

## Original Article

## KNOWLEDGE, ATTITUDE AND PRACTICE OF HAND HYGIENE AMONG HEALTH CARE WORKERS IN KARACHI

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### Abstract

**Background:** Hospital acquired infections (HAIs) are one of the most common problems encountered in health care. It is a major cause of concern for hospitals throughout the world.

**Methods:** The study design was cross sectional and data was obtained from health care workers currently employed in hospitals. We selected tertiary care hospitals by convenient sampling technique. Data were analyzed through SPSS version 20.

**Results:** A total of 330 health care workers were included in the study out of which 54.4% (180) were males and the rest 45.4% (150) were females. When the participants were asked of the minimum time required for alcohol based hand rub to eradicate the microorganisms, only 42% (138) were able to correctly answer that it takes 20 seconds.

**Conclusion:** Our study identified considerable gaps in knowledge and practice in some key areas regarding hand hygiene which need re-emphasis through regular training sessions aim at keeping abreast with standard protocols of hand hygiene.

**Keywords:** Health care workers, hand hygiene, health care providers.

### Introduction

Hospital acquired infections (HAIs) are one of the most common problems encountered in health care (1). It is a major cause of concern for hospitals throughout the world. (2). A study showed that at least 5-15% patients acquire the infections during their stay in the hospital (1). Another study conducted in Europe and in low-middle income countries showed the prevalence in Europe to be about 5.7% and higher in low-middle-income countries of about 16%. (1,2). These infections acquired during the stay of the patient in the hospital causes a number of disabilities, and a high morbidity rate, which is a cause of increased burden on the health care costs on the patient and health services due to prolonged stay in the hospital and additional medications. (2). A study conducted in Europe and United States showed that the annual cost incurred due to HAIs ranges from 13-24 billion dollars in Europe and around 6.5 billion dollars in United States. About 50% of the hospital acquired infections occurs from the hands of health care providers (3). And at least 20% of these acquired infections are preventable by simple measures of hand hygiene (1), which is the most efficient and cost-effective method for infection control. (3). Any action of cleaning hands and removal of the microorganisms from hands using soap and water or alcohol and antiseptic hand rub is acknowledged as hand hygiene (3).

According to several researches, alcohol based hand rubs are more effective than hand washing with soap and water for removal of pathogenic microorganisms, and is tolerated well by the skin (1,2,4,5). In alcohol based hand rubs, gels are tolerated well by the skin as compared to the liquid formulations (5).

Although the large number of recent studies that has provided us with increased data regarding hospital acquired infections and hand hygiene, the compliance of hand hygiene in developing countries is still very low (3). A study conducted in Ethiopia (underdeveloped country) showed that the compliance of hand hygiene in health care workers is 5-89% (average 38.7%) which is unacceptably low (3). A study in China found that compliance of hand hygiene in health care workers is about 30-75% (6). A study conducted in National Taiwan university hospital found that only 16.6% of health care workers perform hand hygiene (7).

We found out that very few studies has been conducted on this subject in Pakistan, in fact we could find only one study conducted previously in Pakistan (Karachi), whose finding showed that only 4.7% of the respondents clean their hands before direct contact with the patients. (8). And only 17% of the physician stated that they were aware of the WHO guidelines regarding hand hygiene. (8).

### Methodology

This cross sectional study was conducted in tertiary care hospitals in the city of Karachi (JPMC, Civil Hospital and Ziauddin Hospital). All health care workers working in these hospitals were approached. Their knowledge, attitude and practices regarding hand hygiene were evaluated through a self-administered questionnaire. Sampling technique for our study was convenience sampling technique. Total number of participants included in the study were 330 with a confidence interval of 95% and standard deviation of 5%. 20% wastage was also added to the sample size. Sample size was calculated using the formula  $n = z^2 p(1-p)/d^2$ . The participants included in the study were health care workers working in these hospitals which included all doctors, nurses, and technicians. There were no age and gender restrictions. Excluded from the study were those who had language barrier, those not willing to consent, and those absent at the time of data collection. Data was collected from the participants through self-administered questionnaire. The questionnaire is adapted from WHO Hand Hygiene Knowledge Questionnaire for Health-Care Workers. All the questionnaires were filled by participants in front of the primary researchers and they were not allowed to use any external source of knowledge for completing the questionnaire. Data was analyzed on SPSS version 20. All qualitative variables were presented as frequency and percentages. Chi-square test was used to find association between categorical variables and a p-value less than 0.05 was considered as significant. Informed consent taken from participants before being included in the study. All information gathered from the participants was kept confidential. Names of the participants will not be asked; instead each questionnaire marked by a serial number.

### Results

A total of 330 health care workers were included in the study in which their knowledge was assessed regarding the use of alcohol based hand rub and how it prevents the spread of pathogenic microorganisms from one patient to another. In our survey, out of total participants, 54.4% (180) were males and the rest 45.4% (150) were females (Table 1). That included 52% (172) doctors and 48% (158) nurse/staff members.

**Table 1: Demographic Characteristics of the Participants**

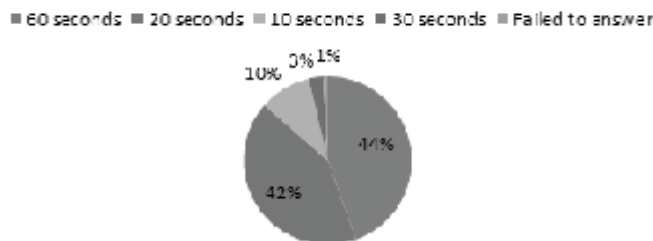
Variable	Male	Female	OR M/F*	Total
No. of Participants	180	150	1.2	330
Percentage of Participants	54.4	45.4	-	100
Training Session				
Variable	Doctors	Nurse/staff	Total participant n=330	
Trained	57	132	189(57.30)	
Not Trained	115	26	141(42.7%)	
Mode & Source Of Health care Associated Infections (HAI)				
Variable	Doctors	Nurse/staff	Total participant n =330	
Main route of cross-transmission of germs by	171	100	271 (82%)	
Frequent source for HAI are the germs on or within patients	121	126	247 (75%)	

\*OR M/F = Odds ratio Male to female

According to the analysis 57.3% (189 out of 330) had received formal training in hand hygiene/ washing in the last 3 years as shown below.

**KNOWLEDGE:** In the study, participants were asked of the minimum time required for ABHR to kill the microorganisms. The results are shown in the pie chart below (figure 1):

**Percentage of participants**



**Figure 1. Percentage of the participants who knew the minimum time required for ABHR to kill the microorganisms**

Most (82%) participants (n=271) correctly identified the main route of cross-transmission of potentially harmful germs. While 75% participants (n=247) identified that germs already present on or within patients are the frequent source of harmful germs responsible for health care-associated infections (HAI) as shown in table.

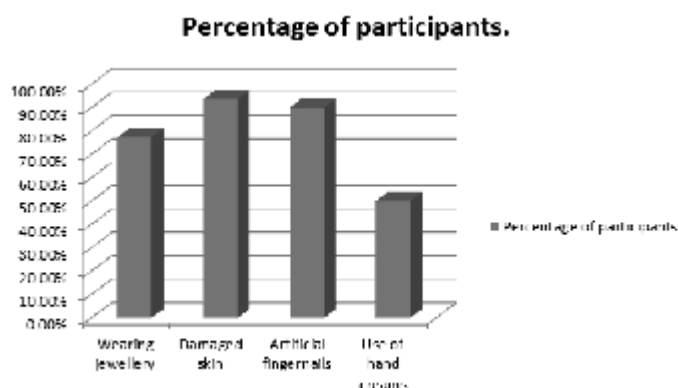
**ATTITUDE:** Then in a series of questions, hand rubbing with alcohol based hand rub was compared with hand washing with soap and water. When asked whether hand rubbing is more rapid for hand cleansing than hand washing, 83.6% (276) of the participants felt that it was true. Also, 88.2% (291) of participants answered that hand rubbing causes more skin dryness than hand washing with soap and water. When asked which of the two is more affective against the microorganisms, 62.7% (207) felt that hand rubbing is more effective. Finally,

76.4% (252) of the participants believed that the recommendation is to perform hand rubbing and then hand washing in a sequence.

**Table 2: Attitude of the Health Care Staff**

Variable	Doctors	Nurse/staff	Total participant n =330
Handrubbing rapid for hand cleansing than handwashing	153	123	276(83.6%)
Handrubbing causes skin dryness more than handwashing	140	151	291(88.2%)
Handrubbing is more effective against germs than handwashing	129	78	207(62.7%)
Handwashing and handrubbing to be performed in sequence	113	139	252(76.4%)

Then the participants were given a list of options and they had to answer whether each of them is associated with increased likelihood of colonization of hands with pathogenic microorganisms. Results are shown in the chart below (figure 2):



**Figure 2. Percentage of the participants knowing source of colonization of microorganisms.**

**PRACTICES:** After that the health care workers were given a list of situations and for each of them they had to choose whether they would do hand rubbing with alcohol based hand rub, handwashing with soap and water or nothing. 0.9% (3) participants failed to answer this question. The results are shown in the table 3 below:

**Table 3: Practices of Health Care workers**

Variable	Rubbing %	Washing %	None
Before palpation of the abdomen.	26.4	69.1	3.6
Before giving an injection.	22.7	72.7	3.6
After emptying a bedpan.	9.1	87.3	2.7
After removing examination gloves.	12.7	85.5	0.9
After making a patient's bed.	11.8	87.3	0
After visible exposure to blood	23.6	75.5	0

**Discussion**

Health care associated infections (HAIs) are a major cause of morbidity and mortality among patients admitted to the hospitals, be it wards or intensive care units. (6) The rates are higher in both developed and third world countries. Several recent researches have

demonstrated that good hand hygiene of health care workers hands is the single most effective way to decrease HAIs (7,9). According to latest World Health Organization (WHO) and Centres for Disease Control and Prevention (CDC) guidelines, hand rubbing with alcohol based hand rub has replaced the conventional hand washing with soap and water (10,11). In our survey, when the knowledge of health care workers was assessed regarding the differences between hand rubbing and hand washing, they demonstrated good knowledge of ABHR with 83.6% correctly answering that hand rubbing is more rapid for hand cleansing than hand washing and 62.7% correctly answering that hand rubbing is more effective against pathogenic microorganisms. These results were similar to a research conducted in a university hospital in Taiwan which also determined that conventional hand washing takes longer time and is less effective against infective organisms.(12)

Although many of our participants were aware of the fact that the alcohol based hand rub is rapid acting, unfortunately, they were not aware of the proper timing for which to use it to be most effective. Only 42 % of the total participants correctly answered it to be 20 seconds out of which 26.4% of the total had formal training regarding hand hygiene in the last three years. This is in accordance to the WHO recommendations which says that hand rubbing should be done for at least 20 - 30 seconds while hand washing needs to be done for at least 40 - 60 seconds. This shows that more awareness needs to be created and educational programs needs to be organized frequently to train health care workers regarding proper hand hygiene in accordance to the latest WHO guidelines. In present study most of the participants (82%) correctly identified that main source of cross-transmission of harmful germs in health care facility as when the health care workers do not clean their hands during work. Three fourth of total participants have core knowledge that germs that are already present on or within patients are frequent sources of harmful germs responsible for HAI. Similar result was found in a research study conducted in Addis Ababa, Ethiopia in 2013 (13).

In our study a large number of the participants felt that hand rubbing with ABHR is more associated with skin dryness and irritation than hand washing. These results are similar to another study conducted in Karachi, Pakistan which also determined that most of its participants felt that it is more associated with skin irritation so much so that it had lead to poor compliance with in their health care workers (8). On the contrary the two studies that were conducted in Switzerland and Taiwan found that hand rubbing is less associated with skin dryness and irritation than with conventional hand washing with antimicrobial soap and water (5,12). In our study the health care workers are well informed regarding what causes more colonization of bacteria on the hands of health care worker. 90.9% felt that the

artificial nails cause hands to become more prone to colonization while 94.5% felt that damaged skin increase the chances of colonization with microorganisms. A study conducted in Nigeria demonstrated similar results with only 7.6% of health care workers using artificial nails showing they were aware of the fact that artificial nails or long nails allow greater colonization of the bacteria under it and also make cleaning difficult. (10). This research also found that one of the causes of damaged skin was using brush for cleaning when hand washing with anti-microbial soap and water and therefore leading to greater colonization with bacteria and therefore concluding that hand rubbing with ABHR is more effective than hand washing. (10)

According to WHO guidelines, "my five moments of hand hygiene", a health care worker needs to perform hand hygiene before and after most situations in his or her daily practice. (14,15). According to WHO guidelines many countries and hospitals as part of quality assurance regularly audit hand hygiene. (16) Unfortunately, most of the health care workers in our study sample demonstrated poor knowledge of the fact that when to use hand rub and when to do hand washing for example 85.5% felt that hand washing should be performed after removing the gloves while WHO guidelines clearly states hand rubbing needs to be performed. (15). A study conducted on community health care workers showed similar results with 95.5% performing hand washing after removal of gloves. (10). The only scenario in which 75.5% of the health care workers answered correctly was that hand washing needs to be performed after visible exposure to blood or secretions. This is correct according to both WHO and CDC guidelines. They recommend hand rubbing in all situations unless there is visible exposure to any of the body secretions or ABHR is unavailable. (10). A study conducted by Doran JA et al in Chicago regarding understanding of hand hygiene among third and fourth year medical students concluded that students demonstrated the best knowledge and worst practices among all health care workers regarding the hand hygiene (17). More studies need to be conducted to determine the knowledge and practices of health care workers working in different departments and different settings in a hospital for example intensive care units, operation theatres, and wards. Also more studies need to be performed which determines the overall compliance of hand hygiene in developing countries and the gold standard in under observation by trained auditors who can observe a health care worker in all 5 moments of hand hygiene. (18).

### Conclusion

The present study identified gaps in hand hygiene knowledge and therefore practices among health care workers. Therefore our study highlights the importance of regular training sessions on health hygiene for health care workers and so frequent workshops and seminars

need to be conducted. Also posting reminders throughout the hospitals and handing out written instructions on how to properly perform hand hygiene to both the health care workers and visitors to the hospital will help in improving the knowledge and therefore practices of hand hygiene among health care workers which directly leads to better patient care and improved health care. Further studies are recommended to observe variations in knowledge, and practices of hand hygiene among doctors, nurses, technicians and rest of the health care staff.

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