

Original Research Article

Adherence of surgeons to the World Health Organization recommendations of hand scrubbing in a tertiary care hospital in Peshawar

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ABSTRACT

Background: In an effort to combat the global rise of wound infection, the World Health Organization (WHO) has recommended hand scrubbing guidelines for surgeons. Our study aimed to determine the adherence of surgeons in Peshawar to these recommendations.

Methods: The method and duration of scrubbing for the first surgical procedure of the day was anonymously observed for 182 surgical consultants and residents in the operating theatre of Khyber Teaching Hospital Peshawar from July to August 2019 followed by a questionnaire which assessed the knowledge of the participants regarding scrubbing protocols. Data was analysed using SPSS 23. Students t test was used and $p > 0.05$ was taken as statistically significant.

Results: Out of 182 participants, 41 (22.5%) were consultants and 141 (77.5%) were residents. A total of 3 (1.6%) participants were observed to strictly adhere to the WHO standards of scrubbing. Average time taken by each surgeon was 0.95 ± 0.6 seconds. Students t-test showed no significant difference between the mean time of consultants and residents ($p > 0.05$). The results of the questionnaire revealed that 90.7% of the staff was aware of the WHO recommendations of scrubbing and 82.6% had noticed relevant display charts in the OT. Majority of participants (69.8%) reported that patient load and limited time were the main cause of lack of compliance.

Conclusions: A serious lack of compliance to protocol was noted in the operating theatre of Khyber Teaching hospital. There is a dire need to improve scrubbing practices.

Keywords: Adherence, Hand hygiene, Operation theatre, Prevention of SSIs, WHO recommendations of surgical scrubbing

INTRODUCTION

Wound sepsis due to health care associated transmission of bacteria is a major global issue amounting to an annual economy of approximately \$3.3 billion in the United States and £700 million in the UK.¹ About 15.5% of the population of developing countries suffers from healthcare-associated infections each year and an estimated 700,000 lives are lost due to antimicrobial resistance.² One of the major risk factors for

postoperative infections is glove punctures seen in approximately 30% of all surgeries.³ In this regard hand hygiene remains the most important factor in preventing wound sepsis and is the standard care practiced by all health care professionals before any surgical procedure.⁴

The world health organization's (WHO) recommendations for surgical scrubbing consist of a series of steps in which the hands, fingers and arms are all cleaned with an alcohol based preparation for 3 to 5

minutes whilst observing proper timing and technique. The objective is to prevent transfer of bacteria through unnoticed glove punctures into the wound and to reduce the normal resident flora on the hands of the operating surgeon.⁵ Studies show that surgical site infections (SSI) can be reduced by one-third if hand washing is strictly observed.⁶

In 2009, WHO started its ‘save lives: clean your hands’ campaign which focused on how to protect against drug resistant bacteria by simple hand washing techniques.^{7,8} However over the years it has been noted that compliance to these guidelines has been quite poor.⁸

Our study was conducted with the aim to find out the adherence of surgeons and residents of our hospital to the WHO recommendations of scrubbing for the first surgery of the day. The study provided local surveillance data that will help us to implement protocols that ensure strict observance of international hand hygiene guidelines for patient and healthcare safety.

METHODS

This cross sectional study was conducted from July to August 2019 in the operating theatre (OT) of Khyber Teaching Hospital Peshawar. Ethical approval from the Ethics Review Board was sought before commencement of the study and all surgical and allied departments were notified beforehand and consent obtained from heads of all units. The study included 182 consecutive consultants and residents belonging to all surgical departments who actively participated in surgical procedures in the main operation theatre. OT personnel not participating in surgical procedures such as technicians, scrub nurses and medical students were excluded from the study.

Observational roles were assigned to trained members (residents) not participating in the study. WHO observational checklist for surgical hand scrubbing with yes-no questions was used.⁵ The observer anonymously noted each participant’s method and duration of scrubbing for the first surgical procedure of that day. All participants were observed only once during the two-month period. The names of all participants were kept confidential and were not disclosed at any point during the study. Adherence to the protocol was assessed by calculating the total score in terms of percentage.

After the two-month observance phase, self-administered questionnaires comprising of ten questions were distributed among the entire surgical staff of the hospital to assess their knowledge regarding scrubbing protocols proposed by WHO. A pilot survey was conducted for testing the internal consistency of this questionnaire before its application on our sample population. All data was documented on a structured pro forma and analysed using SPSS 23. Frequencies and percentages were calculated for categorical variables and mean±SD was calculated for continuous variables. Students t-test and

Chi square analysis were the statistical tests used with p value<0.05 taken as statistically significant. Data was presented in the form of tables and charts.

RESULTS

Out of a total of 182 participants, 41 (22.5%) were consultants and 141 (77.5%) were residents. Gender-wise, 131 (72%) participants were males and 51 (28%) were females. The department wise data is shown in Figure 1.

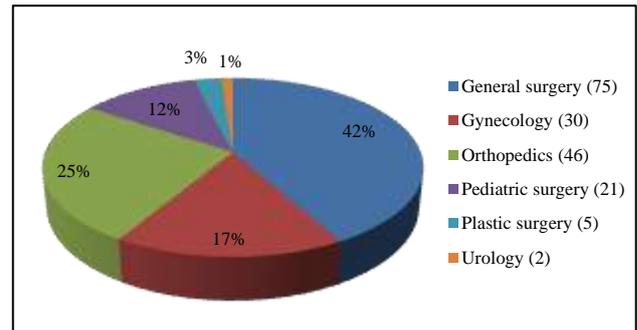


Figure 1: Distribution of surgeons and residents (n).

Table 1: Comparison of mean time of scrubbing among groups.

Groups	Mean time±SD (seconds)	P values
Position	Consultants 0.76±0.36	0.51
	Residents 0.98±0.64	
Gender	Males 1.05±0.64	0.38
	Females 0.69±0.41	

Statistical test applied: Students t test. P<0.05 is taken as statistically significant.

Only 3/182 (1.6%) participants were observed to strictly adhere to the WHO standards of surgical scrubbing. The average time for each surgeon was 0.95±0.61 minutes. Student t-test showed that there was no significant difference between the mean time of consultants and residents and male and female surgeons (p>0.05) (Table 1). The steps of scrubbing were noted for all participants. Details are shown in Table 2.

The results of the questionnaire revealed that 90.7% of the staff was well aware of the WHO recommendations of scrubbing, 82.6% had seen display charts about hand scrubbing techniques in the OT above the wash basin areas and 80.2% agreed that such charts do guide in proper scrubbing. 76.7% of the participants were of the favour that regular training sessions for surgical scrubbing techniques should take place in the hospital. The various causes of lack of adherence along with their reported frequencies are highlighted in Table 3. There was no statistical difference between the various reasons reported among consultants and residents and between various departments (p>0.05). Comparison between the

two genders revealed that more female surgeons agreed that excessive patient load and limited time was the main

cause of lack of compliance as compared to male surgeons (p<0.05).

Table 2: Adherence to different components/steps of surgical hand scrubbing technique; n (%).

Steps of Surgical Scrubbing	Performed	Not performed
Has removed all jewelry/ accessories	182 (100)	0 (0)
Wash hands and arms with antimicrobial soap	79 (43.4)	103 (56.6)
Clean subungual areas with a nail file	0 (0)	182 (100)
Appropriate amount of scrub solution used.	178 (97.8)	4 (2.2)
Timing started. Scrubbed each side of each finger, between the fingers and the back and front of the hand for 2 minutes	7 (3.8)	175 (96.2)
Proceeded to scrub the arms and kept the hand higher than the arm at all times	173 (95.1)	9 (4.9)
Washed each side of arm to 3 inches above the elbow for one minute	12 (6.6)	170 (93.4)
Repeated the process on the other hand and arm and kept hands above elbows at all times. If the hand touched anything except the brush at any time, the scrub was lengthened by 1 minute for the area that was contaminated	109 (59.9)	73 (40.1)
Rinsed hands and arms by passing them through the water in one direction only, from fingertips to elbows. Did not move the arm back and forth through the water.	176 (96.7)	6 (3.3)
At all times during the scrub procedure, care was taken not to splash water on the surgical attire.	172 (94.5)	10 (5.5)

n: Number of participants

Table 3: Causes of lack of adherence among surgeons and reported frequencies (%).

Cause for lack of adherence	Agree	Disagree
Excessive patient burden and limited time for surgeries	69.8	30.2
Lack of familiarity with the standards of scrubbing	45.8	54.2
Supervisor’s instructions to scrub quickly	6.3	93.8
Surgeon is rushing to go somewhere and has to finish work hurriedly	14.6	85.4
Lack of resources (nail brush, number of wash basins in the OT)	21.9	78.1
Standard scrubbing taking a lot of time and is very hectic	16.7	83.3
Excessive scrubbing has deleterious effects on the skin	10.4	89.6
Laziness on the part of surgeons	47.2	52.8

DISCUSSION

The hands of health care workers are the main source of spread of infection in the hospital with some microbes known to survive on hands for up-to 2 hours. Adherence to hand hygiene principles with proper use of alcohol-based scrubs, can reduce infection rate by 40%.⁹ WHO recommends a 300 second (5 minutes) scrub for the first surgical procedure of the day followed by 180 seconds for subsequent scrubs. However, 61% of healthcare workers do not follow best hand-washing practices.¹⁰ Our research highlighted a severe lack of adherence (1.6%) among surgeons to WHO surgical scrubbing guidelines. In contrast other studies such as Khan et al reported an adherence rate of 14.6% which improved to 94% after feedback was provided and Schwartz et al reported a compliance rate of 18% to the entire scrubbing technique.^{11,12}

Our study showed major discrepancies in the scrubbing method of surgeons. Certain steps were altogether

ignored and not followed such as cleaning the nails with a nail file (0%), washing hands with antimicrobial soap (43.4%) and washing the arms above the elbows (6.6%). Scrubbing of the hands was also not done according to protocol by majority (96.2%) of participants. Comparison of our study with Schwartz et al revealed that both studies had similar adherence rates for the steps: remove jewelry and accessories before scrubbing, keep hands higher than elbows at all times and rinse hands and arms in one direction only. However, Schwartz et al reported a higher adherence (33%) to nail cleaning. A study in Nepal showed similar adherence rates to various components of the scrubbing protocol as our study with an overall better adherence (17.5%) to WHO’s five minute first scrub of the day.¹³

Our research revealed that majority of our OT staff was well aware of the WHO recommendations of scrubbing and more than 80% had noticed relevant posters displayed in the operation theatres. Furthermore, all departments were notified beforehand yet adherence was

extremely low (1.6%). A Turkish study reported same findings which showed that the scrub performance of surgeons had no relationship with their knowledge of infection control.¹⁴ Our research revealed that there was no difference between scrubbing practices of consultants and trainees similar to a study by Ezzat et al which is rather disappointing since trainees look up to their consultants for guidance.¹⁵ Majority of the consultants and residents were of the view that heavy patient load and limited time was the reason for low adherence as proposed by Knoll et al.¹⁶ However their study suggested that the idea of this external stress was a subjective perception among the staff and there was no generalizable relationship between excessive nursing care and decline in hand hygiene.¹⁶ Lack of hospital policies and poor implementation strategies are identifiable factors in most cases of poor hand hygiene practices of the health care staff. Many studies have shown improvement in compliance after simple interventions such as video monitoring and providing regular feedback.^{11,17,18}

There are some limitations of the study. Our study consisted of participants belonging to a single hospital in Peshawar. Also every participant was observed only once during the entire study duration. Multi-center studies involving all three major hospitals of Peshawar consisting of multiple observations for each participant may provide better results. Another limitation of our study was that the results of the questionnaire may be biased due to Hawthorne effect, so the actual percentage of participants aware of the WHO guidelines may be less than the reported figure.

CONCLUSION

Surgeons and residents of our hospital are not vigilant about hand scrubbing guidelines. This is attributed less to lack of knowledge and more to the casual behaviour of OT personnel towards following rules and regulations. Continuous education, periodical monitoring and feedback as well as audit are required to improve the current situation.

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REFERENCES

1. Qin Liu L, Mehigan S. The effects of surgical hand scrubbing protocols on skin integrity and surgical

- site infection rates: a systematic review. *AORN J.* 2016;103:468-82.
2. Allegranzi B, Gayet-Ageron A, Damani N, Bengaly L, McLaws ML, Moro ML, et al. Global implementation of WHO's multimodal strategy for improvement of hand hygiene: a quasi-experimental study. *Lancet Infect Dis.* 2013;13(10):843-51.
3. Widmer AF. Surgical hand hygiene: scrub or rub? *J Hosp Infect.* 2013;83:535-9.
4. Clancy C, Delungahawatta T, Dunne CP. Hand-hygiene-related clinical trials reported between 2014 and 2020: a comprehensive systematic review. *J Hosp Infect.* 2021;111:6-26.
5. World Health Organization. WHO guidelines on hand hygiene in health care. First global patient safety challenged clean care is safer care. Chapter 13: Surgical hand preparation: state-of-the-art. Geneva: WHO Press; 2009.
6. Creedon SA. Healthcare workers' hand decontamination practices: compliance with recommended guidelines. *J Adv Nurs.* 2005;51:208-16.
7. World Health Organization. WHO guidelines on hand hygiene in health care. First global patient safety challenged clean care is safer care. Chapter 15: Factors to consider when selecting hand hygiene products. Geneva: WHO Press; 2009.
8. Zil e Ali A, Cheema MA, Wajih Ullah M, Ghulam H, Tariq M. A survey of handwashing knowledge and attitudes among the healthcare professionals in Lahore, Pakistan. *Cureus.* 2017;9:e1089.
9. Kampf G, Löffler H, Gastmeier P. Hand hygiene for the prevention of nosocomial infections. *Dtsch Arztebl Int.* 2009;106(40):649-55.
10. World Health Organization. Health care without avoidable infections: the critical role of infection prevention and control. Geneva: WHO; 2016. Available from: <http://apps.who.int/iris/bitstream/10665/246235/1/WHO-HIS-SDS-2016.10-eng.pdf>. Accessed on 20 August 2016.
11. Khan A, Nausheen S. Compliance of surgical hand washing before surgery: Role of remote video surveillance. *J Pak Med Assoc.* 2017;67(1):92-6.
12. Schwartz X, Schmitz M, Safdar N, Pop-Vicas A. Adherence to surgical hand antisepsis: Barriers and facilitators in a tertiary care hospital. *Am J Infect Control.* 2018;46(6):714-6.
13. Paudel A, Bista B. Compliance of surgical hand scrub in operation theatre of teaching hospital, Chitwan. *J Chitwan Med Coll.* 2019;9(1):36-40.
14. Umit UM, Sina M, Ferhat Y, Yasemin P, Meltem K, Ozdemir AA. Surgeon behaviour and knowledge on hand scrub and skin antisepsis in the operating room. *J Surg Educ.* 2014;71(2):241-5.
15. Ezzat A, Safdar MM, Ahmed I. Are we following the WHO recommendations for surgical scrubbing? *Scott Med J.* 2014;59:214-9.

16. Knoll M, Lautenschlaeger C, Borneff-Lipp M. The impact of workload on hygiene compliance in nursing. *Br J Nurs.* 2010;19(16):18-22.
17. Abdollahi L, Tabrizi SJ, Jodati A, Safaie N, Moradi-Joo M, Daemi A. Quality of surgical scrub in a heart hospital: Do not take it for granted. *J Cardiovasc Thorac Res.* 2017;9(3):164-9.
18. Fouad M, Eltaher S. Hand hygiene initiative: comparative study of pre- and post-intervention outcomes. *East Mediterr Health J.* 2020;26(2):198-205.

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