



Hand Hygiene –The Knowledge, Attitude and Practices with Special Reference to MRSA Among Health Care Workers in A Tertiary Care Hospital, Bengaluru

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Abstract

Background: Health care associated infections are directly related to the hand hygiene practices. Hand hygiene is recognized as the most important measure to prevent cross-transmission of microorganisms and thus reduces the incidence of health care associated infections. MRSA spread is facilitated by cross-transmission via the hands of Health Care Workers (HCWs).

Objective: To know the knowledge, gaps in attitude and practices of Hand hygiene among HCWs and to compare the efficacy of alcohol-based hand rubs and conventional soaps in reducing hand contamination and transmission of MRSA during routine patient care.

Methodology: It was questionnaire-based study conducted among Health Care Workers of tertiary care hospitals in Bengaluru.

Results: Majority of HCWs (78.12%) received formal training in Hand washing. Knowledge about Hand hygiene was good among doctors (76.15%) compared to nurses and others (68.4%). Attitude was moderate among both study groups whereas practices were poor (57.2%) among doctors. ABHRs were found more effective in reducing log reduction count of bacterial contamination (94% vs 83%) and MRSA transmission (75% vs 47.5%) compared to liquid soaps. Increase in bacterial count was observed after antiseptic soap bar use.

Conclusion: Hand hygiene should become an educational priority. Educational interventions for HCWs should provide clear evidence that their hand becomes grossly contaminated with pathogen upon patient contact. They are the easiest and most effective means of decontaminating hands and thereby reducing the rates of Hospital Acquired infections (HAIs). Hand hygiene awareness amongst HCWs can be achieved by promoting and conducting awareness programmes more frequently

Keywords: Hand hygiene, Antiseptic liquid hand wash, Alcohol based hand rubs, MRSA

Introduction

Hand hygiene is general term that applies to either hand washing, antiseptic hand wash, antiseptic hand rub, or surgical scrub¹. Health care associated infections are directly related to the hand hygiene practices. Hand hygiene is recognized as the most important measure to prevent cross-transmission of microorganisms and thus reduces the incidence of

health care associated infections². However, under routine hospital practice compliance with hand hygiene among health care providers is low.^[3] Introduction of an evidence-based concept of “My five moments for hand hygiene” by WHO has helped to address the problem to good extent.^[4] This concept has been effectively used to improve understanding, training, monitoring, and reporting

hand hygiene among Health Care Workers (HCWs).^[5] MRSA spread is facilitated by cross-transmission via the hands of HCWs. Hand rubbing with an alcohol based waterless hand antiseptic seems to be the best method of increasing compliance with hand hygiene.

Materials And Methods:

This questionnaire-based study was conducted in tertiary care hospital in Bengaluru, Karnataka. Ethical clearance was obtained from Institutional Ethical Review Committee. Informed written consent was obtained from 64 Health Care Workers (32 doctors and, 32 other staff which includes Nurses and Group D workers of OT) A self-administered questionnaire containing a set of questions regarding hand hygiene knowledge, attitudes, and practices was distributed to all participants.

Knowledge was assessed using WHO's hand hygiene questionnaire^[8]. This proforma of 10 questions includes multiple choice and "yes" or "no" questions. Attitude and practice were assessed using another self-structured questionnaire which consists of 10 and 6 questions, respectively. Respondents were given the option to select between strongly disagree and strongly agree. A score of 0 was given to negative attitude and poor practices. 1 point was given to each correct response to positive attitudes and good practices so that maximum score for attitude is 10 and for practice it is 6. A score of more than 75% was considered as good, 50-74% moderate and less than 50% was taken as poor.

Microbiological Samples And Processing:

After explaining the detailed procedure imprint of fingertips and palm from the participants both hands were taken on to Chocolate agar and Mannitol salt agar plates before and after the using liquid hand wash and alcohol-based hand rubs and incubated at 37°C under aerobic conditions for 24-48 hours. The total bacterial contamination of hands as the number of colony forming units (CFU) recovered from both the fingertips and palm after 24 to 48 hours of incubation was recorded. The precise count up to 300 CFU was evaluated, as beyond this point colonies formed was considered as confluent growth^{5,6}.

MRSA: Further Staphylococcus aureus was identified by standard microbiological procedure and antibiotic susceptibility was tested on Muller-Hinton agar

(MHA) by Kirby-Bauer disc diffusion method in accordance with CLSI guidelines⁷ to identify Methicillin resistant Staphylococcus aureus (MRSA), most prevalent organism in Hospital set ups.

Statistical Analysis:

Data was analysed by using Microsoft excel software. Descriptive statistics was used to calculate the percentage of each responses given. Z test was used to compare the percentage of correct responses between all the groups. A 'p' value less than 0.05 was considered significant.

Results:

There was a total of 64 Health Care Workers (32 doctors and, 32 nurses and others). In this majority (78.12%) had claimed to have received formal training in hand washing.

Knowledge, Attitude And Practices On Hand Hygiene:

The knowledge on hand hygiene was good among doctors (76.15%) as compared to Nurses and other staff (68.4%). The attitude to the hand hygiene was good among nurses and other staff (73.7%) as compared to doctors (66.5%). Hand hygiene practices were good among nurses and other staff (70.8%) compared to doctors (57.2%) who had significantly poor practices (Table no.1 and Fig no.1). The percentage of correct responses of Health Care Workers to the individual questions on hand hygiene knowledge, Attitude and practices are given in table 3(a,b,c)

Alcohol based hand rubs were found more effective in reducing log reduction count of bacterial contamination (94% vs 83%) and MRSA transmission (75% vs 47.5%) compared to liquid hand soaps (Table no.2 and fig.no. 2). Liquid hand soaps were found to be more effective compared to soap bars and also increase in bacterial count observed after using soap bars.

Discussion/ Conclusion:

In our study, doctors had good knowledge about hand hygiene as compared to Nurses and others. Both the groups had moderate attitude on hand hygiene and hand hygiene practices were poor among doctors compared to nurses and others. Srijeet et.al (2013) studied hand hygiene of 144 participants at Novodaya medical college Raichur, Karnataka and found that

Nursing students had better Knowledge (74%), attitude(52.1% vs 12.9%) and practices 62.1% vs 19.6%) compared to medical students. We have shown that hand rubbing with an alcohol based solution is more effective in than hand washing with antiseptic liquid soap in reducing bacterial contamination as well as MRSA transmission of healthcare workers during routine patient care. This was part to the inadequate time spent washing hands conventionally. E.Girou et.al (France- 2002) studied and found that hand rubs were more effective in reducing bacterial contamination than the hand wash (83% vs58%, p= 0.012) which is consistent with our study. Our study was designed not to interfere with the actual practice of participants in terms of compliance with and quality of hand hygiene, our main objective being to evaluate the efficacy in routine care. Our results show that in routine conditions hand rubbing was the easiest and most effective means of decontaminating hands and thereby reducing the rates of Hospital Acquired infections (HAIs). Hence use of hand rubs in hospital setting should be encouraged. Continuous and

uninterrupted supply of alcohol-based solutions make these solutions ideal substitute for hand washing. Use of soap bars should be strongly discouraged in hospital set ups. The difference in efficacy may have been partly due to the duration of hand washing. The recommended optimal duration of hand washing is at least 30 seconds and up to 1 minute. Hand rubbing and hand washing were actually performed by participants for similar length of time. This duration (30 seconds) seems sufficient for hand rubbing with alcohol based solutions but may not enough for hand washing with medicated soaps. Most observational studies have shown that hand washing is seldom performed for more than 30 seconds and our study confirms these findings^{8,9}.

Our study shows the importance of improving the current training programs targeting hand hygiene practice among different groups of HCWs. Hand hygiene training may need to be conducted more frequently with continuous monitoring and performance feedback to encourage them to follow correct hand hygiene practices.

Tables And Figures

Table No 1: Percentage Of Knowledge, Attitude And Practices Among Study Groups

Sl. No	Study groups	Doctors	Nurses and other staff
1	Knowledge	76.15%	68.4%
2	Attitude	66.5%	73.7%
3	Practices	57.2%	70.8%

Fig.no.1: Percentage of knowledge, attitude and practices among study groups

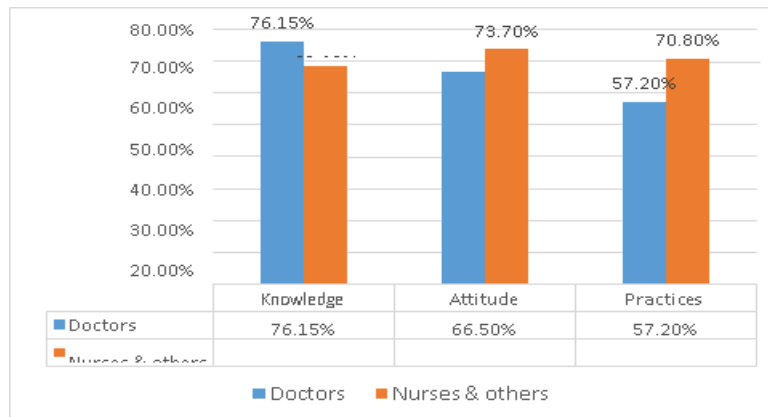


Table-2: comparison of log reduction in bacterial contamination and MRSA reduction after Hand washing with antiseptic liquid soap and hand rubbing with alcohol-based hand rubs. Results showed significant ‘p’ value (<0.05)

Sl.No	Hand Hygiene agents	Log reduction count	MRSA reduction
1	Liquid hand soap	83%	47.5%
2	Alcohol based hand rubs	94%	75%
	P value	<0.007	<0.005

Fig.no.2: Comparison of log reduction in bacterial contamination and MRSA reduction after Hand washing with antiseptic liquid soap and hand rubbing with ABHRs

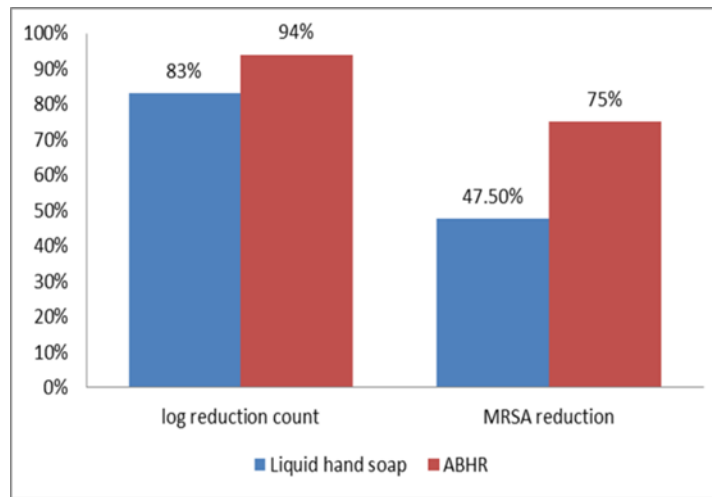


Table-3(a). Comparison of Knowledge in doctors and Nurses on each question.

Sl. No.	Questions	Doctors (n=32)	Nurses & others (n=32)
1	Did you receive formal training in hand hygiene in the last three years?	22 (68.75%)	28(87.5%)
2	Do you routinely use an alcohol-based hand rub for hand hygiene?	30(93.75%)	32(100%)
3	Which of the following is the main route of transmission of potentially harmful germs between patients? (health care workers hands when not clean)	24(75%)	31(96.87%)
4	What is the most frequent source of germs responsible for health care associated infections? (germs already present on or within the patient)	24(75%)	25(78.12%)

5	Which of the following hand hygiene actions prevents transmission of germs to the patient? a) Before touching a patient (yes) b) Immediately after risk of body fluid exposure (yes) c) After exposure to immediate surroundings of a patient (no) d) Immediately before a clean/aseptic procedure (yes)	32(100%) 31(96.87%) 10(31.25%) 31(96.87%)	27(84.37%) 14(43.75%) 13(40.62%) 18(56.25%)
6	Which of the following hand hygiene actions prevents transmission of germs to the health care worker? a) After touching a patient (yes) b) Immediately after a risk of body fluid exposure (yes) c) Immediately before a clean/aseptic procedure (no) d) After exposure to the immediate surroundings of a patient (yes)	32(100%) 32(100%) 7(21.87%) 32(100%)	28(87.5%) 13(40.62%) 30(93.75%) 16(50%)
7	Which of the following statements on alcohol-based hand rub and hand washing with soap and water is true? a) Hand rubbing is more rapid for hand cleansing than hand washing (true) b) Hand rubbing causes skin dryness more than hand washing (false) c) Hand rubbing is more effective against germs than hand washing (false) d) Hand washing and hand rubbing are recommended to be performed in sequence (false)	32(100%) 8(25%) 24 (75%) 8(25%)	20 (62.5%) 18(56.25%) 22(68.75%) 7(21.87%)
8	What is the minimal time needed for alcohol-based hand rub to kill Most germs on your hands? (20 seconds)	26(81.25%)	24(75%)
9	Which type of hand hygiene method is required in the following situations? a) Before palpation of the abdomen (rubbing) b) Before giving an injection (rubbing) c) After emptying a bed pan (washing) d) After removing examination gloves (rubbing/washing) e) After making a patient's bed (rubbing) f) After visible exposure to blood (washing)	27(84.37%) 15 (46.87%) 32 (100%) 30 (93.75%) 18(56.25%) 30 (93.75%)	24 (75%) 10 (31.25%) 32(100%) 31(96.87%) 31(96.87%) 30(93.75%)
10	Which of the following should be avoided, as associated with increased likelihood of colonization of hands with harmful germs? a) Wearing jewelry (yes) b) Damaged skin (yes)	32(100%) 30 (93.75%)	10(31.25%) 20 (62.5%)

	c) Artificial fingernails (yes)	29 (90.6%)	10(31.25%)
	d) Regular use of a hand cream (no)	10(31.25%)	27 (84.37%)

Table:3(b) Comparison of attitude in Doctors and Nurses on each question

Sl.no	Statement	Doctors (n=32)	Nurses & other staff (n=32)
1	I adhere to correct hand hygiene practices at all Times	32(100%)	31(93.75%)
2	I have sufficient knowledge about hand hygiene	32(100%)	30(93.75%)
3	Sometimes I have more important things to do than hand hygiene	21 (65.6%)	21 (65.6%)
4	Emergencies and other priorities make hygiene more difficult at times	15(46.87%)	26(81.25%)
5	Wearing gloves reduces the need for hand Hygiene	19(59.3%)	13(40.62%)
6	I feel frustrated when others omit hand hygiene	22(68.7%)	13(40.62%)
7	I am reluctant to ask others to engage in hand Hygiene	19(59.3%)	19(59.3%)
8	Newly qualified staff has not been properly instructed in hand hygiene in their training	8 (25%)	23(71.8%)
9	I feel guilty if I omit hand hygiene	18 (56.25%)	30(93.75%)
10	Adhering to hand hygiene practices is easy in the current setup	27(84.37%)	30(93.75%)

Table: 3(c) Comparison of Practice in Doctors and Nurses on each question

Sl.no	Statement	Doctor s (n=32)	Nurse & other s (n=32)
1	Sometimes I miss out hand hygiene simply because I forget it	18 (56.25%)	28 (87.5%)
2	Hand hygiene is an essential part of my role	28(87.5%)	30 (93.75%)
3	The frequency of hand hygiene required makes it	11(34.3%)	8(25%)

	difficult for me to carry it out as often as necessary		
4	Infection prevention team have a positive influence on my hand hygiene	23 (71.8%)	29 (90.6%)
5	Infection prevention notice boards remind me to do hand hygiene	23(71.8%)	24(75%)
6	It is difficult for me to attend hand hygiene courses due to time pressure	7(21.87%)	17 (53.1%)

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Hand Hygiene Colour images

Bacterial growth before and after using antiseptic soap bars



Bacterial growth before and after using antiseptic liquid soap



Bacterial growth before and after using Alcohol based hand rubs

