

# Knowledge and practice of hand hygiene among undergraduate students and junior doctors in the Regional Institute of Medical Sciences, Imphal

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## ABSTRACT

**Context:** Maintenance of proper hand hygiene among treating doctors and nurses is one of the most important measures to curb health-care-associated infections. Hand hygiene can prevent the spread of germs including those that are resistant to antibiotics and are becoming difficult, if not impossible, to treat. There are few published articles on similar topic in different settings in India but not in Manipur. Keeping this in mind, the study was conducted. **Aims:** To assess the knowledge and practice of hand hygiene among undergraduate students and junior doctors in rims, imphal and its association with the selected variables of interest. **Settings and Design:** Regional Institute of Medical Sciences (RIMS). **Methods and Material:** A cross-sectional study was done on 924 participants by using a self-administered questionnaire. The data was analyzed using the software SPSS 21 version. **Results:** Of the participants, 49.1% had poor knowledge about hand hygiene; 14.3% had average knowledge, and 36.6% had good knowledge. Knowledge was significantly associated with the frequency of washing hands after patient contact or any laboratory procedure or after the removal of hand gloves ( $P < 0.001$ ) and the frequency of following the six steps of hand washing ( $P = 0.001$ ). **Conclusions:** Nearly half (49.1%) of the participants had poor knowledge about hand hygiene; more than one-tenth (14.3%) had average knowledge, and more than one-third (36.6%) had good knowledge.

**Keywords:** Hand hygiene, handwashing, knowledge, practice

## Introduction

Maintenance of proper hand hygiene among treating doctors and nurses is one of the most important measures to curb health-care-associated infections.<sup>[1]</sup> Hand hygiene is one of the most important healthcare concerns globally and is a single most cost-effective and practical measure to cut down infections and

spread of antimicrobial resistance across all settings—from advanced health-care systems to primary health-care centers.<sup>[2-4]</sup> WHO introduced the “My five moments with hand hygiene” approach for health-care workers and these are before and after touching a patient, before performing aseptic procedures, after exposure to body fluids, and after touching patient surroundings.<sup>[5,6]</sup> The knowledge and practice of the medical and nursing students reflects the future healthcare community.<sup>[7,8]</sup> Therefore, this study was conducted. There are few published articles on similar topic in different settings in India but not in Manipur. Keeping this in mind, the study was conducted.

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## Subjects and Methods

This cross-sectional study was conducted among the undergraduate students (MBBS and B.Sc Nursing students) and junior doctors (MBBS interns and postgraduate students) to assess their knowledge and practice of hand hygiene and its association with the selected variables of interest in RIMS, a tertiary care hospital situated in Imphal, West district of Manipur of Manipur between July 2016 and October 2018. Students who refused to participate in the study and who could not be contacted even after three consecutive visits were excluded from the study.

The sample size was calculated using similar study result on knowledge on hand hygiene<sup>[5]</sup> with the prevalence of 9%, 2% allowable error at 95% confidence, a nonresponse rate of 10%, and was found to be 901 approximately. Sampling was not done as it was intended to cover the whole of the study population.

The study variables were age, sex, designation, field of speciality, training in hand hygiene whereas the outcome variables were knowledge and practice of hand hygiene.

A self-administered questionnaire was used for data collection which consisted of three sections, Section A with questions on general profile of the participant, Section B on “WHO Hand Hygiene Knowledge Questionnaire for Health-Care Workers,” and Section C on practice questions on hand hygiene.

There were 25 questions for evaluating the knowledge regarding hand hygiene. A score of 1 was given for each correct response and 0 for no/don't know/incorrect response and so the maximum score for knowledge was 25 and minimum was 0.

## Operational definitions

### Knowledge scoring

a) Above and equal to 3<sup>rd</sup> quartile - Good knowledge, b) between 2<sup>nd</sup> and 3<sup>rd</sup> quartile - Average knowledge, and c) equal to or below 2<sup>nd</sup> quartile - Poor knowledge.

Field of speciality: The various departments of the institute were classified into preclinical, paraclinical, and clinical departments.

## Data collection

After explaining the purpose of the survey, an informed verbal consent was taken from all the participants. The participants were assured about their anonymity. The questionnaires were distributed among the participants and the filled questionnaires were collected after 15–20 minutes.

## Statistical analysis

Data collected was checked for completeness and consistency. Data were entered in IBM SPSS version 21 for Windows (IBM Inc. Armonk, New York, USA) and were summarized by using descriptive statistics. A Chi square test was employed to test the

association between knowledge and practice of hand hygiene with selected variables of interest. A *P* value of <0.05 was considered as statistically significant.

## Ethical issues

The ethical approval was obtained from the Research Ethics Board, RIMS, Imphal before the beginning of the study [A/206/REB-Comm (SP)/RIMS/2015/198/66/2016]. Informed verbal consent was obtained from the respondents. Data were accessible only to the investigator.

## Results

Figure 1 shows the flowchart showing participants included in the study. Table 1 shows that majority of the participants were MBBS students ( $n = 392$ ; 42.4%) followed by postgraduate students ( $n = 308$ ; 33.3%), nursing students ( $n = 154$ ; 16.7%), and interns ( $n = 70$ ; 7.6%); 36.4% ( $n = 112$ ) were postgraduate students from third year, followed by second year ( $n = 106$ ; 34.4%) and first year ( $n = 90$ , 29.2%). The majority ( $n = 240$ ; 77.9%) of the postgraduate students were from clinical departments and a majority of the participants (59.4%) did not receive any training for hand hygiene.

Figure 2 shows that almost half of the participants (49.1%) had poor knowledge, followed by good knowledge (36.6%) and average knowledge (14.3%).

Table 2 shows that the postgraduate students (53.6%), second-year postgraduate students (60.4%), and participants who had received any form of training in hand hygiene practices (63.5%) were having statistically significant association with good knowledge. Speciality departments of PG students are not significantly associated with knowledge.

**Table 1: Sociodemographic characteristics of the participants (n=924)**

Sociodemographic characteristics	Number n(%)
1. Designation	
PG	308 (33.3)
Interns	70 (7.6)
MBBS students	392 (42.4)
Nursing students	154 (16.7)
2. Year of training of PG students	
1 <sup>st</sup> year	90 (29.2)
2 <sup>nd</sup> year	106 (34.4)
3 <sup>rd</sup> year	12.1 (36.4)
3. Field of speciality of PG students	
Preclinical	22 (7.2)
Paraclinical	46 (14.9)
Clinical	240 (77.9)
4. Received training for hand hygiene	
Yes	375 (40.6)
No	549 (59.4)

Table 3 shows that most of the participants (97.8%) washed hands after patient contact/laboratory procedure. Among them, 76.8% washed their hands always. Regarding hand hygiene after removal of hand gloves, 87.3% used to follow hand hygiene and, out of them, 69.9% used to follow it always.

Figure 3 shows that the commonest reason for not using hand hygiene practices after using gloves were most of the participants ( $n = 104$ ; 88.9%) thought that gloves obviate the use of hand hygiene and so it was not necessary while the other reasons were busy schedule ( $n = 9$ ; 7.7%) and forgetfulness ( $n = 4$ ; 3.4%).

Figure 4 shows that the highest number of participants used personal handkerchief (58%) as drying method after hand wash followed by common towels (40%) and disposable paper towels (33.3%).

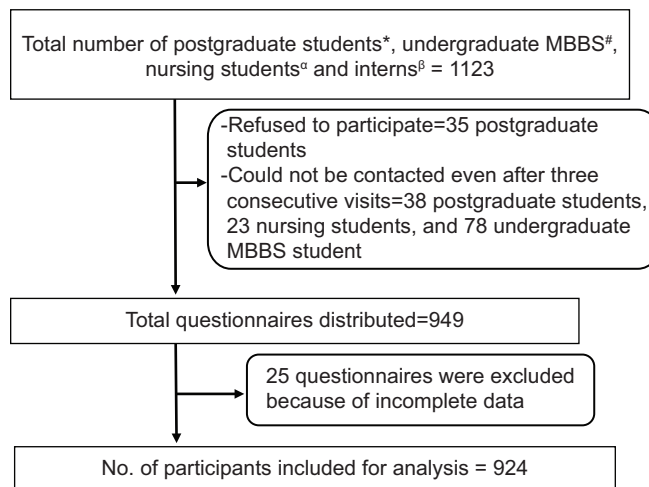
**Table 2: Association of knowledge with sociodemographic characteristics of participants**

Characteristics	Knowledge n (%)			P
	Good	Average	Poor	
<b>Designation</b>				
PG students	165 (53.6)	44 (14.3)	99 (32.1)	< 0.001
Interns	37 (52.9)	6 (8.6)	27 (38.6)	
MBBS students	96 (24.5)	53 (13.5)	243 (62)	
Nursing students	40 (26)	29 (18.8)	85 (55.2)	
<b>Year of training (PG students)</b>				
1 <sup>st</sup>	47 (52.2)	6 (6.7)	37 (41.1)	0.002
2 <sup>nd</sup>	64 (60.4)	11 (10.4)	31 (29.2)	
3 <sup>rd</sup>	54 (48.2)	27 (24.1)	31 (27.7)	
<b>Speciality department (PG students)</b>				
Preclinical	7 (31.8)	3 (13.6)	12 (54.5)	0.194
Paraclinical	27 (58.7)	6 (13)	13 (28.3)	
Clinical	131 (54.6)	35 (14.6)	74 (30.8)	
<b>Prior training on hand hygiene</b>				
Yes	238 (63.5)	35 (9.3)	102 (27.2)	<0.001
No	100 (18.2)	97 (17.7)	52 (64.1)	

Figure 5 shows that only 43.5% of the postgraduate students, 45.7% of interns, 17.9% of MBBS students, and 27.3% of nursing students followed the six steps of hand washing always.

Table 4 shows that the participants who were postgraduate students, participants who received training in hand hygiene washed hands always after patients' contact/laboratory procedure, and were found to be statistically significant. It also shows that participants who received training in hand hygiene always used to wash hands after removal of gloves and this result was statistically significant.

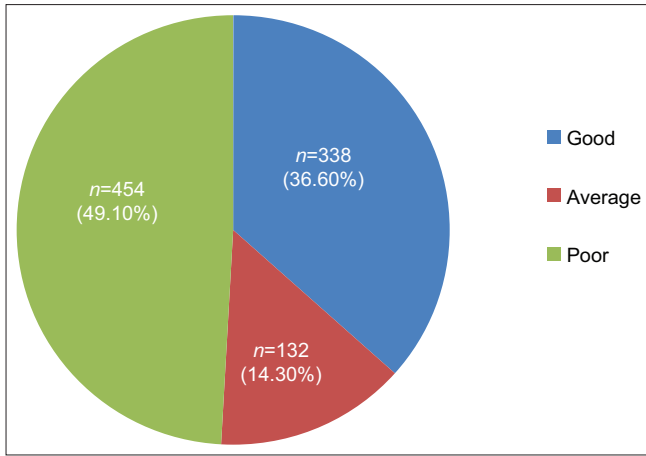
Table 5 shows that majority of those participants who occasionally washed hands after patient contact/laboratory procedure/after removal of hand gloves and those participants who tend to forget to follow the six steps of hand washing had poor knowledge and were found to be statistically significant.



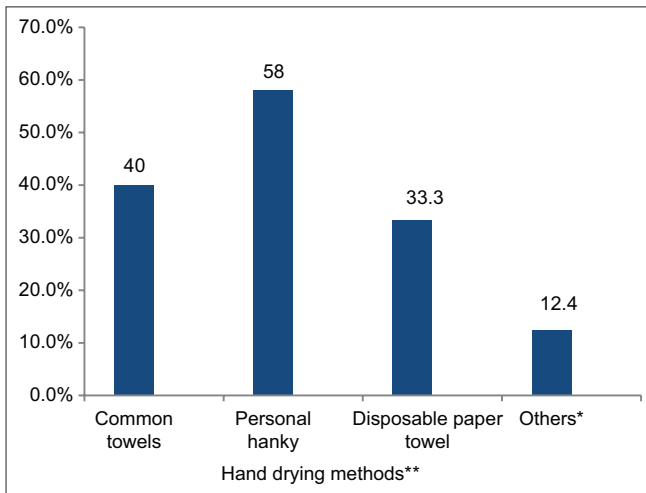
**Figure 1:** Flowchart showing participants included in the study (N=924) \*post graduate students = 381, # undergraduate MBBS = 484, αnursing students = 180, βinterns = 78

**Table 3: Responses of participants for hand hygiene after patient contact/laboratory procedure/after removal of hand gloves/after exposure to body fluids/anatomical specimen (n=924)**

Responses to practice questions	Responses of participants n (%)			
	PG students (n=308)	Interns (n=70)	MBBS students (n=392)	Nursing students (n=154) Total (n=924)
<b>a. Do you wash hands after patient contact/laboratory procedure?</b>				
Yes	307 (99.7)	67 (95.7)	377 (96.2)	153 (99.4) 904 (97.8)
No	1 (0.3)	3 (4.3)	15 (3.8)	1 (0.6) 20 (2.2)
<b>If yes, how often? (N=904)</b>				
Always	272 (88.6)	57 (85.1)	271 (71.9)	94 (61.4) 694 (76.8)
Occasionally	35 (11.4)	10 (14.9)	106 (28.1)	59 (38.6) 210 (23.2)
<b>b. Do you follow hand hygiene after removal of hand gloves?</b>				
Yes	278 (90.3)	68 (97.1)	310 (79.1)	151 (98.1) 807 (87.3)
No	30 (9.7)	2 (2.9)	82 (20.9)	3 (1.9) 117 (12.7)
<b>If yes, how often? (N=807)</b>				
Always	217 (78.1)	54 (79.4)	200 (64.5)	93 (61.6) 564 (69.9)
Occasionally	61 (21.9)	14 (20.6)	110 (35.5)	58 (38.4) 243 (30.1)



**Figure 2:** Distribution of participants according to the type of knowledge (N = 924)



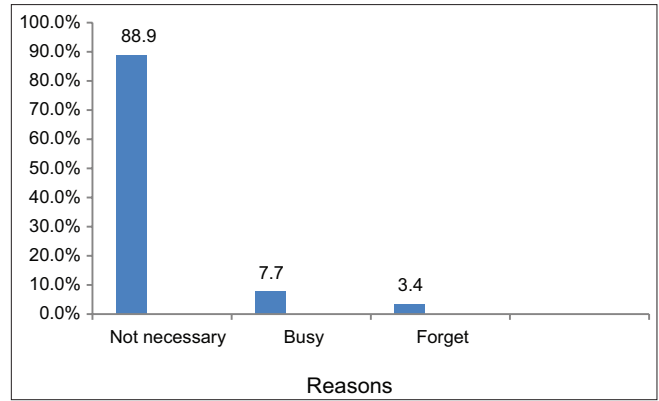
**Figure 4:** Responses to “What are the hand drying methods you use after hand washing?” *air dry, cotton swabs, aprons, papers\*\** Percentage might not tally to 100 as multiple choices were allowed

## Discussion

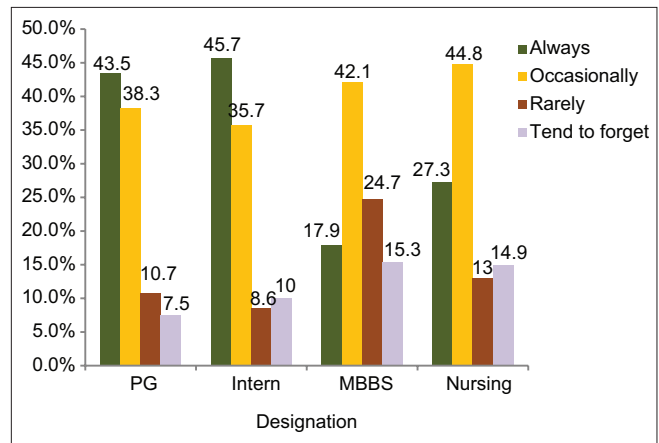
The present study demonstrated that only 36.6% of the participants were having good knowledge in contrast to findings of other studies.<sup>[4,5,9-12]</sup> and it was also found that almost half (54.9%) of the participants did not receive any kind of training in hand hygiene unlike the results of the study conducted by Modi PD *et al.*<sup>[13]</sup> and Ahmad J.<sup>[14]</sup>

In this study, majority of the participants washed their hands after patient contact or any laboratory procedure (97.8%) and after the removal of hand gloves (87.3%) which were similar to the findings of other studies.<sup>[14-17]</sup>

The commonest reason for not using hand hygiene practices after using gloves were most of the participants thought that it was not necessary and gloves obviate the use of hand hygiene and other reasons were busy schedule and forgetfulness. These results were similar to the findings of BaderAldee RM,<sup>[18]</sup> Anargh V *et al.*,<sup>[19]</sup> Anjo



**Figure 3:** Reasons of not using hand hygiene practices after using gloves (N = 117)



**Figure 5:** Responses of different groups of participants to “How do you follow the six steps of hand washing?” (N = 924)

**Table 4: Association of designation of participants with how often they wash hands after patient contact/ laboratory procedure**

Designation	How often you wash hands after patient contact/laboratory procedure? n (%)		P
	Always	Occasionally	
PG students	272 (88.6)	35 (11.4)	<0.001
Interns	57 (85.1)	10 (14.9)	
MBBS students	271 (71.9)	106 (28.1)	
Nursing students	94 (61.4)	59 (38.6)	
Received any training in hand hygiene			<0.001
Yes	315 (84.9)	56 (15.1)	
No	379 (71.1)	154 (28.9)	
Received any training in hand hygiene	How often you wash hands after removal of hand gloves?		<0.001
Yes	268 (78.8)	72 (21.2)	
No	296 (63.4)	171 (36.6)	

UM *et al.*,<sup>[20]</sup> Bushara MOE *et al.*<sup>[21]</sup> Participants (40%) used common towels, 58% used personal hankerchief which was not a good practice, 33.3% used disposable paper towels, and 12.4% used other methods of hand drying after hand washing like letting it get dried by itself (air drying), sterile cotton swabs, aprons, curtains, and whatever

**Table 5: Association of knowledge with practice on hand hygiene of the participants**

Practice	Knowledge n (%)			P
	Good	Average	Poor	
How often do you wash hands after patient contact/laboratory procedure?				
Always	315 (45.4)	85 (12.2)	294 (42.4)	<0.001
Occasionally	16 (7.6)	47 (22.4)	147 (70)	
How often do you follow hand hygiene practices after removal of hand gloves?				
Always	246 (43.6)	83 (14.7)	235 (41.7)	<0.001
Occasionally	42 (17.3)	31 (12.8)	170 (70)	
How do you follow the six steps of handwashing?				
Always	131 (47.1)	34 (12.2)	113 (40.6)	0.001
Occasionally	126 (33.4)	51 (13.5)	200 (53.1)	
Rarely	47 (30.1)	30 (19.2)	79 (50.6)	
Tend to forget	34 (30.1)	17 (15)	62 (54.9)	

available like other studies.<sup>[17,22-24]</sup> Reusing or sharing towels should be avoided because of the risk of cross-infection. Careful hand drying is a critical factor determining the level of bacterial transfer. This is because wet hands provide better condition for the transmission of microorganisms and recognition of this could improve significantly hand hygiene practices in clinical and public health settings.

Less than half of the postgraduate students (43.5%), MBBS students (17.9%), and nursing students (27.3%) follow the six steps of hand washing always in contrast to the finding of Chakraborty T *et al.*<sup>[17]</sup> where a majority (80.8%) of the participants followed the six steps of hand washing always. This may be because the participants might not be aware of the importance of the six steps of hand washing or might take it to be time consuming.

Prior training in hand hygiene was found to be significantly associated with the participants' knowledge of hand hygiene which was similar to the findings of Vaishnav B *et al.*<sup>[1]</sup> showing that training has a positive relationship with knowledge.

Good knowledge was significantly associated with practice of hand hygiene after patient contact always which was similar to the finding of Vaishnav B *et al.*<sup>[1]</sup> and Omuemu VO *et al.*<sup>[25]</sup>

Overall, a small proportion of the participants had good knowledge about hand hygiene and the participants with good knowledge were associated with good practice. Therefore, it is important to educate the medical and nursing students about hand hygiene. Increasing emphasis on hand hygiene in the undergraduate curriculum might improve the students' knowledge and practices about hand hygiene. Hand hygiene being one of the most important primary prevention against any infectious diseases, it cannot be neglected by any of the members of the medical profession, starting from primary care to advanced care. Hand hygiene training sessions need to be conducted for doctors and medical students with continuous monitoring and performance feedback to encourage them to follow correct hand hygiene practices.

## Key Messages

Hand hygiene being one of the simplest and effective practice to prevent infections, compliance and knowledge are still poor. Frequent training programs and reminders should be implemented to boost up the knowledge and increase the compliance of this practice.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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