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## Short Communication

## Hand hygiene practices among health care workers (HCWs) in a tertiary care facility in Pune

Lt V. Anargh<sup>a</sup>, Maj Harpreet Singh<sup>b</sup>, Aniket Kulkarni<sup>b</sup>, Col Atul Kotwal, SM<sup>c,\*</sup>,  
Air Cmde Ajoy Mahen<sup>d</sup>

<sup>a</sup> Intern, 166 Military Hospital, C/o 56 APO, India

<sup>b</sup> Resident, Dept of Community Medicine, AFMC, Pune 411040, India

<sup>c</sup> Director, AFMS (Medical Research), New Delhi, India

<sup>d</sup> Professor & Head, Dept of Community Medicine, AFMC, Pune 411040, India

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## ABSTRACT

**Background:** Improper hand hygiene by healthcare workers (HCWs) is responsible for about 40% of nosocomial infections resulting in prolonged illnesses, hospital stays, long-term disability and unexpected high costs on patients and their families, and also lead to a massive additional financial burden on the health-care system.

**Objective:** To assess knowledge and practices regarding hand hygiene among HCWs of a tertiary health care facility.

**Methods:** A cross sectional, questionnaire and observation based study was carried out in a tertiary care health care facility in Pune. Based on sample size calculations, 100 HCWs working in medical and surgical wards were studied.

**Results:** The proportion knowledgeable about hand hygiene practices was 85% and 73% HCWs were of the belief that unclean hands are an important route of cross transmission. WHO guidelines regarding procedure were being followed by 90% for hand washing with soap and water and 64% for alcohol based rubs. Majority preferred hand washing with soap and water over hand rubbing with alcohol based solutions. 21% of HCWs were missing hand hygiene opportunities 1 in 5 times. Heavy workload (38%), non availability (52%) and inaccessibility (9%) of hand hygiene facilities were the common reasons for non-compliance. Availability of 'one time use paper towels' was low (12%).

**Conclusion:** Inadequate compliance despite knowledge and false sense of security by alcohol based rubs was seen. A multi disciplinary, multifaceted approach is required to tackle issues of non-compliance.

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### Introduction

The importance of hand hygiene was recognised as early as 1840s, by Dr. Oliver Wendell Holmes to prevent childbed fever

and in the late 1840's, by Dr. Ignaz Semmelweis to reduce maternal mortality in a Vienna hospital, however, adherence still remains low (40% or below) in most of the health care institutions.<sup>1,2</sup>

\* Corresponding author. Tel.: +91 11 23094808 (O), +91 (0) 8860438811.

E-mail addresses: [dratulkotwal@gmail.com](mailto:dratulkotwal@gmail.com), [atuljyoti2710@hotmail.com](mailto:atuljyoti2710@hotmail.com) (A. Kotwal).

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Improper hand hygiene by healthcare workers (HCWs) is responsible for about 40% of nosocomial infections.<sup>3</sup> Lack of knowledge and lack of recognition of hand hygiene opportunities during patient care are mainly responsible for poor hand hygiene among HCWs. Although many countries have guidelines regarding hand hygiene for healthcare settings, overall compliance among HCWs remains poor<sup>4,5</sup> despite hand hygiene being regarded as one of the most important elements of infection control activities.<sup>6</sup> WHO, in 2005 issued guidelines regarding specific steps and procedures to be followed during hand washing.<sup>7</sup>

The spread of infections in developing countries remains a serious problem, especially in high-risk settings such as health care facilities due to lack of awareness in health care workers and compounded by “omo syndrome” (a belief that they are super clean and sterile).<sup>8</sup>

Present study attempts to describe the extent to which hand washing procedures are known and followed by health care workers in a large tertiary care hospital.

## Material and methods

A cross-sectional survey was carried out in a medical college hospital in Pune. By expecting the compliance to hand washing in HCW's to be 60% with type I error as 5% and error of margin of 10%, the sample size worked out to be 90. However, a total sample of 100 HCWs was studied. Sampling frame consisted of all HCWs involved in patient care in the tertiary care hospital, from which requisite sample was drawn by simple random sampling. Doctors (interns, residents, specialists) and HCWs working in Operation Theatre were not included in the study as they form a different group. A questionnaire was prepared based on WHO and CDC guidelines and available studies on hand washing covering various aspects like knowledge about cross transmission of pathogens, recommended steps for hand washing, materials used, attitudes and hand hygiene practices and the availability of facilities in their ward/department. The availability of hand washing facilities and equipment was also triangulated by a survey. Institutional Ethical clearance was obtained and informed consent was obtained after explaining the nature of study to all participants. A database was created in MS Excel and appropriate statistical analysis carried out.

## Results

45% of the HCWs were working in medical wards while the rest were in surgical wards. Majority (91%) had received training either during their graduation or on the job and a large proportion (81%) attended reorientation activities.

Level of knowledge regarding hand hygiene immediately before touching a patient for preventing transmission of germs and unclean hands as an important route of cross transmission, was high (85% and 73%).

Table 1 shows details of compliance while washing hands with soap and water and alcohol based rubs.

Majority preferred hand washing with soap and water over hand rubbing with alcohol based solutions in scenarios like: before giving an injection (68%), after emptying a bed pan

**Table 1 – Hand washing practices among study participants.**

Scrubbing	Hand washing with soap & water N	Hand rubbing with alcohol based rubs N
No scrubbing	00	21
Only scrubbing of palms	00	12
Only web spaces	10	02
All parts	90	65
<b>Duration</b>		
<20 s	09	46
20–40 s	27	36
>40 s	64	18

(98%), after removing examination gloves (98%), after making a patient's bed (93%) and after visible exposure to blood (99%).

Frequency and Reasons for not adhering to Hand Hygiene Practices are shown in Table 2. Non availability of hand washing facilities was most common reason for non adherence to hand hygiene practices.

The results of facility observation in Table 3 show that all wards/departments were provided with soap and water; wash basin and hand operated faucets. However, 20% mentioned about the non availability of liquid soap and 11% commented that alcohol based rubs were provided with a frequency of 1 per 4 beds. Availability of 'one time use paper towels' was also low (12%).

## Discussion

The HCWs in our study preferred hand washing with soap and water over alcohol based rubs and this was in contrast with the study carried out in tertiary care centre in Chennai.<sup>9</sup>

The compliance to the WHO guidelines regarding adequate hand hygiene was higher in our study (91% for hand washing with soap and water and 64% for alcohol based rubs) than the study done in Ludhiana (41.3%) among nurses working in ICU settings of tertiary care hospital.<sup>10</sup> Lower compliance with alcohol hand wash may be explained by their perception that 85% HCWs in our study considered that hand rubbing with alcohol based rubs to be more rapid than hand washing with soap and water.

**Table 2 – Frequency & reasons for not adhering to hand hygiene practices.**

Missed hand washing	Number (n)
<b>Frequency</b>	
1 in 5 times	21
1 in 10 times	04
1 in 20 times	15
1 in 50 times	24
1 in 100 times	36
<b>Reason</b>	
Facilities not available	52
Very busy	38
Facilities available but access difficult	09
Facilities available but not in good condition	01

**Table 3 – Availability of hand washing facilities.**

Facility	As per HCWs		As per facility survey	
	Available	Not available	Available	Not available
Wash basin	100	00	100	00
Hand operated faucet	100	00	100	00
Liquid Soap	80	20	85	15
Alcohol based rub	99	01	100	00
One time use paper towel	13	87	12	88
Cloth towel	92	08	91	09

However, 81% considered hand washing with soap and water to be superior to hand rubbing with alcohol based solutions for effectiveness against germs in contrast to survey findings amongst HCWs in US who preferred alcohol based solutions over hand washing with aqueous solutions or soap and water and showed an overall hand hygiene compliance rate of 38.4% with aqueous and 79.4% with alcohol.<sup>11</sup>

Lack of complete understanding of guidelines can be deduced from the fact that 81% perceived it as non essential to turn off the hand operated faucet with towel after performing hand washing.<sup>7</sup> This may be due to the fact that paper towels are not available in our health care system. Similar to our findings, in a study in US among HCWs, the mean self reported compliance rate was 84% but when missing out on occasions was accounted for, the overall compliance rate was only 38.4%.<sup>12</sup>

The factors for non-compliance in this study are in consonance with a review conducted to assess barriers to appropriate hand hygiene.<sup>13</sup> The low availability of alcohol based rubs (11%) with a frequency of 1 per 4 beds found in our study, needs to be looked into in order to improve compliance as availability of these has been shown to be directly associated with improved compliance.<sup>14</sup>

To conclude, this study has clearly shown the requirement of an in-depth appraisal of important issues of compliance and patient safety. Educational interventions to recognise the hand hygiene opportunities, improved availability of hand hygiene facilities and multifaceted approach to tackle various barriers (poor attitude, workload, etc) of adherence are needed to be accorded priority. This has to be a part of the overall strategy of improving the adherence to universal precautions in tertiary care hospitals.<sup>15</sup>

### Limitations of the study

In this questionnaire based study, response bias may have led to overestimation of compliance. A triangulation with observation of HCWs was not done because if it is done with their knowledge then Hawthorne effect comes into play and if done without their knowledge then ethical considerations need to be discussed.

### Intellectual contribution

**Study concept:** Col Atul Kotwal, SM, Lt V Anargh.

**Drafting & Manuscript revision:** Col Atul Kotwal, SM, Aniket Kulkarni, Maj Harpreet Singh.

**Statistical analysis:** Col Atul Kotwal, SM, Aniket Kulkarni.

**Study supervision:** Col Atul Kotwal, SM, Air Cmde Ajay Mahen.

### Conflicts of interest

All authors have none to declare.

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