Original Article

Self-reported practices of hand hygiene among the trainees of a teaching hospital in a resource limited country

Muhammad Ali Anwar,[1] Sana Rabbi,[2] Muhammad Masroor,[3] Fouad Majeed,[4] Marie Andrades,[5] Shehla Baqi[6]

Department of Medicine, Dow Medical College and Civil Hospital Karachi,[1,3] Dow Medical College, Dow University of Health Sciences, Karachi,[2] Department of Family Medicine, Aga Khan University Hospital, Karachi,[4,5] Department of Infectious Disease, Sindh Institute of Urology and Transplantation, Civil Hospital Karachi,[6] Pakistan.

Abstract

Objective: To determine the compliance of hand hygiene among the trainee physicians of a tertiary care teaching hospital; and to identify physicians' opinion regarding various obstacles in adhering to the hand hygiene principles.

Methods: Cross-sectional survey was conducted among the Interns (House Officers) and Post Graduate trainee physicians of a tertiary care teaching hospital in a resource limited country. Subjects were consented and selected through non probability convenient sampling. A self-administered questionnaire, based on the hand hygiene guidelines laid down by the World Health Organization (WHO) was used.

Results: A total of 211 questionnaires were completed. Only 4.7% of the physicians reported to decontaminate their hands before having direct contact with their patients. Only 17% claimed to be aware of the WHO recommendations on hand hygiene. Majority of subjects considered "lack of sinks, soap, water and disposable towel" as a major barrier towards hand hygiene adherence. Overall compliance of hand hygiene was found to be 38.8% but it widely varied as a function of patient care activity.

Conclusion: Hand hygiene practices among trainee physicians were not in line with WHO recommendations. To make a difference, interventions taken to improve awareness alone, won't be sufficient; they have to be supported with improving facilities for hand hygiene (JPMA 59:631; 2009).

Introduction

Health-care associated infections continue to pose a serious threat of increasing mortality and morbidity among the hospitalized patients. World Health Organization reports that at anytime, over 1.4 million people world wide suffer from infections acquired in health-care settings.[1] Rate of nosocomial infections varies between 3 to 21% in various hospitals around the world.[2] These rates tend to be as high as 39% in hospitals located in resource-poor countries.[3] Organisms that cause nosocomial infections are most commonly transmitted by the hands of healthcare workers.[4] Therefore, hand-hygiene is considered to be the single best measure for infection control and it has been observed that rates of nosocomial infection are considerably reduced when healthcare workers act in accordance with recommended guidelines for hand hygiene.[4-6] Despite this fact, physicians' adherence to hand-hygiene practices remains consistently poor.[6-8] Notable factors for poor compliance include hand irritation,[9] inaccessibility or shortage of hand-washing equipments,[7-11] dense working conditions,[9,10,12] and poor knowledge.[8,10] Adherence has been found to be associated with awareness being observed, the belief of being a role model for other colleagues, a positive attitude towards hand hygiene after patient contact, and easy access to a hand-rub solution.[6,8] Multifaceted approach including interventions like educational programmes, provision of hand hygiene facilities and promotion of hand-rubs as an alternative to soap, lead to an increase in compliance.[5,6,8]

To bring a change it is necessary to first collect information about physicians' assessment of their own behaviour towards hand-hygiene and their attitude towards possible interventions. Many studies in this domain have been carried out in the West, but sparse data is available from any developing country. The objective of the present study, was to evaluate physicians' self-assessment of compliance with hand-hygiene principles and to identify the factors associated with inadequate adherence to hand hygiene.

Methods

In January, 2007 a questionnaire survey was conducted in a large tertiary care teaching hospital in Karachi, Pakistan. The study subjects included trainee physicians i.e. interns (house officers) and post graduate students. Interns receive one year of medical training and Post-graduates receive a minimum of four years training. They were selected because they are the first to encounter a patient, and act as a role model for students and paramedical staff. Subjects were selected through non probability

convenient sampling.

A self-administered questionnaire was designed by consensus among authors. The choice of this tool was guided by other studies in this area.[11,13] The questionnaire was composed of two parts. First part was constructed to find out how far the current hand hygiene practices were in line with World Health Organization (WHO) recommended guidelines.[1] Each of the WHO recommendation was structured into 14 items that used a four point scale response format operationalized as "Always, Most of the times, Sometimes and Never". The second part of the questionnaire was constructed to identify the significance of various factors associated with inadequate adherence to hand hygiene practices. A Six point Likert scale was used in this section. Only first two responses (Strongly agree and Agree) were considered to be significant factors. The questionnaire was originally devised by Larson E et al (2004)[14] and modified for use in this study.

Each ward was visited only once in order to avoid duplication of respondents. Responses were drawn from all the available physicians attending the ward during each observational period, generally during the morning shifts of duty (0800-1400). The questionnaire was distributed by the Principal Investigator (PI) and the objective and the purpose of the study were explained to each respondent. Participants were assured confidentiality and were given an opportunity to decline to participate in the study. Each respondent was required to sign a consent form to volunteer in the study and to permit the use of their data as needed. PI was readily accessible to participants for the return of questionnaires. The data was entered into Statistical Package for Social Science (SPSS) version 16. Data entry was double punched and verified. Frequencies and percentages were derived for categorical variables. To estimate univariate associations, differences in proportions were assessed by using the Chi-square test; Odds Ratio (OR) and 95% confidence intervals (CIs) were computed by logistic regression analysis. All p-values were two sided and considered as statistically significant if < 0.05.

Results

A total of 211 physicians filled out the questionnaire, out of which 148 (70%) were Interns and 63 (30%) Post-Graduate Trainee Physicians. Median age of the participants was 24 years, 54% were male and 46% were females. Median clinical experience of House officers was 6 months and of Post-graduates was 3 years. The results of the series of questions on the domain of hand hygiene compliance and self reported practices are cited on Table-1. Notably, only 4.7% of the respondents reported to decontaminate their hands before having direct contact with the patients and only 20.9% claimed to disinfect their hands after caring for the patient. Twenty five percent reported that they either always or sometimes keep their nail tips more than 5mm long. Fifty five percent reported to have no means for drying their hands after washing. Only 49.3%(104) reported to rub their hands with soap for the recommended time period of 15seconds.[15] Overall compliance of hand hygiene, for the activities which are strongly recommended by WHO for implementation,[1] was found to be 38.8%; and it showed wide variation depending upon the nature of patient care activity. Only 17 % of 211 physicians surveyed, reported that they were familiar with the WHO recommendations on Hand-hygiene.

Table-1: Self-reported practices of hand hygiene among the trainees. (n=211).

Indication of hand hygiene	Always n (%)	Most of the time n (%)	Sometimes n (%)	Never n (%)
1. Before having direct contact with patients	10(4.7)	30(14.2)	113(53.6)	58(27.5)
2. After having direct contact with patients	44(20.9)	44(20.9)	67(31.8)	56(26.5)
3. If moving from a contaminated body-site to clean body-site	57(27)	58(28.5)	62(29.4)	34(16.1)
4. Before any non-surgical invasive procedure like inserting urinary or peripheral vascular catheters	84(39.8)	34(16.1)	57(27)	36(17.1)
5. After contact with any object in patient's immediate surrounding	36(17.1)	51(24.2)	75(35.5)	49(23.2)
6. After removing gloves	97(46)	28(13.3)	65(30.8)	21(10)
7. If hands are visibly soiled with dirt, body fluid, excretion or blood	198(93.8)	8(3.8)	5(2.3)	0 (0)
8. Use same pair of gloves for the care of more than one patient	16(7.6)	20(9.5)	46(21.8)	129(61.1)
9. Wear gloves before potential contact with body fluids, mucous membrane and non-intact skin of the patient	151(71.6)	32(15.2)	22(10.4)	6(2.8)

The series of questions on the domain of obstacles in adhering to hand hygiene principles revealed that unavailability of hand-hygiene facilities like shortage of soap, water, disposable towels and gloves was the most frequently reported barriers. Most of the respondents believed that hand irritation associated with hand washing or hand-rub use was not a major reason of poor compliance. Also; majority of respondents opined that forgetfulness and dense working conditions are not valid reasons of poor adherence.

Univariate logistic regression analysis looking at the

Table-2: Univariate Analysis comparing knowledge of WHO guidelines with appropriate hand hygiene behavior. (n=211).

Indication of hand hygiene	Knowledge of WHO guidelines		Odds Ratio (CI)*	P-value
	Yes	No		
1. % individuals who disinfect hands before having direct contact with patients	47.2	13.3	5.83(2.65- 12.83)	<0.001
2. % individuals who disinfect hands after having direct contact with patients	52.8	39.9	1.68(0.82-3.4)	0.157
3. % individuals who disinfect hands if moving from a contaminated body-site to clean body-site	69.4	52	2.09 (0.97-4.52)	0.059
4. % individuals who disinfect hands before any non-surgical invasive procedure like inserting urinary or peripheral vascular catheters	77.8	52	3.23 (1.39-7.48)	0.006
5. % individuals who disinfect hands after contact with any object in patient's immediate surrounding	47.2	40.5	1.32 (0.64-2.7)	0.455
6. % individuals who disinfect hands after removing gloves	58.3	60.1	0.93 (0.45-1.92)	0.84
7. % individuals who disinfect hands if visibly soiled with dirt, body fluid, excretion or blood	94.4	98.3	0.3 (0.04-1.86)	0.196
8. % individuals who use same pair of gloves for the care of more than one patient	11.1	17.3	0.59 (0.19-1.81)	0.361
9. % individuals who wear gloves before potential contact with body fluids, mucous membrane and non-intact skin of the patient	88.9	86.1	1.29 (0.42-3.9)	0.659

* Confidence Interval.

association between knowledge of WHO guidelines and quality of hand-hygiene practices is displayed on Table-2. It was identified that physicians who were familiar with the hand-hygiene guidelines were more likely to disinfect their hands before having any direct contact with their patients and before doing any non-surgical invasive procedure. However, no significant impact of having knowledge was identified on other aspects of hand-hygiene indications. Stratified analysis comparing male and female physicians revealed no significant difference in their hand hygiene practices. However, it was found on univariate analysis that male physicians were less likely to keep longer than recommended nail tips as compared to females (Odds Ratio=0.364, Confidence Interval=0.191-0.692, p-value=0.002). A stratified analysis comparing practices of Interns and Post-graduate students did not identify any significant difference. Likewise, there was no significant difference in the practices of the physicians in medical, surgical, paediatric and Intensive Care Units (ICU).

Discussion

Although hand hygiene is a simple procedure, practices of physicians in our study did not meet the current standards set by World Health Organization (WHO). With the aim to reduce healthcare associated infections and the spread of antimicrobial resistance, the WHO launched Global Patient Safety Challenge in October 2005 under the slogan of "Clean care is safer care". A major component of the challenge is to evaluate and implement the new guidelines for the promotion of hand hygiene in health care. It calls Member Nations for strengthening their capacity to improve patient safety and share experiences and to explore aspects underlying hand hygiene behaviour that may influence its promotion among healthcare workers.[16] This study attempts to fulfill the afore mentioned statement by providing useful insight into the prevailing practices of hand-hygiene and points out major obstacles, particularly in a setting that is short of resources.

Compliance rate in our study was based on self-assessment which is a simple measure requiring few means. It can be done routinely and periodically and enables one to reach a large number of physicians in a short period of time. Studies have shown overall consistency between self-reported compliance rates and observed compliance rates;[13] despite this fact, possibility of overestimation by physicians of their own behaviour cannot be refuted and therefore actual adherence might be even worse. Further observational trials might help to substantiate our findings. At this point, there is little insight into why healthcare workers might overestimate compliance, but this is potentially an important area for further research and future intervention.

Due to the dearth of published information on healthcare workers' hand hygiene practices in Pakistan; it was not possible to make national comparisons. Overall compliance rate for various hand hygiene activities, found in the literature from Ireland (Creedon et al 2005),[17] Honkong (Lam et al 2004),[5] Massachusetts (Harris et al 200),[11] Germany (Wendt et al 2004)[18] and Switzerland (Pittet et al 2004)[12] varied around 50%.

As also recognized by other researchers in this domain;[8,11] enhanced adherence to hand hygiene was noticed "after" caring for a patient; whereas poorer adherence was reported "before" having direct contact with a patient. This disparity might be explained by lack of knowledge of Hand Hygiene guidelines but another possible explanation is the desire on the part of healthcare workers to protect themselves from transmissible pathogens. A perception of self-risk is therefore likely to be a strong influential factor which

may guide future interventions.

Knowledge of guidelines was associated with better hand-hygiene practices; therefore we think that efforts need to be focused to raise awareness regarding the impact of health-care associated infections and implications of hand-hygiene by holding seminars, group discussions, written instructions and posted reminders. Studies have consistently identified improvement in overall hand-hygiene practices by interventions targeting at improving knowledge among the healthcare workers.[5,8]

Researchers have noticed better hand-hygiene compliance among healthcare workers working in Paediatrics and Medicine departments as compared to those involved in Surgical and Intensive care units.[6,17] But this is not consistent with our findings where practices were uniformly poor across various specialties. Although dense working condition is usually cited as an explanation for poorer compliance rate particularly in ICUs but we think that lack of facilities and resources are the major limiting factors in our setting.

Studies have demonstrated variation of compliance among different groups of health care workers;[17,18] but no difference in practices was noted between our physician populations. Although, Post-graduate trainees are clinically more experienced than Interns, but their hand-hygiene practices were found to be consistently poor. This might explain that clinical experience is not related with hand hygiene adherence.

Only 32 (16.7%) of the respondents had an access to alcohol based hand-rubs, this points to the need for its more frequent availability. The recommendation on hand hygiene has recently been updated, and hand washing has been replaced by hand-rub as the standard of care.[1,15] Fortunately, respondents in this study believed that hand irritation was not a major element causing poor compliance, as opposed to other studies wherein hand irritation associated with hand-rub use was described as the most prominent barrier.[9] It might be possible that physicians in our study were not using handrub solutions frequently enough to be exposed to the side-effects associated with its use. Therefore hand irritation, as an upcoming barrier must be dealt before hand. Care must be taken in selecting the hand-rub solution for use as it should be such that it minimizes skin irritation and dryness. All future interventions must be supported by improving the facilities for hand-hygiene.

References

1. World Alliance for Patient Safety. WHO guidelines on hand hygiene in health care advanced draft a summary: Clean hands are safer hands. World Health Organization. (Online) (Cited 2009 February 20). Available from URL: http://whqlibdoc.who.int/hq/2005/WHO_EIP_SPO_QPS_05.2.pdf.
2. Mayon-White RT, Ducel G, Kereselidze T, Tikomirov E. An international survey of the prevalence of hospital-acquired infection. J Hosp Infect 1988; 11 Suppl A: 43-8.
3. Rizvi MF, Hasan Y, Memon AR, Abdullah M, Rizvi MF, Saleem S, et al. Pattern of nosocomial infection in two intensive care units of a tertiary care hospital in Karachi. J Coll Physicians Surg Pak 2007; 17: 136-9.
4. Kusachi S, Sumiyama Y, ArimaY, Yoshida Y, Tanaka H, NakamuraY, et al. Creating a manual for proper hand hygiene and its clinical effects. Surg Today 2006; 36: 410-5.
5. Lam BC, Lee J, Lau YL. Hand hygiene practices in a neonatal intensive care unit: a multimodal intervention and impact on nosocomial infection. Pediatrics 2004; 114: 565-71.
6. Pittet D, Hugonnet S, Harbarth S, Mourouga P, Sauvan V, Touveneau S, et al. Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. Infection Control Programme. Lancet 2000; 356: 1307-12.
7. Kaplan LM, McGuckin M. Increasing handwashing compliance with more accessible sinks. Infect Control 1986; 7: 408-10.
8. Danchaivijtr S, Pichiensatian W, Apisarnthanarak A, Kachintorn K, Cherdrungsi R. Strategies to improve hand hygiene practices in two university hospitals. J Med Assoc Thai 2005; 88 Suppl 10: S155-60.
9. Akyol AD. Hand hygiene among nurses in Turkey: opinions and practices. J Clin Nurs 2007; 16: 431-7.
10. Sax H, Perneger T, Hugonnet S, Herrault P, Chraiti MN, Pittet D. Knowledge of standard and isolation precautions in a large teaching hospital. Infect Control Hosp Epidemiol 2005; 26: 298-304.
11. Harris AD, Samore MH, Nafziger R, DiRasorio K, Roghmann MC, Carmeli Y. A survey on handwashing practices and opinions of healthcare workers. J Hosp Infect 2000; 45: 318-21.
12. Pittet D, Simon A, Hugonnet S, Pessoa-Silva CL, Sauvan V, Perneger TV. Hand hygiene among physicians: performance, beliefs, and perceptions. Ann Intern Med 2004; 141: 1-8.
13. Moret L, Tequi B, Lombrail P. Should self-assessment methods be used to measure compliance with handwashing recommendations? A study carried out in a French university hospital. Am J Infect Control 2004; 32: 384-90.
14. Larson E. A tool to assess barriers to adherence to hand hygiene guideline. Am J Infect Control 2004; 32: 48-51.
15. Boyce JM, Pittet D; Healthcare Infection Control Practices Advisory Committee; HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. Guideline for Hand Hygiene in Health-Care Settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. Society for Healthcare Epidemiology of America/Association for Professionals in Infection Control/Infectious Diseases Society of America. MMWR Recomm Rep 2002; 51(RR-16): 1-45.
16. World Health Organization. Clean Care is Safer Care: Countries and regions committing to support health care-associated infection. (Online) 2009 (Cited 2009 Feb 20). Available from URL: http://www.who.int/gpsc/statements/en/index.html.
17. Creedon SA. Healthcare workers' hand decontamination practices: compliance with recommended guidelines. J Adv Nurs 2005; 51: 208-16.
18. Wendt C, Knautz D, von Baum H. Differences in hand hygiene behavior related to the contamination risk of healthcare activities in different groups of healthcare workers. Infect Control Hosp Epidemiol 2004; 25: 203-6.