was planned to evaluate the knowledge and attitude towards hand hygiene among undergraduate medical students and nursing staff at our tertiary care centre.

**Method:-**

This was an institution-based descriptive cross-sectional study conducted over a period of one month. The study included 247 medical students and nursing staff to assess their knowledge and awareness of hand hygiene using a set of questionnaires. Ethical approval was obtained from the institutional ethical committee to conduct the questionnaire-based study and consent was obtained from participants to participate in the study. "WHO's hand hygiene knowledge questionnaire for healthcare workers" was used to assess participants' knowledge. Other relevant information such as age, sex, and profession were included in the questionnaire. WHO questionnaire includes multiple choice and "yes" or "no" questions. The questionnaire includes a variety of questions based on awareness of the effectiveness of hand hygiene to prevent HAIs, knowledge of routes of transmission of HAI, sources of germs that can cause HAI, methods of hand hygiene, etc. Attitude was assessed using six structured questions which were included in the questionnaire. Respondents were given the option to select on a 1- to 5-point scale between strongly agree and strongly disagree. A score of 0 was given for negative attitudes. 1 point was given for each correct response to positive attitudes so the maximum score for attitude was 10. A score of more than 75% was considered good, 50–74% moderate, and less than 50% will be taken as poor. The questionnaire was circulated among students and nursing staff through GoogleForms. Responses obtained from the participants were statistically analyzed using SPSS (version 21) software. Data were represented as frequency and percentages. Descriptive statistics were used to calculate percentages for each of the responses given. The comparison of knowledge between students and nursing staff was calculated using the chi-square test. The p-value < 0.05 was taken as significant.

**Results:-**

A total of 247 participants submitted the questionnaire of which, (49.8%) were females, and (50.2%) were males. Figure 1 shows the frequency distribution of study participants of which the majorities were undergraduate medical students.



**Figure 1:** Frequency distribution of study participants

Table 1 describes the knowledge of participants regarding hand hygiene. It was observed that Nursing staff had significantly better knowledge than medical students on the main route and source for transmission of harmful germs to the patients in a healthcare facility. ( $p$ -value = 0.001) Surprisingly, 95.2% of participants had correct knowledge regarding the main route of cross-transmission of potentially harmful germs between patients in healthcare settings. However, only 49.4% of the respondents could answer correctly that germs already present on or within the patient are the most frequent source of healthcare-associated infection.

To prevent the transmission of germs to the patient, hand hygiene is recommended before touching the patient and/or performing any aseptic procedure. The nursing staff was more aware of hand hygiene actions preventing germs transmission to healthy patients than the medical students. Almost 100% of nursing participants were aware of the moments of hand hygiene recommended to prevent the transmission of germs to healthcare workers.

90.7% of participants knew hand-rubbing is more rapid than handwashing. However, 23.9% of the participants think that hand rub may cause dryness of hands. Interestingly, over half of the participants (42.1%) believe that handwashing and hand-rubbing are to be performed in sequence.

Nursing staff had a significantly better idea of the minimum time needed for alcohol-based hand-rub to kill most germs on hands ( $p$ -value = 0.004).

There are increased chances of colonization of hands with harmful germs in case of wearing jewellery, damaged skin, or artificial fingernails. This was correctly answered by 87%, 86.2%, and 90.2% of the participants. However, almost half of the participants (44.5%) think that the use of hand creams increases the colonization of hands with harmful germs.

**Table 1:-** Comparison of knowledge among medical students and nursing staff on responses received for hand hygiene questionnaire

Sr No	Knowledge about hand hygiene	Medical Students (n= 188)	Nursing Staff (n=59)	$p$ -value
1	Which of the following is the main route of transmission of potentially harmful germs between patients? (Healthcare workers' hands when not clean)	126 (67%)	53 (89.8%)	0.001
2	What is the most frequent source of germs responsible for healthcare-associated infections? (Germs already present on or within the patient)	80 (42.5%)	13 (22%)	0.020
3	<b>Which of the following hand hygiene actions prevents transmission of germs to the patient?</b>			
3a	Before touching a patient (yes)	183 (97%)	59 (100%)	NS
3b	Immediately after risk of body fluid exposure (yes)	171 (90.9%)	46 (77.9%)	0.028
3c	After exposure to immediate surroundings of a patient (no)	24 (12.7%)	12 (20.3%)	NS
3d	Immediately before a clean/aseptic procedure (yes)	178 (94.6%)	58 (98.3%)	NS
4	<b>Which of the following hand hygiene actions prevents transmission of germs to the health care</b>			

	<b>worker?</b>			
4a	After touching a patient (yes)	181 (96.2%)	59 (100%)	NS
4b	Immediately after a risk of body fluid exposure (yes)	181 (96.2%)	58 (98.3%)	NS
4c	Immediately before a clean/aseptic procedure (no)	34 (18%)	16 (27.1%)	NS
4d	After exposure to the immediate surroundings of a patient (yes)	178 (94.6%)	59 (100%)	NS
<b>5</b>	<b>Which of the following statements on alcohol-based hand rub and hand washing with soap and water is true?</b>			
5a	Hand rubbing is more rapid for hand cleansing than hand washing (true)	172 (91.4%)	52 (88.1%)	NS
5b	Hand rubbing causes skin dryness more than hand washing (false)	40 (21.2%)	19 (32.2%)	NS
5c	Hand rubbing is more effective against germs than hand washing (false)	140 (77.4%)	55 (93.2%)	0.006
5d	Hand washing and hand rubbing are recommended to be performed in sequence (false)	86 (45.7%)	18 (30.5%)	NS
<b>6</b>	<b>What is the minimal time needed for alcohol-based hand rub to kill most germs on your hands? (20-30 seconds)</b>	129 (68.6%)	45 (76.2%)	0.004
<b>7</b>	<b>Which type of hand hygiene method is required in the following situations?</b>			
7a	Before palpation of the abdomen (rubbing)	163 (86.7%)	48 (81.3%)	NS
7b	Before giving an injection (rubbing)	121 (64.3%)	19 (32.2%)	NS
7c	After emptying a bedpan (washing)	142 (75.5%)	56 (94.9%)	0.001
7d	After removing examination gloves (rubbing)	105 (55.8%)	50 (84.7%)	NS
7e	After making a patient's bed (rubbing)	83 (44.1%)	9 (15.2%)	NS
7f	After visible exposure to blood (washing)	177 (94.1%)	59 (100%)	NS
<b>8</b>	<b>Which of the following should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?</b>			
8a	Wearing jewellery (yes)	159 (84.5%)	56 (94.9%)	0.008
8b	Damaged skin (yes)	156 (82.9%)	57 (96.6%)	NS
8c	Artificial fingernails (yes)	166 (88.2%)	57 (96.6%)	NS
8d	Regular use of a hand cream (no)	84 (44.6%)	26 (44%)	NS
<i>p</i> -value ≤0.05 (significant), <i>p</i> -value <0.01 (highly significant), and >0.05 (not significant)				
NS: Non-significant				

Table 1 describes participants' knowledge about the type of hand hygiene method required in different situations. For the majority of the situations such as before palpation, before giving an injection, after emptying the bedpan, after removing examination gloves, and after making a patient's bed, the hand hygiene method recommended is hand rubbing. The nursing staff was significantly better aware about hand washing is recommended after emptying the bedpan (*p*-value 0.001). 100% of nursing staff correctly answered that handwashing is the most effective way for reducing the number of pathogenic bacteria on the hands if hands are visibly soiled or contaminated with blood. Females had significantly better knowledge than males regarding the method of hand hygiene most effective for reducing the number of pathogenic bacteria on the hands of personnel. (*p*-value 0.02)

Most students and nursing staff had positive attitudes about hand hygiene. The majority of the participants (82.6%) felt guilty when they omitted HH, while 72.9% of participants felt frustrated if others omit HH. 74.9% of participants thought emergencies and other priorities make hand washing more difficult to perform (Table 2). This attitude is a good base to improve the practice of hand hygiene and overcome challenges in the future.

**Table 2:-** Comparison of attitudes toward hand hygiene practices among medical students and nursing staff.

Sr No	Statement	Medical Students (n=188)	Nursing staff (n=59)
1	I always adhere to correct hand hygiene practices	148 (78.72%)	57 (96.61%)
2	Emergencies and other priorities make hygiene more difficult at times	147 (78.19%)	38 (64.40%)
3	Wearing gloves reduces the need for hand hygiene	69 (36.70%)	13 (22.03%)
4	I feel frustrated when others omit hand hygiene	133 (70.74%)	47 (79.66%)

5	I am reluctant to ask others to engage in hand hygiene	70 (37.23%)	29 (49.15%)
6	I feel guilty if I omit hand hygiene	154 (81.91%)	50 (84.74%)

### Discussion:-

Hospital Acquired Infection is a major threat to patients, increasing both morbidity and mortality, and it can be prevented by proper hand hygiene practices.

In the present study, both the group of participants, nursing staff and medical students, had a fair knowledge of many aspects of hand hygiene which was a positive sign. Nursing staff had significantly better knowledge than medical students on hand hygiene. This finding is similar to the finding reported by Van de Mortel *et. al.* (2010)<sup>9</sup> who compared the hand hygiene knowledge, beliefs, and practices between nursing and medical students.

95.2% of participants had correct knowledge regarding the main route of cross-transmission of potentially harmful germs between patients in healthcare settings. It is high compared to the finding of a study carried out in Raichur, India and Western Saudi Arabia which reports 73.6% and 56.1% of participants respectively could answer correctly on this aspect of hand hygiene.<sup>10,11</sup>

Regarding the source of infection, less than half (49.4%) of the respondents could answer correctly that germs already present on or within the patient are the most frequent source of healthcare-associated infection. This observation is in agreement with the study conducted by Iqra Zia *et. al.* in Pakistan.<sup>12</sup> However, our findings about the awareness of nursing participants (100%) concerning the moments of hand hygiene, recommended to prevent the transmission of germs to healthcare workers, was higher than their study.

Most of our participants (>90%) knew that hand-rubbing is more rapid than handwashing, which is significantly different from the findings of Bakarman *et. al.* (~50%). Differences in responses were also observed in responses to other questions. When asked whether hand rub causes dryness, only a quarter of our participants thought it to be true, but Bakarman *et. al.* reported about half of their study group from Saudi Arabia believed it to be true. Similarly, in the present study, only 42% believed handwashing and hand-rubbing are to be performed in sequence, whereas 70% responded it is true in the study by Bakarman *et. al.* Concerning the questions on hand-rub and hand-wash; however, our findings were comparable to the studies by Nair *et. al.* from India and Iqra Zia *et. al.* from Pakistan.<sup>10-12</sup>

The percentage of correct responses regarding factors increasing the chances of colonization of hands with harmful germs in our study was identical to the findings of Bakarman *et. al.*, Nair *et. al.*, and Iqra Zia *et. al.*, but a higher percentage of correct responses was observed by Shukla *et. al.* from Lucknow, India.<sup>10-12</sup>

Awareness regarding the type of hand hygiene method to be followed in different scenarios was significantly more in nursing participants than in medical students and females than in males, among our participants. Similar findings were reported by Nair *et. al.*<sup>10</sup>

Attitude towards hand hygiene was good among both the categories of participants in our study, though it was slightly better among the nursing staff than medical students. About 80% of the medical students responded that they adhered to hand hygiene practices and felt guilty if they missed it. A similar finding was reported by Hosseinialhashemiet. *al.* where attitude scores toward HH were moderate to good among all healthcare personnel.<sup>13</sup> Our findings were, however, in stark contrast to the findings of Nair *et. al.* where it was observed that the medical students had poor attitudes toward hand hygiene.<sup>10</sup>

The findings of our study cannot be, however, generalized, owing to the small sample size from a single tertiary centre. Hand hygiene practices can be better or otherwise in centres across India and around the world. As this study was based on a questionnaire, the genuineness of the responses cannot be validated, and biasedness cannot be ruled out.

From overall observation, it can be concluded that though the participants had general knowledge about hand hygiene, they differed in certain areas, like the type of hand hygiene method required in different situations. Such findings clearly indicate the gaps in knowledge of hand hygiene among different categories of healthcare workers.

**Conclusion:-**

Hand hygiene is the most important step in the primary prevention of infectious diseases. Neglect of hand hygiene by any healthcare worker has serious aftermath on the health of the patients and sometimes on the healthcare worker himself. Conducting regular training sessions on hand hygiene for all categories of healthcare workers with vigilant monitoring and performance assessment to ensure and encourage them to follow correct hand hygiene practices should be obligatory in all healthcare settings from primary to tertiary.

**References:-**

1. Huang GK, Stewardson AJ, Grayson ML. Back to basics: hand hygiene and isolation. *Current Opinion in Infectious Diseases*. 2014;27(4):379-389.
2. Shukla M, Tyagi M, Gupta N. A Study on Knowledge of Hand Hygiene among Health Care Personnel in Selected Primary Health Care Centres in Lucknow *International Journal of Health Sciences and Research*.2016;6:22-26.
3. Guideline for hand hygiene in health care settings: Recommendations of the Health Care Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *MMWR* 2002;51(No. RR-16). Available at: [www.cdc.gov/mmwr/PDF/rr/tr5116.pdf](http://www.cdc.gov/mmwr/PDF/rr/tr5116.pdf) pdf icon
4. P. Mathur Hand hygiene: back to the basics of infection control. *Indian J Med Res*, 2011;134:611-620.
5. Guide to implementation of the WHO multimodal hand hygiene improvement strategy. Available from: <http://www.who.int/patientsafety/en/>.
6. WHO Guidelines on Hand Hygiene in Health Care. First global patient safety challenge. Clean care is safer care (2010) Available from: <http://www.who.int/patientsafety/en/>.
7. Clancy C, Delungahawatta T, Dunne CP. Hand-hygiene-related clinical trials reported between 2014 and 2020: a comprehensive systematic review. *J Hosp Infect*. 2021;111:6-26.
8. 15th October is Global Hand Washing Day. Available from: <http://www.globalhandwashing.org/global-handwashing-day/>.
9. Van de Mortel TF, Apostolopoulou E, Petrikos G. A comparison of the hand hygiene knowledge, beliefs, and practices of Greek nursing and medical students. *American Journal of Infection Control*. 2010; 38(1):75–77.
10. Nair SS, Hanumantappa R, Hiremath SG, Siraj MA, Raghunath P. Knowledge, attitude, and practice of hand hygiene among medical and nursing students at a tertiary health care centre in Raichur, India. *International Scholarly Research Notices*. 2014;2014:2014:608927.
11. Bakarman MA, Baig M, Malik AA, Gazzaz ZJ, Mostafa MM, Zayed MA, Balubaid AS, Alzahrani AK. Hand hygiene knowledge and attitude of medical students in western Saudi Arabia. *PeerJ*. 2019;7:e6823.
12. Zia I, Cheema SS, Sheikh NS, Ashraf H. Hand hygiene knowledge, attitudes, and self-reported practices among medical and nursing staff of a tertiary-care military hospital: a cross-sectional study. *International Journal of Infection Control*. 2022;18. <https://doi.org/10.3396/ijic.v18.21469>
13. Hosseinialhashemi M, Kermani FS, Palenik CJ, Pourasghari H, Askarian M. Knowledge, attitudes, and practices of health care personnel concerning hand hygiene in Shiraz University of Medical Sciences hospitals, 2013-2014. *American journal of infection control*. 2015;43(9):1009-11.
14. Dutta G, Singh TG, Kumar T. Knowledge and practice of hand hygiene among undergraduate students and junior doctors in the Regional Institute of Medical Sciences, Imphal. *Journal of Family Medicine and Primary Care*. 2020;9(9):4741.