




Evaluation of the Theater Staff Performance Regarding Surgical Hand Scrub at Rania Teaching Hospital

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Abstract

Background: The proper hand scrub is helpful to eliminate contaminations deactivating, and protect patients and health care personnel from transmitted diseases. The goal of this study was conducted to provide demographic data and to evaluate theatre staff performance regarding surgical hand scrub at Rania teaching Hospital in the Kurdistan region of Iraq, during the period of 2018 – 2019.

Materials and Methods: A non-probability purposive sample of surgical staff (surgeon and scrub nurse), data collection of the study instrument was constructed of total of 19 items. The instrument's content validity was determined through a panel of 7 experts. The instrument's reliability was determined using Equivalence (inter-raptor or inter-observer); the data were collected through the evaluation technique and then organized and coded into computer files. Statistical approaches were used for data analysis using SPSS 25.0 version.

Results: The result revealed that most of the participants were male, most of them graduated from institute nursing, but more than three-quarters were not trained. More than half of the surgical staff had 6 – 11 years of experience in the surgical room. On the other hand, three-quarters of the participants had a low level of performance regarding surgical hand scrubs. There is a significant association between gender job title and surgical staff's performance regarding surgical hand scrub at a $p < 0.05$ except for age, the number of trainings, and years of experience in the surgical room at a $p > 0.05$.

Conclusion: Our result showed that more than half of the participants had a low level of performance regarding surgical hand scrub therefore the study recommended training courses and participation in symposia regarding infection control and surgical hand scrub.

Keywords: Theatre staff, evaluation, surgical, hand scrub, Rania teaching hospital

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Introduction

Hand hygiene is considered a primary measure for reducing the risk of transmitting infection among patients and health care personnel. [1] Also, Hand hygiene is the most important fundamental principle and one of the first measures in reducing nosocomial infections and increasing patient safety. [2] The Center for Diseases Control (CDC) reported that the correct hand-washing reduces nosocomial infections by 30%. Hence, the correct hand washing before surgical operations has a critical role in preventing post-surgical infections. [3] One of the essential elements of infection control activities is hand hygiene, so sufficient technical evidence supports the inspection that if correctly performed, just hand washing can radically decrease the risk of transmission of infection in health care settings and reduce the cost of medications. Most surgical professionals agree that improper hand scrub is considered the most significant risk factor for transmitting bacteria, viruses, and any pathogens from the surgical staff's hand to the patient because it leads to nosocomial infection and disease. So, the surgical site is the most critical area that contributes to infection. [4] The primary purpose of surgical hand scrub is to eliminate debris and transient bacteria, decrease resident micro-organisms to the lowest amount and slow down rapid recoil growth on surgical staff's hands, nails, and forearms. [5] Usually, aqueous scrub with a brush using povidone-iodine or chlorhexidine-based detergents are the main components of surgical hand antiseptics for the surgical staff [6]. Every theater staff should be wearing a special short cleaned sleeved cotton scrub suit daily but must cover all underwear clothes. All jewellery, such as wedding rings, necklaces, earrings, watches, and bracelets should be removed before starting the scrubbing procedure. [7] The hair must be collected entirely in the theater room and covered by a clean disposable hat or

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cap. Also, the mask should be worn correctly by covering the nose and mouth before the scrubbing to prevent spreading the droplets and must be secured behind the head and neck, and should be tight enough to prevent space at the sides. Because eye goggles are one of the most protective instruments for surgical staff, they must be worn before the scrubbing procedure. [8]

- Regulate the flow and temperature of the water. Open package containing nailbrush lie the brush on the back of the scrub sink still in the opened package.

- Wet hands and arms for an initial pre scrub wash. Use several drops of scrub solution maternal, work up a heavy lather, then wash the hands and arms to the elbows.

- Rinse hands and arms thoroughly, allowing the water to run from the hands to the elbows. Do not retrace or shake hands and arms; let the water drip from the elbow.

- Remove the sterile brush and pick from the opened package – clean under nails with pick and discard.

- Moisten the brush and work up a lather. Lather fingertips with the sponge side of the brush; then, use the bristle side of the brush and then scrub the spaces under the fingernails of the right or left hand. Repeat for another hand. Scrubbing the hands must remain above the level of the elbows and away from theatre attire to avoid contamination from splashing.

- Lather fingers. Wash on all four sides of the fingers using the sponge side only [9].

- The scrub procedure must follow the Trust policy for hand decontamination, ie.

1. Palm to palm
2. Right palm over the left dorsum and left palm over the right dorsum
3. Palm to palm fingers interlaced
4. Back of fingers to opposing palms with fingers interlocked
5. Rotational rubbing of right thumb clasped in left palm and vice versa
6. Rotational rubbing backward and forwards with clasped fingers of the right hand in left palm and vice versa.

Continue to wash the arms but encompass only two-thirds of the forearms to avoid compromising the cleanliness of the hands. Hands and arms must be rinsed thoroughly from fingertip to elbow without retracing, allowing the water to drip from the elbow before approaching the gown pack. [10] The recommended time for surgical hand preparation decreased from >10 minutes to 5 minutes. Even today, 5-minute protocols are common. [11] The scrub must be lengthened by one minute for the area that has been contaminated. [12]

Materials and Methods

We have done a hospital based descriptive study in between 10th October 2018 to 5th March 2019, at Rania teaching Hospital in Rania city. All scrub staff that participated in the surgical room. The study tool was based on an extensive review of related literature and studies to evaluate theater staff performance regarding surgical hand scrubs. The instrument of the study, permission was granted from the College of the Nursing/ University of Raparin and Rania Directorate of Health to carry out this

study at the Rania teaching Hospital in Rania district. The instrument was determined using Equivalence (inter-raptor or inter-observer).

Data management and Statistical Analysis: The data were collected through the use of evaluation techniques. Data analysis was done using SPSS version 25.0 and summarized by descriptive statistics. Association between some socio-demographic Characteristics and performance of theater staff regarding surgical hand scrub using Chi-Square test.

Results

The surgical staff who performed hand scrubbing for the surgical procedure included in the current study was 49 (38.8%) of them were surgeon, 23 (46.9%) were institute nurses, and 7 (14.3%) graduated from secondary school nursing; more than a quarter of them had experience working in the surgical room, but there were only 9 (18.4%) of them trained one time about surgical hand scrub. Distribution of mean, minimum, and maximum of some socio-demographic data as shown in **Table – 1**.

Table-1 Distribution of mean, minimum, and maximum of some socio-demographic data

Variables	Mean (+ SD)	Minimum	Maximum
Age	38.45 + 7.30	24	59
Number of Training	0.29 + 0.61	0	3
Years of employment	14.84 + 7.33	1	33
Years of experience	10.29 + 7.66	1	29

The highest rate of the participants was male, married, nurses' staff with sufficient economic state who lives in an urban area (59.2%, 83.7%, 61.2%, 42.9% & 79.6%) respectively.

Figure-1 Distribution of participants had a low level of performance

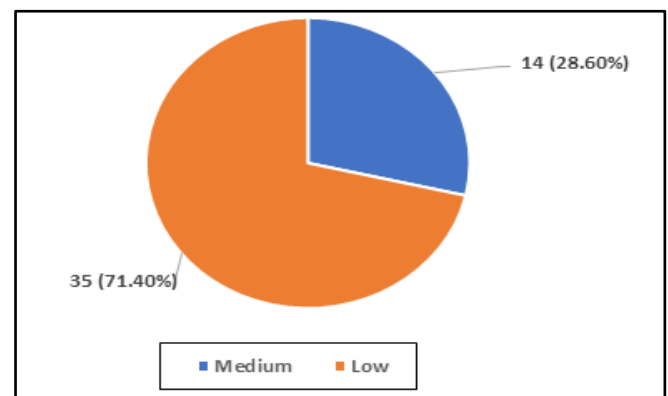


Table 2: Distribution of Socio-demographic variables

Variables	Categories	No.	Percentage
Age	≤ 35	13	26.5
	36 - 40	19	38.8
	≥ 41	17	34.7
Gender	Male	29	59.2
	Female	20	40.8
Marital Status	Single	8	16.3
	Married	41	83.7
Monthly Income	Sufficient	21	42.9
	Barely sufficient	20	40.8
	Insufficient	8	16.3
Job Title	Surgeon	19	38.8
	Secondary school nurse	7	14.3
	Institute nurse	23	46.9
Residential Area	Urban	39	79.6
	Suburban	10	20.4
Number of training regarding surgical hand scrub	Zero	38	77.6
	One	9	18.4
	Two and more	2	4.0
Years of Employment	≤ 10	16	32.7
	11 - 20	23	46.9
	≥ 21	10	20.4
Years of Experience in the theater room	≤ 5	15	30.6
	6 - 10	17	34.7
	11 - 15	5	10.2
	≥ 16	12	24.5

The surgical staff were always performed the steps of surgery only in items (1, 14 and 19) but never used eye goggles, nail pick, and scrub brush that showed in items (6,10 and 11) as shown in **Table – 3**.

Table 3: Distribution of participant's responses regarding surgical hand scrub questions

No.	Items	Never	Sometimes	Always
1.	Surgical staff is changing their own clothes completely before entering the surgical room.	-	-	49 (100%)
2.	Surgical staff is removing jewelry such as ring and hand watch before the procedure	17 (34.7%)	2 (4.1%)	30 (61.2%)
3.	Surgical staff is pulling back his /her hair in a top knot or bun and don't allow any hair to hang over the face.	2 (4.1%)	3 (6.1%)	44 (89.8%)
4.	The surgical staff is wearing a standard surgical head cover or cap and completely covers the hair.	2 (4.1%)	3 (6.1%)	44 (89.8%)
5.	The surgical staff is putting on a suitable surgical mask correctly. (it mean to cover the nose, mouth, cheek, and chin)	3 (6.1%)	12 (24.5%)	34 (69.4%)
6.	The surgical staff is wearing a special eye goggle before scrubbing.	46 (93.9%)	-	3 (6.1)
7.	The surgical staff is rolling up sleeves of the uniform 3 inches above the elbow. (if sleeves are long)	18 (36.7%)	3 (6.1%)	28 (57.1%)
8.	The surgical staff is using moderate warm water for surgical hand rub.	48 (98.0%)	-	1 (2.0)
9.	The surgical staff is wetting hands and arms before starting scrub wash.	9 (18.4%)	22 (44.9%)	18 (36.7%)
10.	The surgical staff is using disposable nail pick under running water to clean beneath the nails?	48 (98.0%)	-	1 (2.0)
11.	The surgical staff is using a new scrub brush.	49 (100.0%)	-	-
12.	The surgical staff is starting scrubbing from the fingertip to the four corners of each finger to the dorsum, palm and wrist for 2 ½ minutes for each hand.	36 (73.5%)	13 (26.5)	-
13.	The surgical staff is scrubbing the left and right of each arm circular motion with soap from the wrist up to 2 inches above the elbow rinse for 2 ½ minutes for each arm.	40 (81.6%)	9 (18.4%)	-
14.	The surgical staff is using antimicrobial soap for surgical hand rub instead scrub brush.	-	-	4 (100.0%)
15.	The water splashing the clothes of Surgical staff during the scrubbing procedure.	27 (55.1%)	20(40.8%)	2 (4.1%)
16.	The surgical staff is discarding the nail pick and scrub brush to trash when finished this step.	48 (98.0%)	1 (2.0%)	
17.	Surgical staff is ringing in one direction from the base of the palm toward the elbow.	7 (14.3%)	8 (16.3%)	34 (69.4%)
18.	The surgical staff is washing up to (5.1 to 7.6 cm) above the elbow for one-minute duration.	47 (95.9%)	1 (2.0%)	1 (2.0%)
19.	The surgical staff is keeping their hands held higher than her arms during the entire process.	-	-	49(100.0%)

There was a significant association between gender job title and monthly income with the performance of theater staff regarding surgical hand scrub at p-value less than 0.05 except for age, number of trainings, and years of experience in the theater room at p-value greater than 0.05 as shown in **Table – 4**.

Table 4: Association between some socio-demographic Characteristics and performance of theater staff regarding surgical hand scrub

Variables	Levels of Performance				Total		p - value
	Low		Medium		No.	(%)	
	No.	(%)	No.	(%)			
Age (in years)							
≤35	11	22.4	2	4.1	13	26.5	0.523*
36 - 40	13	26.5	6	12.2	19	38.8	
≥ 41	11	22.4	6	12.2	17	34.7	
Gender							
Male	16	32.7	13	26.5	29	59.2	0.002
Female	19	38.8	1	2.0	20	40.8	
Marital status							
Single	6	12.2	2	4.1	8	16.3	0.588*
Married	29	59.2	12	24.5	41	83.7	
Job Title							
Surgeon	7	14.3	12	24.5	19	38.8	0.0001
Secondary School Nurse	7	14.3	0	0.0	7	14.3	
Institute nurse	21	42.9	2	4.1	23	46.9	
Income							
Sufficient	10	20.4	11	22.4	21	42.9	0.006
Barely sufficient	18	36.7	2	4.1	20	40.8	
Insufficient	7	14.3	1	2.0	8	16.3	
Residential Area							
Urban	27	55.1	12	24.5	39	79.6	0.702*
Sub- urban	8	16.3	2	4.1	10	20.4	
Number of Training regarding surgical hand scrub							
Zero	26	53.1	12	24.5	38	77.6	0.460*
One	8	16.3	1	2.0	9	18.4	
Two and more	1	2.0	1	2.0	2	4.1	
Years of experience in the theater room							
≤ 5	13	26.5	2	4.1	15	30.6	0.501*
6 - 10	11	22.4	6	12.2	17	34.7	
11 - 15	3	6.1	2	4.1	5	10.2	
≥ 16	8	16.3	4	8.2	12	24.5	
*By Fisher's exact test; Bolded p-value < 0.05 Statistically Significant							

Discussion

The design was quantitative, and a descriptive study was conducted on surgical hand scrubs at the general hospital in Rania city to evaluate theater staff performance regarding surgical hand scrubs. The mean of age, a number of training courses, years of employment, and years of experience in the surgical room; which were between (38.45 + 7.3), (0.29 + 0.61), (14.84 + 7.33), (10.29 + 7.66) respectively. The findings of the first part of the data analysis in table two showed that the age of surgical staff was less than forty, most of them were male married, and nearly half of them have had a sufficient monthly income, the majorities of their residential area were urban. Out of forty-nine participants, more than half were scrub nurses (institute and secondary school nurses), but less than half were surgeons. However, nearly half of them had 11–20 years of employment, and less than half had 6-10 years of experience in the theater room. However, more than three a quarter had a low level of performance regarding surgical hand scrub because more than three-quarters of the participants never trained. However, nine staff trained one time, and only two staff trained more than twice regarding surgical hand scrub. This result agrees with the study done by Sana'a, and Mahmud in Azady teaching hospital in Kirkuk city, which reported that the nurses had poor practices of standard precautions in the surgical ward. [11] **Table – 3**, which showed that the results of the surgical staff's response to the items regarding surgical hand scrub issues, indicated that all theater staff changed their clothes and used only antimicrobial soap without using a scrub brush and nail pick. The majority of the surgical staff pulls back their hair in a top knot or bun and do not allow any hair to hang over the face, and wear a standard surgical head cover or cap to cover the hair completely. Also, the current study showed that nearly a quarter of surgical staff is ringing in one direction from the base of the palm toward the elbow. All theater staff kept their hands held higher than their arms during the entire process before entering the surgical room. On the other hand, more than half of the theater staff never removed jewellery such as rings and hand watches before the procedure during hand scrub and never rolled-up uniform sleeves 3 inches above the elbow.

Nearly a quarter of all surgical staff was started scrubbing from the fingertip to the four corners of each finger to the dorsum, palm, and wrist, but they did not continue for 2½ minutes for each hand. Also, the surgical staff is scrubbing the left and right of each arm circular motion with soap from the wrist, but unfortunately, the majority of them do not reach up to 2 inches above the elbow. More than half of the surgical staff have splashed the water on their clothes during the scrubbing procedure. The present study reported that nearly a hundred percent of the surgical staff were not washed up to (5.1 to 7.6 cm) above the elbow for a one-minute duration. Eye goggles are considered a critical instrument of personal protective equipment in standard precaution. It is recommended as suitable equipment for protecting the eyes from splashing the blood and body fluid because the blood splash injury can occur rapidly without knowledge of the event within the surgical procedure. However, Prescription glasses are unsuitable for use as the sole source of eye protection from blood splash injury. [12] Scrubbing with a disposable sponge or combination sponge-brush has been shown to reduce bacterial counts on the hands as effectively as scrubbing with a brush.

On the other hand, the most commonly used products for surgical hand antisepsis are chlorhexidine or povidone-iodine-containing soaps. Several studies have demonstrated that scrubbing for 5 minutes reduces bacterial counts. [13] The researchers return these results for some reasons, first of all. There is no standardized protocol regarding surgical hand scrub in the Kurdistan Region, and at Rania teaching hospital, secondly: they did not have a surgical brush pick nail; the third one is neglecting the main points by the surgical staff and no follow up from the ministry of health for the surgical staff performance regarding hand scrub. Eventually, more than a quarter were deprived of training courses regarding infection control as a general and surgical hand scrub at a specific point in the theater room. The staff, especially the scrub nurse, did not participate in training and symposium inside and outside the country.

Regarding table four which deals with the association between some socio-demographic characteristics and performance of theater staff regarding surgical hand scrub, the result showed that there is a significant association between gender, job title, and monthly income with the performance of theater staff regarding surgical hand scrub at p-value less than 0.05 except age, number of training and years of experience in the theater room at p-value greater than 0.05. This result disagrees with the study conducted in Iran, which reported that there was not any significant relationship between the performance of surgical hand scrubs and gender. [14] Also recorded, there was a significant relationship between surgical hand scrub and academic degree hand, and it was not opposite with protocols. A significant association between gender, job title, and monthly income with the performance of theater staff regarding surgical hand scrub at a p-value less than 0.05 except age, number of trainings, and years of experience in the theater room at a p-value greater than 0.05.

Conclusion

However nearly half of the participants had 11 – 20 years of employment and more than a quarter of them had 6-10 years of experience in the surgical room and nearly half of them were not trained in surgical hand scrub; but our study finding results demonstrated that nearly the majority of the participants had a low level of performance, while a bit more than a quarter of them had a medium level of performance regarding surgical hand scrub. So, the researchers recommended conducting more studies on the infection control issue by the ministry of health/ infection control department to focus on and pay more attention to this critical issue. Also, the surgical staff should be given more opportunities to participate in symposia regarding infection control issues especially surgical hand scrub.

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Here, BOS – Bayan O Sharif; SME – Safya M. Edan; BIS – Balen I Saeed, and AKK – Amina K Kaka

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