HAND HYGIENE;

Perceptions of medical students.

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ABSTRACT… Background: WHO Guidelines recommends ''My five moments for hand hygiene" for prevention of HCAI. **Objective:** To assess the knowledge and practices of medical students about HCAI and hand hygiene. **Setting:** Lahore Medical & Dental College (LMDC), Lahore. **Period:** Four weeks, in January and February, 2012. **Methods:** Descriptive cross-sectional study was conducted using WHO's "Hand Hygiene Knowledge Questionnaire", among MBBS students from 3rd to final years, 2012. Data was entered and cleaned in SPSS 19 and presented in tables and graphs. Descriptive statistics was used in the forms of numbers and percentages. **Results:** Among 227 respondents, 63% were female, 67% were 20 to 22 years old, 38% were from 3rd year, 40% from 4th year and 22% from final year, 61% never received hand hygiene training and 67% never used hand rubs. Few students named unclean hands as main route (42%) and source of HCAI (21%). Hand hygiene was preferred before touching patients (76%) and after body fluid exposure (70%). It was perceived to be rapid (63%), effective (66%), cause of skin dryness (57%) and it was supposed to be used concomitantly with hand washing (74%), before abdomen palpation (48%), giving injection (31%), after removing gloves (22%) and making patient's bed (31%). Damaged skin (92%), artificial fingernails (78%) and jewelry (53%) were perceived to increase hand contamination. **Conclusions:** There were serious gaps in knowledge of proper hand cleaning techniques and their importance in prevention of health HCAI. Hand hygiene, must be part of curriculum and training of all health care providers.

Key words: Hand hygiene, health care associated infections, medical students, perceptions

Article Citation

✓ Daud S, Mahwish R, Shuja H. Perceptions of medical students about hand hygiene. Professional Med J Feb 2013;20(1):164.170.

INTRODUCTION

Health care-associated infection (HCAI) is defined as "an infection occurring in a patient during the process of care in a hospital or other health-care facility that was not present or incubating at the time of admission. This also includes infections acquired in the hospital but appearing after discharge, and occupational infections among staff of the facility"[1]. As a better reflection of the diverse healthcare settings currently available to patients, the term healthcare-associated infections replaced old ones such as nosocomial, hospital-acquired or hospital-onset infections[2]. HCAIs have become more common as medical care has grown more complex and patients have become more complicated,[3] thus affecting around 1.4 million patients at any time worldwide[1,4]. These infections result in excess length of stay, mortality and healthcare costs and in 2002, an estimated 1.7 million healthcare-associated infections occurred in the United States, resulting in 99,000 deaths[5].

Studies document that most HAIs, are of an endogenous nature, and due to micro-organisms already colonizing the patient before the onset of infection[6,7]. The hands of healthcare workers (HCWs) are the most common vehicle for the transmission of healthcare-associated pathogens from patient to patient and within the healthcare environment[1,8,9]. Patient-to-patient transmission of pathogens via HCWs' hands involves five sequential steps. Patients' skin can be colonized by transient pathogens that are subsequently shed onto surfaces in the immediate patient surroundings, thus leading to environmental contamination. As a consequence, HCWs contaminate their hands by touching the environment or patients' skin during routine care activities, sometimes even despite glove use. It has been shown that organisms are capable of surviving on HCWs' hands for at least several minutes following contamination. Thus, if hand hygiene practices are suboptimal, microbial colonization is more easily established and/or direct transmission to patients or a

fomite in direct contact with the patient may occur[1,9].

Based on the above evidence and the demonstration of its effectiveness, optimal hand hygiene behavior is considered the cornerstone of HCAI prevention[1,9-11]. For this purpose, the implementation strategy proposed in the recent World Health Organization (WHO) Guidelines on Hand Hygiene in Health Care, adapts ''My five moments for hand hygiene,'' developed in 2005. This is a user-centered concept created according to principles of human factor design[1,12]. This concept allows a comparison of hand hygiene performance across a broad range of health care settings and has been applied successfully by many hospitals worldwide[1,13]. Table-I depicts that as a standardized tool, ''My five moments for hand hygiene'' approach merges the hand hygiene indications into five moments when hand hygiene is required within the health care flow (Table I)[1].

According to the WHO, when an alcohol-based hand rub is available, it should be used as the preferred means for routine hand antisepsis. This is because the alcohol-based hand rubs have immediate advantages like elimination of the majority of germs (including viruses), short time required (20 to 30 seconds), availability of the product at the point of care, good skin tolerability and no need for any particular infrastructure (clean water supply network, washbasin, soap, hand towel). Hands need to be washed with soap and water when they are visibly dirty or soiled with blood or other body fluids, when exposure to potential spore-forming organisms is strongly suspected or proven, or after using the lavatory. Soap and alcohol-based hand rub should not be used concomitantly[1]. Ensuring hand safety by not wearing jewelry, keeping nails short and caring for the skin are other aspects of hand hygiene that enhance the efficacy of hand rubbing with an alcohol-based hand rub and washing with soap and water[1].

The rising importance of need for prevention and control of HCAI make it crucial that HCWs should be educated in optimal hand hygiene practices. It is only logical that at the time of commencing their clinical education (clinical years) and before their interaction with the hospital environment and patients, all HCWs must be prepared in hand hygiene procedures. At present, there is a dearth of studies in Pakistan which provide information on such practices in the clinical setting and also there is no evidence available in the country about the status of optimal hand hygiene education provided to our undergraduate HCWs. The present study was conducted with a view to ascertain the knowledge and practices of medical students in the

The 5 moments	Consensus recommendation
Before touching a patient	• before and after touching the patient
Before aseptic / clean procedure	• before handing an invasive device for patient care, regardless of whether or not gloves are used • If moving from a contaminated body site to another body site during care of the same patient
After body fluid exposure risk	• after contact with body fluids or exertions, mucous membrane, non-intact skin or wound dressing • If moving from a contaminated body site to another body site during care of the same patient • after removing sterile or non-sterile gloves
After touching a patient	• before and after touching the patient • after removing sterile or non-sterile gloves
After touching patient surroundings	• after contact with inanimate surfaces and objects (including medical equipment) in the immediate vicinity of the patient • after removing sterile gloves or non-sterile gloves

Table-I. "My five moments for hand hygiene" concept and transmission risks

clinical years about WHO criteria of optimal hand hygiene in controlling HCAIs.

METHODS

Cross sectional survey was conducted among all registered students in 3rd, 4th and final year MBBS classes, in academic year 2012 of Lahore Medical & Dental College (LMDC). A structured questionnaire, adapted from WHO's "Hand Hygiene Knowledge Questionnaire for Health-Care Workers" was used[14] with addition of a section on background information of students. The study duration was four weeks, in January and February. Data was entered, cleaned and analyzed using statistical package for social scientists (SPSS) version 19. Data was presented in the form of tables and graphs and descriptive statistics was used in the forms of numbers and percentages.

The approval of the Institute's ethics committee was obtained prior to the study. Confidentiality of the subjects was maintained. Informed consent from the respondents was obtained for data collection and publication of research findings.

RESULTS

In the present study, among 300 registered MBBS students in 3rd, 4th and final years, 227 participated in the study (response rate = 76%). Out of these students, 144(63%) were female, 83(37%) were male, 153(67%) were in the age group 20 to 22 years and 74(33%) were in the age group 23 to 25 years. The representation from various classes was 86(38%) from 3rd year, 90(40%) from 4th year and 51(22%) from final year.

Among the respondents, 138(61%) never received any formal training in hand hygiene either before or during their clinical education, while 89(39%) students admitted that they have received such coaching. Only 75(33%) students reported that they routinely use an alcohol-based hand rub for hand hygiene while 152(67%) students never used hand rubs.

Among the options provided to students regarding the main route of cross-transmission of potentially harmful germs in HCAI, 95(42%) students correctly selected unclean hands of the health care workers as the main route for HAIs, 94(41%) opted for patients exposed to colonized surfaces, 22(10%) blamed circulating hospital air and 16(7%) perceived that act of sharing non-invasive objects like stethoscope and BP apparatus pressure cuffs etc. was responsible for cross infection. Figure I elucidates that when students were inquired about the main source of HAIs, only 21% correctly blamed the germs already present on or within the patient, while others attributed the source of HCAI to be hospital environment and surfaces (57%), hospital air (12%) and hospital water system (10%).

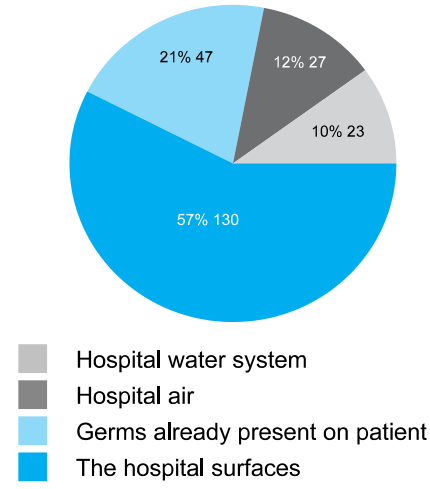

Fig-1. Perceptions of 227 MBBS students about most frequent source of germs responsible for HAI

Table II, depicts the perceptions of students regarding the timing of hand hygiene actions. For prevention of transmission of germs to the patients, the preferred timings of hand hygiene actions were before touching the patient (76%), immediately after a risk of body fluid exposure (70%), after exposure to the immediate surroundings of patient (60%) and immediately before a clean/ aseptic procedure (68%).

Among study participants, 143(63%) agreed that hand rubbing is more rapid for hand cleansing than hand washing but 129(57%) felt that hand rubbing cause skin dryness more than hand washing, 149(66%) perceived hand rubbing was more effective against germs than hand washing but 169(74%) felt that it is recommended that hand washing and hand rubbing should be performed concomitantly in sequence. Among students, only 40(18%) correctly perceived minimal time needed for alcohol-based hand rub to kill most germs on the hands to be 20 seconds. However, 126 (56%) students chose 10 seconds, 35(15%) students opted for 3 seconds and 26(11%) students perceived this time to be 60 seconds.

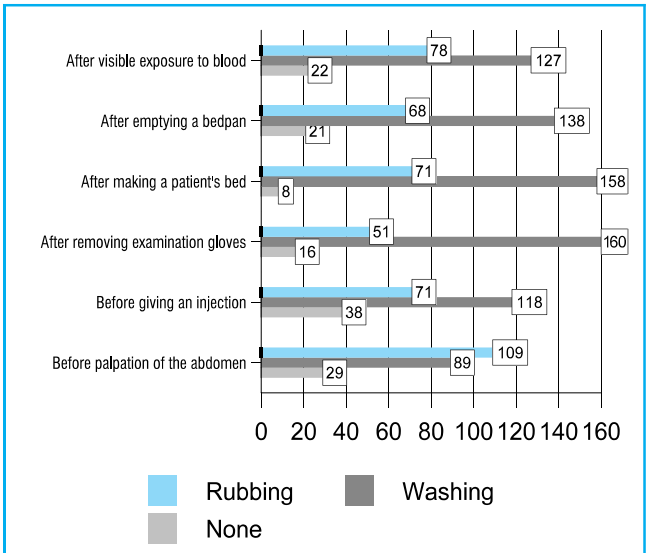

Fig-2. Perceptions of 227 MBBS students about type of hand hygiene method required in the different situations

Students were asked to choose the required hand hygiene actions in different situations. As shown in Figure II, alcohol rub was the choice of 48% before palpation of abdomen, 31% before giving an injection, 22% after removing gloves and 31% after making patient's bed. Among respondents, hand washing was selected by 61% after emptying a bedpan and 56% after visible exposure to blood.

In our study, 208(92%) students identified damaged skin, 177(78%) blamed artificial fingernails and 121(53%) ascertained wearing jewelry as agents for colonization of hands with germs. A large number of students 180(79%) agreed that regular use of hand cream does not pose such hazard.

DISCUSSION

Our study clearly revealed that medical students even in their clinical years, did not have a culture of good hand hygiene practice. Comparable studies have also endorsed this finding that hand hygiene practices among medical students, trainee physicians, doctors and other health care workers are not in line with WHO recommendations[11,15-17].

Among our respondents, 61% never received any formal training in hand hygiene and 67% never used alcohol based hand rubs. However, De Alwis et al. (2012) report from their study that in spite of training and performance under supervision during exams and the hand hygiene promotion activity, students did not demonstrated good hand hygiene practices[15].

The awareness about source and route of HAIs was poor among our students as only 42% named the correct source and even fewer (21%) correctly identified contaminated hands as the main route of spread. Majority of students endorsed the five moments of hand hygiene, but hand washing was the popular choice for hand cleaning in all situations, even those which require hand rubbing. In the present study, perceptions about the efficacy, use and skin safety of hand and hand washing were not clear. Endorsing the findings of the present study, Snow et al. from USA (2006) state that, even though medical students reported strongly positive attitudes toward, they had a low overall rate of hand hygiene[18]. Similarly, Waltman et al. (2011) from another state in USA claim that in their study, students demonstrated strong knowledge of hand hygiene principles, but their practice was poor[19].

Comparable studies from Italy and USA highlight that nursing students had better hand hygiene practices compared with medical and other health care counterparts (van De Mortel 2012; Waltman et al. 2011)[19-20]. In their study Waltman et al. (2011) described that nursing students' knowledge of infection control principles and hand hygiene practices are the effect of a multifaceted approach including, education, skills training, monitoring and research in evidence-based practice[19]. Reporting from Switzerland, Tschudin-Sutter (2010), recognize lack of knowledge of guidelines for hand hygiene, lack of recognition of hand hygiene opportunities during patient care, and lack of awareness of the risk of cross-transmission of pathogens as barriers to good hand hygiene practices in health care workers[21].

Various studies identifying lacunae in hand hygiene practices also provided recommendations for better practices. Snow et al. (2006) endorsed that mentor's use of hand hygiene and glove usage was associated with increased hand hygiene among students[18]. Tschudin-Sutter (2010) was of the view that the practical approaches to promote hand hygiene in the intensive care unit include provision of a minimal number of handrub dispensers per bed, monitoring of compliance, and choice of the most attractive product[21]. Multidisciplinary programs to promote increased use of alcoholic handrub lead to an increased compliance of healthcare workers with the recommended hand hygiene practices. Anwar et al. (2009) endorsed the views of other studies by commenting that interventions taken to only improve awareness won't be sufficient; they have to be supported with improving facilities for hand hygiene[16]. It is now recognized that improving compliance with hand hygiene recommendations depends on altering human behavior. Input from behavioral and social sciences is essential when designing studies to investigate compliance. Interventions to increase compliance with hand hygiene practices must be appropriate for different cultural and social needs[11]. Larson et al. (2006) further added that ways to minimize adverse effects of hand hygiene include

Timing	Responses			
	Yes		No	
Timing of hand hygiene actions that prevents transmission of germs to the patient				
Before touching the patient	172	75.8	55	24.2
Immediately after a risk of body fluid exposure	159	70.0	68	30.0
After exposure to the immediate surroundings of patient	136	59.9	91	40.1
Immediately before a clean/aseptic procedure	154	67.8	72	32.2
Timing of hand hygiene actions that prevents transmission of germs to the health care worker				
After touching the patient	161	70.9	66	29.1
Immediately after a risk of body fluid exposure	160	70.5	67	29.5
Immediately after a clean/aseptic procedure	136	59.9	91	40.1
After exposure to the immediate surroundings of patient	156	68.7	71	31.3

Table-II. Perceptions of 227 MBBS students about the timing of hand hygiene actions that prevents transmission of germs to the patients & health care workers

selecting less irritating products, using skin moisturizers, and modifying certain hand hygiene practices such as unnecessary washing. Institutions need to consider several factors when selecting hand hygiene products: dermal tolerance and aesthetic preferences of users as well as practical considerations such as convenience, storage, and costs[22].

CONCLUSIONS

The present study concludes that perception of medical students and their practices regarding hand hygiene was not in line with WHO recommendations. There were serious gaps in knowledge of proper hand cleaning techniques and their importance in prevention of health care-associated infection (HCAI). Hand hygiene, must be part of curriculum and training of all health care providers. These practices must be monitored and evaluated on regular basis. Positive role modeling and mentoring would be required to inculcate proper and sustainable hand cleaning practices. Facilities, equipment and safe hand cleaning material must be provided at all critical sites in the hospital.

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Article received on: 04/09/2012
Accepted for Publication: 25/11/2012
Received after proof reading: 10/12/2012

The conventional definition of management is
getting work done through people,
but real management is developing people through work.

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