



## Assessment of Knowledge, Attitude and Practice of Hand Hygiene among Resident Doctors and Nursing Students in a Tertiary Care Hospital of North East India

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### ABSTRACT:

Hand hygiene practices of health care workers has been shown to be an effective measure in preventing hospital acquired infections. This study was undertaken to evaluate the level of knowledge and attitude among residents and staff nurses regarding hand hygiene practices and also to identify gaps among 43 resident doctors and 82 staff. Significant difference 24(55%) and 24 (30%) were observed regarding most frequent source of germs responsible for health care associated infections among resident and nurses respectively. In this study, both residents and nurses had fair knowledge about hand hygiene. A difference in knowledge was observed regarding use of jewellery i.e. 37(85%) against 52(62.2%) and artificial nails 34(80%) against 50(60%) amongst residents and nurses respectively. It is important to conduct regular training programs on hand hygiene for medical staff and nursing staff with continuous monitoring and performance feedback to encourage them to follow correct hand hygiene practice beneficial beside the increase in supplies necessary for hand washing and institutional support.

**KEYWORDS:** Hand hygiene Practice, Knowledge, Attitude

### I. INTRODUCTION

Hand hygiene practices of health care workers has been shown to be an effective measure in preventing hospital acquired infections. It has been recognized as the leading measure to prevent cross-transmission of microorganisms and to reduce the incidence of health care associated infections<sup>1</sup>. Hand hygiene involves any action of hand cleansing, rubbing hands with an alcohol base hand rub or washing your hands with soap and water

to avoid the transmission of microorganisms through hands. Normal hand washing with soap and water is the best component of a hand hygiene program to reduce the risk of contracting infection through contact with hands<sup>3</sup>. Hospital acquired infections due to poor hand hygiene practices are leading to increased morbidity, mortality and health care costs among hospitalized patients worldwide<sup>4</sup>. The high prevalence of these infections, as high as 19%, in developing countries is posing a challenge to health care providers<sup>5</sup>. Hand hygiene is now regarded as one of the most important element of infection control activities. WHO's First Global Patient Safety Challenge, "Clean Care is Safer Care", is focusing on improvement of hand hygiene standards and practices in health care along with implementing successful interventions.<sup>6,7</sup>

Despite evidences provided by several studies and expert opinion that hand hygiene is one of the most effective methods to reduce transmission of potential pathogens or antimicrobial-resistant organisms<sup>8</sup>. Improvements in adherence to hand hygiene and proper attitude towards hand washing technique among health care workers are lacking even after educational efforts<sup>4</sup>.

### II. MATERIAL AND METHODS

The study was carried out for a period from September to December 2019 to assess the knowledge and attitude regarding hand hygiene amongst 43 resident doctors and 82 staff nurses in a tertiary care Hospital in North East India. A Cross-sectional study was conducted and data was collected using a questionnaire. Consent was obtained from those who volunteered to participate.

A total of 125 respondents were included in the study (Resident and nurses) and pre-validated



questionnaires were administered to respondents. Their level of knowledge was assessed on the basis of the Hand Hygiene Knowledge Questionnaires for Health-Care Workers designed by WHO and revised August 2009, which was modified and this included 49 questions carrying both multiple choice and ‘yes’ or ‘no’ questions in the knowledge section. Measurement of attitude and practice was done on the basis of 15 questions and 6 questions respectively where the subjects had to give their

opinion on a 1 to 5 point Likert scale ranging from strongly disagrees to strongly agree. For scoring, 1 point was given for each correct response to good level of knowledge, positive attitude, good practices and satisfaction with facilities. 0 point was given for poor level of knowledge, negative attitude, poor practices and dissatisfaction with facilities. A score of more than 75% was considered good, a score between 50-74% was moderate/ average/ fair and below 50% was considered poor.

**Table 1: Comparison of knowledge in resident and nursing staff regarding various aspects of hand hygiene practices.**

		Residents n = 43		Nurses N=82	
K1	Which of the following is the main route of transmission of potentially harmful germs between patients (Health care workers hands when not clean)	31	72%	57	70%
K2	What is the most frequent source of germs responsible for health care associated infections? (Germs already present on or within the patient)	24	55%	24	30%
K3	According to WHO how many steps of hand washing , do you know? (7)	30	70%	66	80%
K4	Do you think wearing gloves replaces the need for hand washing practices (N)	31	72%	62	75%
The most appropriate timing for performing hand hygiene actions that prevent transmission of germs to the health care worker?					
K5	After touching a patient (yes)	41	95.3%	80	97%
K6	Immediately before a clean / aseptic procedure (no)	39	90%	75	92.2%
K7	Immediately after a risk of body fluid exposure (yes)	34	80%	70	85%
K8	After exposure to the immediate surroundings of a patient (yes)	30	72%	62	75.5%
The most appropriate timing for performing Hand hygiene actions that prevent transmission of germs to the patient?					
K9	Before touching a patient (yes)	39	92.2%	76	93%
K10	After exposure to immediate surroundings of a patient (no)	32	75%	63	77.3%
K11	Immediately after risk of body fluid exposure (yes)	34	79%	67	82%
K12	Immediately before a clean / aseptic procedure (yes)	37	85%	71	87%
With respect to Hand cleansing which of the following statements on alcohol-based hand rub and hand washing with soap and water are true?					
K13	Hand rubbing is more rapid for hand cleansing than hand washing (true)	31	73%	62	75%
K14	Hand rubbing causes skin dryness more than hand washing (false)	15	35%	18	22%
K15	Hand washing is more effective against germs than hand washing (true)	32	75%	66	80%
K16	Hand washing and hand rubbing are	15	34.3%	16	20%



	recommended to be performed in sequence (false)				
K17	What is the minimal time needed for alcohol based rub to kill most germs on your hands? (20 seconds)	16	37%	21	25%
Which type of hand hygiene method is required in the following situations?					
K18	Before palpation of the abdomen ( rubbing)	15	35.4%	33	40%
K19	Before giving an injection ( rubbing)	12	29%	30	37%
K20	After emptying a bed pan (washing)	22	52%	62	75%
K21	After removing examination gloves (rubbing/washing)	32	75%	68	82.5%
K22	After making a patients bed ( rubbing)	17	40%	25	30%
K23	After visible exposure to blood (washing)	21	48.5%	48	59%
Which of the following should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?					
K24	Wearing jewellery (yes)	37	85%	52	62.2%
K25	Damaged skin (yes)	40	92%	75	91%
K26	Artificial fingernails (yes)	34	80%	50	60%
K27	Regular use of a hand cream (no)	27	62%	57	70%
What type of cleansing agent is used in your healthcare setting?					
K28	Soap bar	34	80%	64	78%
K29	Alcohol based hand rub	38	89.1%	75	92%
K30	Liquid soap	41	95%	78	95.5%
K31	Antiseptic	40	94%	80	97%
K32	Are WHO recommended hand washing instructions displayed at your set up	39	90%	75	91%
Where are the hand washing facilities located at your workplace?					
K33	Throughout the healthcare setting	42	97%	80	98%
K34	Conveniently located	37	85%	69	84%
K35	Inconveniently located	4	10%	4	5%
K36	Don't know	2	5%	9	11%
What do you think are the reasons for poor hand washing compliance?					
K37	Lack of knowledge of guidelines/ protocols	38	89%	74	90%
K38	Wearing gloves/ gowns	39	90%	71	87%
K39	Lack of role models among colleagues/ superiors	37	85%	72	88%
K40	Understaffing and Overcrowding	25	57%	53	64%
K41	Poor access to hand washing facilities	26	63%	60	73%
K42	Non availability of alcohol based hand rubs	23	54%	48	59%
K43	Non availability of soap and water	25	57%	49	60%
K44	Hand washing agents cause irritation and dryness	31	73%	62	75%
What is the best approach to improve handwashing compliance?					
K45	Motivation	40	92%	79	95%
K46	Availability of alcohol based hand rubs	22	52%	45	55%
K47	Training and education of HCW	35	82%	70	85%
K48	Need for automated soap dispensers	9	22%	25	30%



K49	Instructions demonstrating correct hand washing techniques to be displayed	33	77%	66	80%
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**Table 2: distribution of participants according to their attitudes towards various aspects of hand hygiene practices**

		Residents		Nursing staff	
		N	%	N	%
A1	I adhere to correct hand hygiene practices at all times	17	40%	58	70%
A2	I have sufficient knowledge and training about hand hygiene	15	35%	62	75%
A3	A health care personnel should enrol in regular training sessions regarding hand hygiene practices	12.9	30%	48	59%
A4	You feel guilty when you omit hand hygiene	21	48%	59	72.5%
A5	You feel uncomfortable when others omit hand hygiene	11	25%	45	55%
A6	Hand washing is cumbersome in case of emergencies	18	42%	25	30%
A7	A health care personnel should act as a role model for others	16	38%	48	59%
A8	Sometime I have more important things to do than hand hygiene	13	30%	33	40%
A9	Wearing gloves reduce the need for hand hygiene	15	35%	22	27%
What is your perception of the dirty areas of the hands?					
A10	Palm	34	82%	69	84.5%
A11	Finger	33	79%	62	75%
A12	Finger tips	33	79%	59	72%
A13	Dorsum of Hands	19	45%	40	49%
A14	Nails	21	49%	43	52%
A15	Web spaces	13	32%	27	33%

**Table 3: Practices of hand hygiene among medical and nursing staff.**

	Responses	Resident doctors		Nursing staff	
		N	%	N	%
P1	Sometimes I miss out hand hygiene simply because I forget it	17	40	25	30
P2	Hand hygiene is an essential part of my role	34	80	72	88
P3	The frequency of hand hygiene required makes it difficult for me to carry it out as often as necessary	24	55	57	70
P4	My Seniors have a positive influence on my hand hygiene	31	72	70	85
P5	My friends and peers have a positive influence on my hand hygiene	30	70	78	95



P6	It is difficult for me to attend hand hygiene courses/workshop due to time pressure	22	52	61	74
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**Table 4. Satisfaction with facilities for hand hygiene among medical and nursing staff**

	Responses	Resident doctors		Nursing staff	
		N	%	N	%
<b>F1</b>	Are facilities for hand washing/ hand rub available in your work area/faculty? (yes)	<b>34</b>	<b>80</b>	67	<b>82</b>
<b>F2</b>	Are you satisfied with the facilities available for hand hygiene in your faculty? (yes)	<b>32</b>	<b>75</b>	<b>70</b>	<b>85</b>
Satisfaction with the availability of					
F3	Soap/antiseptic and water for hand washing	<b>30</b>	<b>70</b>	60	<b>72</b>
F4	Alcohol rub	<b>32</b>	<b>75</b>	63	<b>77</b>
F5	Paper/clothes for drying hands	<b>24</b>	<b>55</b>	<b>41</b>	<b>50</b>
F6	Availability of gloves	<b>31</b>	<b>72</b>	66	<b>80</b>
F7	Training programmes on hand Hygiene conducted by the hospital	<b>31</b>	<b>75</b>	<b>57</b>	<b>70</b>

### III. RESULTS

No difference was observed in study group regarding knowledge about routes of transmission of infection, steps of hand washing recommended by WHO and whether gloves can replace the hand washing. Significant difference 24(55%) and 24 (30%) were observed regarding most frequent source of germs responsible for health care associated infections among resident and nurses respectively [Table-1]. Both groups have shown similar knowledge regarding hand hygiene steps and most appropriate timing for performing hand hygiene actions that prevent transmission of germs to the patient and to the health care worker. They have shown similar knowledge regarding effectiveness of hand washing over hand rubbing with alcohol based solutions (45% in residents and 40% in nurses). But there was a knowledge difference about type of hand hygiene method required to be used in situations like regarding palpation of the abdomen, after emptying a bed pan and after visible exposure to blood with 15 (35.4%), 33(40%) and 22(52%), 62(75%) and 21(48.5%), 48(59%) in residents and nurses respectively [Table-1]. Otherwise they have shown similar knowledge regarding type of hand hygiene method required to be used in situations like before giving an injection and after removing examination gloves, after making a patients bed.

A difference in knowledge was observed regarding use of jewellery i.e. 37(85%) against

52(62.2%) and artificial nails 34(80%) against 50(60%) amongst residents and nurses respectively. Both the groups are equally aware of type of cleansing agent used, hand washing facilities located at workplace, reasons for poor hand washing compliance and what methods should be adopted to improve hand hygiene compliance. Both the group have shown similar perception of the dirty areas of the hands. Resident doctors and particularly nurses mentioned absence of positive role models—that is, experienced nurses or physicians who were noncompliant with good hand hygiene practices—as reasons for their own noncompliance.

### IV. DISCUSSION

In this study, both residents and nurses had fair knowledge about hand hygiene. Seventy percent respondents answered correctly when asked about the main route of transmission of potentially harmful germs between patients. Our results are comparable with studies carried by MHJD Ariyaratne et al<sup>9</sup> and Maheshwari Veena et al<sup>4</sup> which reported that 72% and 75% of participants knew that unhygienic hands of health care workers were the main route of transmission respectively. However, only 55% of residents & 30% of nurses knew that the most frequent source of germs responsible for HCAI's were the germs already present on or within the patient, with residents having better knowledge in this aspect. In our study, 74% were aware that hand rubbing is



more rapid for hand cleansing. The fact that hand rub is not more effective than hand washing was correctly known to 75% of medical students and 80% of nursing staff. An unexpected finding was that only few residents and nursing staff (37% and 25% respectively) knew that 20 seconds is the minimum time required for effective hand hygiene as documented in the WHO guideline<sup>6</sup>. Our findings were comparable to a study carried out by Abd Elaziz et al at Ain Shams University, Cairo wherein 23.2% of observed candidates showed inappropriate hand washing due to both short contact time (less than 30 sec) and improper drying after hand washing.<sup>10</sup>

In our study both groups had poor knowledge regarding the correct type of hand hygiene prior to palpation of abdomen (38%), giving an injection (34%) and after making a patient's bed (34%). A study of MHID Ariyaratne et al in Sri Lanka have shown comparative values of 31%, 26% & 25% respectively<sup>9</sup>. Overall correct responses regarding appropriate use of hand rub and hand washing was unsatisfactory and there were several gaps in their knowledge with regard to the accurate procedure. It is important to address this during future clinical training sessions.

In our study, Nursing staff is following good hand hygiene practices in comparison to resident doctors. This shows that practices are much influenced by attitude, which was found to be better among nursing students than among the medical students. Our finding was similar to a study done by Tabassum N et al<sup>1</sup> where nursing students have shown better attitude and practices regarding hand hygiene. A majority (75%) of nursing staff thought they had sufficient knowledge about hand hygiene compared to just 35% of residents which is almost similar to other studies done by E Arthi et al<sup>11</sup> and Sasidharan et al<sup>12</sup>. This could be due to the fact that unlike medical students, the nursing students are trained about good hand hygiene practice during the early part of their curriculum. This explains the need to conduct training sessions regularly to medical students and stress upon the importance of hand hygiene at least during their internship. Further, a significantly higher percentage of nurses (80%) reported adhering to correct hand hygiene methods compared to just 40% of residents. Our finding is comparable to study done by V Maheshwari et al wherein 62.5% of nurses adhere to correct hand hygiene methods compared to just 21.3% of residents<sup>4</sup>. In our study, 27% medical students and 35% nursing students thought that wearing gloves could replace hand hygiene. Our finding is similar to a study done by MHJD Ariyaratne et al who found that 26% medical students and 39% nursing students

thought that wearing gloves could replace hand hygiene<sup>9</sup>. The participants also cited various reasons for poor adherence to hand hygiene like forgetfulness, emergency cases. Such poor attitude was seen more among the medical students than nurses. This is similar to the finding in a study done by by Sasidharan et al where nursing students showed better attitudes (52.1%) than medical students (12.9%).<sup>12</sup> Medical students appear to copy the hand hygiene behavior of the physicians they see at work, often resulting in poor hand hygiene compliance that will, in turn, be copied by future students. Positive role models are very much needed to break the cycle.<sup>13</sup> This fact is also reflected in our study where 88% of nursing students and 85% of residents have admitted to lack positive role model.

## V. CONCLUSION:

The study highlights the need for improving the existing hand hygiene training programs/ curriculum to address the gaps in knowledge, attitude and practices and to keep health care workers updated about nosocomial infections and prevention of infections. More frequent and adequate training programs can go a long way in addressing the gaps in knowledge and improving adherence to good infection control practices. The training and behavior change communications for hand hygiene need to be emphasized more among the medical students. Seniors and peers can be role models to students for good practices. Synergistic efforts of seniors and hospital administration can improve good hygiene practices among the students who are future cadres of health care workers. Hence it is important to conduct regular training programs on hand hygiene for medical staff and nursing staff with continuous monitoring and performance feedback to encourage them to follow correct hand hygiene practice beneficial beside the increase in supplies necessary for hand washing and institutional support.

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