



## ORIGINAL RESEARCH ARTICLE

### COMPLIANCE OF SURGICAL HAND SCRUB IN OPERATION THEATRE OF TEACHING HOSPITAL, CHITWAN

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#### ABSTRACT

**Background:** Surgical hand scrub is an important practice that forms the base in the prevention and control of surgical site infection. The objective of the study was to evaluate the compliance of surgical hand scrub among surgical team in Operation Theatre of Teaching Hospital, Chitwan.

**Methods:** Descriptive cross-sectional design was used. Data collection instrument (a checklist) was developed based on national and international standards of surgical hand scrub. Data was collected by observation of surgical team who were scrubbing in the Operation Theatre, Chitwan Medical College before proceeding to surgical procedures.

**Results:** A compliance with the standards for surgical scrub prerequisites (70%), scrub process (81.53%), time of scrub (27%) and overall compliance (75.95%) observed. The total score of compliance with the standard was only 13%. The main issues found in the study were not correctly wore surgical cap and mask (44.9%), using of timer/wall clock before starting scrubbing (91.3%), improper follow the continue rotational action down opposing arms working to the elbow for one minute (53.6%) and repeated blotted dry of skin area once it done (30.4%)

**Conclusions:** The results showed there was gap in the surgical hand scrub of the studied hospital and the compliance with the standard can be improved by simple surgical hand scrub intervention, periodical observation audit and feedback.

#### INTRODUCTION

Hand Hygiene is the least expensive and most effective factors in preventing and controlling the transmission of pathogens within health care settings.<sup>1</sup> The hands of health workers play an important role in transmission of the health care associated pathogens from one patient to another.<sup>2</sup> Health care associated infection due to poor hand hygiene is a major cause of increasing morbidity,

mortality and health care costs among hospitalized patient worldwide.<sup>3</sup>

Globally, surgical site infection (SSI) rates have been reported range of 2.5% to 41.9% with significantly higher rates in developing countries.<sup>4</sup> SSI is the results from multiple factors related to patient, surgeon and health care environment. European Centre for Disease Prevention and Control 2015 reported 1.88% SS. In Nepal, SSI was reported about

3.99% among 92,41,979 cases.<sup>5</sup> SSI's leads to prolong hospitalization, financial burden, reoperation, readmission and increase mortality rates.<sup>6</sup>

Surgical hand scrubbing is essential in order to eliminate the transient flora and reduce the resident flora.<sup>7</sup> Surgical hand scrubbing is an extension of hand washing with antimicrobial soap and water before donning surgical attire pre-operatively.<sup>1,8</sup> Jewellery and nails can be the source of microbial transmission so it is mandatory to remove jewellery, artificial nails or nail polish and to keep nails short before surgical hand preparation.<sup>1</sup>

Before each operation, entire surgical team should scrub their hands and arms to the elbow. The first scrub of the day is longer i.e. minimum 5 minutes than any subsequent scrubs between consecutive clean operations i.e. minimum 3 minutes.<sup>9</sup> The most commonly use products for surgical hand antiseptics is chlorhexidine or povidine-iodine containing soaps.<sup>1</sup> Abdollahi et al.<sup>10</sup> found that compliance with scrub prerequisites 58%, scrub process 68%, 2 minutes scrub time 22% and scrub equipments 55% in pre-test. Dhakal, Angadi & Lopchan<sup>11</sup> claimed that nurses (4.29%) on operation theatre did not scrub hands well to two inch above the elbow and completed the procedure less than 3 to 5 minutes.

Despite the considerable advancement in surgery, post-surgery infection still is one of the causes of mortality and surgical team hands are one of the most important causes of these infections and studies shown that the compliance of surgical hand scrub is not adequate even after the intervention. So, it significant to identify the level of compliance of surgical hand scrubs among the surgical team in Operation Theatre of Teaching Hospital, Chitwan.

Observational study found surgical scrubbing practices was 75.1% adequate among nurses which concluded that nurse's still need more training to achieve excellence in this area<sup>12</sup> so that surgical hand preparation is use to prevent surgical site infection.<sup>7</sup> Hence the objective of the study was to evaluate the compliance of surgical hand scrub among surgical team in Operation Theatre of Teaching Hospital, Chitwan.

## METHODS

A descriptive cross-sectional study was conducted

at Operation Theatre, Chitwan Medical College, Chitwan, Nepal from 20th June to 4th July, 2018 AD after getting ethical clearance from CMC-IRC. The total of sixty-nine respondents from surgical team included surgeons (n=27), residents surgery (n= 9), interns (n= 10) and registered Nurses (n=23) who were selected by non-probability consecutive sampling technique.

The study instrument was an observational checklist with Yes- No questions. The checklist developed based on the standard tool.<sup>1,8</sup> The observation check list of compliance of surgical hand scrub (scrub pre requisites, scrub process and scrub time) consisted 22 items. Each item in checklist rated Yes for scored '1' and No for scored '0'. Level of compliance was measured by calculating the total score in terms of percentage.

Data collection was done through observation method. One participant was observed once a time; they were excluded if they scrub next time. To describe the results, the descriptive and inferential statistics were used by the IBM SPSS version 20.

## RESULTS

Table 1 shows that among the 69 respondents, majority of males (53.6%), surgeons (39.1%) and they (47.8%) had job experience of 1– 5 years. Most of the surgical hand scrub was observed in morning shift (69.6%).

**Table 1: Demographic Information of the Respondents (n=69)**

Variables	Number	%
Sex		
Male	37	53.6
Female	32	46.4
Profession		
Registered Nurse	23	33.3
Surgeon	27	39.1
Resident (Surgery)	9	13
Intern (MBBS)	10	14.5
Education		
Proficiency Certificate Level	21	30.4
Bachelor	21	30.4
Post Graduate	21	30.4

Super Speciality	6	8.7
Job Experience		
< 1 year	28	40.6
1-5 years	33	47.8
6-10 years	8	11.6
Working Shift		
Morning	48	69.6
Evening	21	30.4

**Table 2: Utilization of Scrub Pre requisites for the Surgical Hand Scrub (n=69)**

Items of Scrub Pre requisites	Performed activities	
	YES (%)	NO (%)
Wear surgical cap and face mask correctly	38 (55.1)	31 (44.9)
Keeps nails short*	68 (98.6)	1 (1.4)
Remove nail polish, artificial nails and all jewellery (rings, watch, bracelets) *	67 (97.1)	2 (2.9)
Be sure about availability of soap, povidine iodine 7.5% and sterile gown and gloves.	47 (68.1)	22 (31.9)
Wash hands and arms with soap if hands are visibly soiled	64 (92.8)	5 (7.2)
Start timing either through wall clock or scrub sink timer.	6 (8.7)	63 (91.3)

*\*Critical steps*

Table 2 presents that only 55.1% of respondents wore surgical cap and face mask correctly where 2.9% performed surgical hand scrub without removing nail polish and jewellery. Before proceeding for surgical hand scrub, 68.1% were ensured about the availability of soap, povidine iodine 7.5% and sterile gown and gloves. Most of them (92.8%) washed hands and arms with soap if hands were visibly soiled. Very limited respondents (8.7%) used follow the principal of starting timer of scrub sink.

Table 3 presents that 98.6% of respondents applied sufficient amount of povidine iodine 7.5% from dispenser, 89.9% scrubbed right palm over back of left hand and vice versa with finger interlaced,

65.2% performed rotational rubbing backwards and forwards with clasped finger of right hand into left hand and vice versa, 46.4% continued with rotational action down opposing arms working to the elbow for 1 minutes. 88.4% of respondents rinsed hands and arms by passing them through the water from fingertips to elbow and 85.5% hold the hands above the elbow at all the times. Only, 7.2% of respondents moved their arms back and forth through the water and 5.8% splashed water onto their dress.

**Table 3: Scrub Process Domain related to Surgical Hand Scrub (n=69)**

Items of Scrub Process	Performed activities	
	YES (%)	NO (%)
Apply appropriate amount (5ml) of scrub solution (Povidone iodine 7.5%) from dispenser	68 (98.6)	1 (1.4)
Scrub right palm over back of left hand and vice versa with fingers interlaced	62 (89.9)	7 (10.1)
Rub palm to palm, finger interlaced	59 (85.5)	10 (14.5)
Rotational rubbing backwards and forwards with clasped finger of right hand into left hand and vice versa	45 (65.2)	24 (34.8)
Rotational rubbing of right thumb clasped in left hand and vice versa	56 (81.2)	13 (18.8)
Rub fingertips on palms for both hands.	30 (43.5)	39 (56.5)
Continue with rotational action down opposing arms working to the elbow for 1 minute. *	32 (46.4)	37 (53.6)
Rinse hands and arms by passing them through the water in one direction; only from fingertips to elbow*	61 (88.4)	8 (11.6)
Do not move the arms back and forth through the water	64 (92.8)	5 (7.2)
Do not splash the water onto the dress	65 (94.2)	4 (5.8)
Hold the hands above the elbow at all the times*	59 (85.5)	10 (14.5)

Grasp sterile towel and back away from sterile field	69 (100)	
Use one side of towel to dry one hand from fingertip to elbow	63 (91.3)	6 (8.7)
Use opposite side of towel to dry another hand from fingertip to elbow	63 (91.3)	6 (8.7)
Do not repeat to an area of skin once it has blotted dry *	48 (69.6)	21 (30.4)

\*Critical steps

Table 5 shows that most of the respondents (87%) did not compliance surgical hand scrub before proceeding to surgical procedure based on criteria.

**Table 5: Items of Scrub time and Level of Compliance on Surgical Hand Scrub among Surgical Team (n=69)**

Items of Scrub Time	PERFORMED ACTIVITIES	
	YES (%)	NO (%)
Complete the first scrub of the day within 5 minutes and other consecutive scrub within 3 minutes*	19 (17.5)	50 (72.5)
Overall Level of Compliance on Surgical Hand Scrub among Surgical Team n=69		
Level of compliance	NUMBER	PERCENTAGE
Good	9	13
Poor	60	87
Total	69	100

Mean+ SD = 17.87+3.41, maximum possible score: 22, Obtained score: 8 – 21

#### Key points:

>90% without missing critical steps = Good level of compliance

<90% with or without missing critical steps = Poor level of compliance

#### DISCUSSION

Surgical hand scrub is an essential component of

everyone who involved in operative procedures. Improper hand scrubs facilitate to carry microbes so that surgical hand scrub is significant to prevent surgical site infection. Results of the present study showed considerable lacking in the surgical scrub of the studied hospital. Compliance with the scrub time standards had the lowest score (27%).

Several studies of similar type have shown that significance dissimilarities of level of surgical hand scrub compliance.<sup>4,6,10,12-14</sup> This study found that only 13% of respondents had compliance the surgical hand scrub according to the standard checklist criteria of (more than 90% score without missing critical steps).

Hospital has policy to wear mask, cap, remove artificial jewellerys, nail police, certain of scrub materials and start sink timer before scrub process. Lack of awareness about hospital policy results variations in scrub practice. It is important to provide documented policy to improve compliance and to prevent post-surgery infections.

There were several lacking in the process of the observed scrubs in this study. Alaa-Eldeen, Saad & Elreface<sup>15</sup> mentioned that only 46.7% nurses performed the principles of aseptic technique in wearing mask, gowning, gloving and scrubbing correctly. It might be due to lack of in-service training for the surgical team. A study in King Khalid hospital, Najran found that 84.9% of surgical team scrubbed hands and forehead and dried them correctly.<sup>14</sup> Jeyakumar, Sabu & Segeran<sup>12</sup> revealed that the adequacy of scrubbing was very good (75.1%). The strict implementation of protocol and continuous inhouse skill training, providing feedback enhance the higher compliance of surgical hand scrub.<sup>1,17</sup>

According to hospital policy, the standard time for the first scrub was 5 minutes and for the second scrub was 3 minutes. However, observations of this study found that only 17.5% respondents could follow the duration of scrub in the first and second as per determined criteria. Utilization of time in terms of both over- scrubbing and under scrubbing can increase the risk of transmitting infection so it is better for the scrubbers to follow the rules.<sup>13,16</sup>

#### CONCLUSION

This study observed the surgical hand scrub in

the Operation Theatre of teaching hospital in the real situation. The results showed considerable noncompliance in the scrub of studied hospital. Yet, the gap between compliance scores, still there is potentiality for improvement in all dimensions. Based on the study findings, periodical audit of the surgical hand scrub in the operation theatre to see whether it complies with the standards or not and to find out the problems to be solved through hands on skill education.

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