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CLINICAL AUDIT

Surgical Hand Washing – A Clinical Audit of Young Surgeons at a Tertiary Care Hospital

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ABSTRACT

Background: Surgical hand washing is the most important preliminary step towards an aseptic surgical approach while dealing the patients. The surgeons know the significance of asepsis, but still they fail to follow the steps of an ideal surgical scrubbing and hand washing technique.
Aim: To assess the compliance of standard surgical practices of hand washing technique among young surgeons.
Methods: A total of 30 surgical residents were assessed for the compliance of standard surgical practices of hand washing technique randomly. Interventions were made to improve the mistakes and malpractices and inporive the compliance rates of the World Health Organization (W.H.O.) criteria. Data was collected on a computer generated questionnaire. Data was analyzed using the S.P.S.S. 26 version.
Results: Only 63% resident surgeons were compliant in following the standard hand washing technique. After intervention, the rates increased to 90.3%. The 30-35 years age group had the best compliance rates.
Conclusion: Repeated audits, timely interventions and senior supervisison of the surgical residents regarding the surgical scrubbing and hand washing technique can reduce the malpractices to a minimum level. There is a huge gap in the usual practitces and standard practices.
MeSH Words: Hand washing, Asepsis, Surgical scrub, Alcohol, Povidine, Compliance

INTRODUCTION

Globally, Surgical Site Infection (SSI) rates range from 2.5-41.9%, with developing countries experiencing significantly higher rates.[1] SSIs prolong hospitalization, increase financial burden and increase the rates of reoperation, readmission, and mortality.[1] To eradicate the transient flora and minimize the resident flora, surgical hand cleaning is required.[1] Surgical hand washing is vital in reducing the spread of nosocomial infections as well as surgical site infections.[2] Besides, contaminated hands of healthcare providers and nursing staff can lead to the dissemination of germs and infections to the patients. This is an important cause of healthcare-associated infection (HCAI).[3] A standard technique of washing the hands is thus, inevitably significant in preventing such nosocomial infections. [3] The World Health Organization (W.H.O.) strictly recommends hand washing in five instances to limit the risk of HCAI: (1) prior to coming in contact with the patient; (2) prior to an aseptic task; (3) following the risk of bodily fluid exposure; (4) past patient contact; and (5) after contact with patient surroundings.[3] However, numerous studies have revealed that hand hygiene instructions are still poorly followed, and that improvement efforts are generally ineffective.[4] According to studies, healthcare personnel only clean their hands for a few seconds and do not bother to clean all their hands and fingers all over with the lather of scrub.[4] Despite the fact that surgical hand scrubbing is used all around the world, different researchers have documented noncompliance in various forms.[3] Thus, an audit cycle was conducted among the surgical residents to assess and improve the surgical hand washing in accordance with the standard practices.

MATERIALS AND METHODS

This clinical audit was performed in the elective Operation Theater of Department of General Surgery of Lahore General Hospital, a tertiary care center, with 30 surgical residents over a period of 2 weeks from January 11, 2022 to January 24, 2022. The nature of this study and its aims were explained to all the surgical residents, followed by taking the informed consent.

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Pre-Intervention Observation: In the first week, all the residents were observed while washing their hands in the Surgical Scrub Area, before entering their respective Operation Theaters. This practice of surgical scrubbing and hand washing was observed by our audit team of three persons. The residents were assessed for their compliance to the checklist in Table 1.
The Intervention: At the end of the first week, all the subjects were lectured in the ward on proper technique, using the W.H.O. standard practices manual. They were shown a video-graphic demonstration and later taken to Operation Theater to demonstrate the sequential steps of hand washing as a class and at personal level.

Table 1. W.H.O. Guidelines on Hand Hygiene in Health Care, 2019.[5]

Criteria	Description	Response	Response
1	Remove hand accessories	Yes	No
2	Wet hands with water	Yes	No
3	Apply enough soap to cover all hand and forearm surfaces	Yes	No
4	Rub hands palm to palm	Yes	No
5	Right palm over left dorsum with interlaced fingers and vice versa	Yes	No
6	Palm to palm with fingers interlaced	Yes	No
7	Backs of fingers to opposing palms with fingers interlocked	Yes	No
8	Rotational rubbing of left thumb clasped in right palm and vice versa	Yes	No
9	Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa	Yes	No
10	Rubbing each side of both forearms till the elbows	Yes	No
11	Minimum recommended time of 2 minutes completed while rubbing	Yes	No
12	Rinse hands with water	Yes	No
13	Hands above elbows during rinsing	Yes	No
14	Dry hands thoroughly with a single use towel	Yes	No
15	Use towel to turn off faucet	Yes	No

Post-Intervention Assessment: During the second week, all the surgical residents were assessed again to check their application of standard methods according to W.H.O. guidelines and checklist mentioned in Table 1. Every correct attempt to wash hands before preparing for the Operation Theater by each of the surgical

residents was counted as one and the total number of correct attempts were counted as a percentage compliance against each criterion to the total number of required correct attempts, as given to be 15 in number. 1 criterion= 1 mark, hence15 marks in totality. (Table 1)

Percentages for fulfillment of all criteria in the pre-intervention observation and the post-intervention assessment were calculated for each surgical resident. The percentages for the fulfillment of each criterion individually in the pre-intervention observation and the post-intervention assessment by all surgical residents were also calculated individually. Frequencies and mean values were calculated and compared to determine the individual as well as collective compliance and success rates, pre- and post-intervention using the SPSS.

Figure 1. Pictorial representation of sequential steps of standard surgical hand washing technique, inspired from W.H.O. guidelines on hand hygiene in health care, 2009.

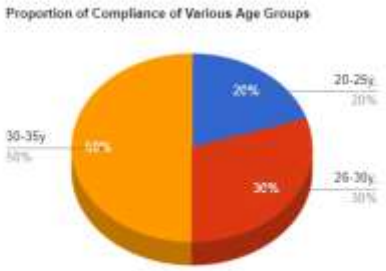
RESULTS

A total of 30 surgical residents, 22 male and 8 female participants were observed for their abilities to acquire standard hand hygiene. Some fundamental interventions were made to correct their mistakes and improve the compliance rates then. Overall, the adherence to the standard criteria in pre-intervention observation was 63% which increased to 90.33% in the post-intervention assessment. We observed a significant variation among individual steps in the pre-intervention and the post- intervention attempts.

Table 2.Pre- & Post-Intervention Percentage Rates of Compliance/Adherence of various criteria by Surgical Residents.

Criteria	Compliance/Adherence Rates (%)		% Change
	Pre-intervention Observation	Post-Intervention Assessment	
Hands Preparation Phase			
1	95%	100%	5
Hands Washing & Rinsing Phase			
2	100%	100%	-
3	90%	100%	10
4	100%	100%	-
5	85%	100%	15
6	55%	80%	25
7	60%	90%	30
8	35%	85%	50
9	45%	85%	40
10	80%	95%	15
11	0%	75%	75
12	100%	100%	-
13	100%	100%	-
Hands Drying Phase			
14	0	90%	90
15	0	55%	55

Figure 2. Graphical representation of proportion of compliance of various age groups.



DISCUSSION

The W.H.O. defines the process of hand washing as "washing hands with basic or antimicrobial soap and water."[3] 'Hand hygiene' is a broad phrase that encompasses all the aspects of hand cleansing, including the three phases as mentioned in table 2[3]. The single most essential factor in decreasing and avoiding healthcare-associated illnesses is hand washing[4]. All surgical personnel share the goal of providing bacterial decontamination in the operating room. The surgical team's pre-operative hand washing using an antibacterial solution is proven to be effective in preventing nosocomial infections[2]. The normal micro flora of the skin is hidden beneath the superficial layers of our skin in the hair follicles, sweat and sebaceous glands[6]. The sterilized surgical gloves also have micro perforations leading to the transmission of these bacteria to the patient under procedure[7]. With punctured gloves, according to a recent study, there is twice the risk of SSI[4]. Joseph Lister worked to determine the efficacy of carbolic acid on hand cleaning against wound infection[3]. Here, we have discussed our results pre and post intervention.

Pre-Intervention Findings: Currently, the most widely utilized surgical hand washing solutions include povidone iodine and chlorhexidine gluconate[2]. Our unit also uses povidone-iodine-based hand scrub. It is well known that healthcare professionals are not particularly careful and cautious about hand hygiene[4]. A study showed that only 13% of the respondents followed the surgical hand scrub checklist criteria.[1] While in our study, none of the candidates was able to meet the required compliance levels. An effective hand washing technique consists of three stages: hand preparation, washing and rinsing, and drying.[3] Prior to any intervention, our data collection revealed a compliance rate of 63% across all the steps. This is comparable to the compliance rates found in the study conducted by Basurrah et al., but having a remarkably higher rate than in studies conducted by Salemi et al. (19 percent) and Chittaro et al. (19.3%)[3].

Nail varnish, artificial nails, any kind of jewelry and wrist watches harbor rich amounts of microbes and hence interfere the process of acquiring hand. They are highly unappreciated in the clinical setting.[3] In this study compliance rate of 95% was noted in removing hand accessories before scrubbing.

In our study, a considerable variation or mistakes were observed in the hands washing and rinsing steps with rotational thumb rubbing step showing the lowest (35%) and palm to palm rubbing step showing the highest (100%) compliance in the pre-intervention phase. Inappropriate consumption of time while scrubbing can also increase the chances of persistence of normal micro flora.[1] Following the W.H.O. guidelines, we took 2 minutes to be the shortest expected time duration for scrubbing.[4] A study in Nepal documented the lowest score was for compliance with the scrub time standards (27 percent).[1] In our audit, none of the interns

completed the minimum standard time for scrubbing but after the feedback compliance rate increased up to 75%.

Hand drying after hand washing is equally important because at this stage, hands may get re-contaminated with microbes. According to a study conducted at King Khalid Hospital in Najran, 84.9 percent of the surgical team properly scrubbed and dried their hands and forehands.[1] While the compliance rates in our study varied considerably from those stats and the percentage of people who dried their hands before gloving was zero percent.

Post-Intervention Findings: Strict protocol implementation and continuous in-house skill training, as well as feedback, improve surgical hand scrub compliance.[1] Hence, it is critical to receive training and education in surgical hand disinfection. In a study conducted on cardiac surgeons and cardiologists in Riyadh, the compliance rates to the standard hand washing techniques were considerably low. Hand hygiene practices of cardiac surgeons and cardiologists were observed in that study. These compliance rates were found to be 83% and 77% with nurses' motivation and encouragement, but when the motivation and encouragement were removed, compliance dropped to 55.7% and 52% in both groups[4]. The same trend was observed in our audit where the compliance rate increased from 63% to 90.33% after the feedback.

In a study conducted in Nepal the rate of compliance for the removal of nail accessories and all kind of jewelries was found to be 97%, contrasting with the 100% compliance post-intervention in our research study[1]. Post-intervention, among the steps of hand washing and rinsing, the compliance rates of standard rotational rubbing of thumbs and fingers improved the most, accounting to have a percentage compliance of 85% for both types of movements. This rate contrasts with 100% compliance rates post-intervention for these stroking movements in an Indian study.[3] Approximately 90% compliance rates were observed for hand drying in our study, which is comparable to 100% compliance rates post intervention in another study[3].

Repeated, regular cycles of clinical audits, usage of hidden cameras and evidence-based surgical lectures on standard practices can strongly bring positive changes in the prevailing circumstances and help attenuate the mistakes[8].

CONCLUSION

There is a huge gap between the usual and standard surgical practices. The compliance with the standard can be improved by surgical hand scrub intervention, repeated audits and supervision of the seniors. The importance of surgical asepsis should be emphasized before every surgical procedure in the group meeting of surgeons.

Limitations of the Study: None.

Ethical Consideration: The written informed consent was taken from the surgical residents before the conduction of whole clinical audit. Ethical review was obtained.

Conflict of Interest: The authors declare no conflict of interest.

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