

Examination of Surgical Hand Washing Practices of nurses and Doctors Working in the Operating Room

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Abstract

Aim: The purpose of this study is to examine surgical hand washing practices of nurses and doctors working in the operating room department.

Methods: Study is a descriptive research. The study was conducted in the Operating Room Department of a university hospital from December 2016 to February 2017. The research sample consisted of 50 nurses and 50 doctors. Procedures for surgical hand washing were collected using informed observation technique. Permission was obtained from the institution and employees for the research. The data were evaluated as number, percentage, mean and chi-square.

Results: 48% of the nurses taken into the research sample were in the age range of 31-40 years, 76% of them were women, 44% of the doctors were in the age range of 31-40 years and 88% of them were male. 100% of the nurses and 58% of the doctors stated that they were trained in surgical hand preparation. While 22% of the nurses use brush, 12% of the doctors use it. It has been found out that there is a statistically significant difference between the nurses and the doctors in term of use of antiseptic solution and separate sterile towels for each hand.

Conclusion: It has been determined that health care workers follow the steps for surgical hand washing in general but show incompliance with only some steps. In this direction, it is recommended that knowledge of the health care workers should be updated in the orientation process and in the subsequent in-service trainings in line with the latest guidelines.

Key Words: Surgical Hand Washing/Scrub, Operating Room, Hospital Infection, Nurse, Doctor, Health Care Worker.

Introduction

Surgical infections and the infections that occur during medical treatment are defined as health care-associated infections. Surgical site infections constitute 17% of health care-associated infections. It is known that

the most important cause of health care-associated infections is inappropriate hand hygiene (1). Skin is one of the most important sources of microbial contamination in surgical environments, and microorganisms can be easily spread from the hands of

health care workers (2,3). The use of sterile gloves during surgical intervention does not remove the necessity of hand preparation before surgery because microorganisms can be transmitted through the surgical field as a result of perforations/ tears in the glove during surgery (4). It is estimated that gloves are punctured in 8-50% of the operations (3), and in this way microorganisms breeding in moist environment under gloves can also be transmitted through the surgical field (2).

The first and most important step in preventing surgical site infections that may develop due to the operating room is to perform surgical hand washing appropriately before the surgical intervention (1,2). Surgical hand washing is the procedure of removing transient flora and reducing resident flora by washing the hands with an antiseptic solution or scrubbing the hands with an alcohol-based solution before surgery by the perioperative team members (4,5,6,7). Soap with antiseptic properties should be used in surgical hand scrub (6). If the hands are washed with non antimicrobial soap, skin bacteria multiply rapidly under surgical gloves. Therefore, products used for surgical hand preparation should keep the microbial release from the hands below the reference line until the end of the operation (8).

Accessories such as rings, watches, bracelets should be removed before surgical hand scrub. Hands

should be washed with soap without antimicrobial properties, and after the fingernails are cleaned with sterile/ disposable nail cleaner, hands and forearms should be rinsed under running water. Skin and fingernails should be clean and the fingernails should be used short. Nail polish and artificial fingernails should not be worn; sterile/ waterproof tape should be used if there is a scratch, cut on hand. A palmful of antiseptic solution should be applied in a cupped hand, covering all surfaces before washing, and both hands, fingers and four surfaces of forearm should be washed effectively. In this process, a soft non-irritating sponge can be used and hands should always be kept elevated and should be rinsed from fingertips to elbows, and water should not be splashed the surgical attire during washing. After the washing, hands should be held higher and away from the body for water leaks from fingers towards elbows, nurses and doctors should go into the operating room holding hands higher, a separate sterile towel for each hand should be used, gloves should be worn without touching anywhere and holding hands at waist level, and hand washing time should be sufficient (1,4,5,7,9). There is no standard in some issues (such as solution selection, brush usage, washing time, washing technique) related to procedures for surgical hand scrub and the researches for these issues are being conducted (2,9-12).

There are national/international organizations that deal with hand hygiene practices. The Centers for Disease Control and Prevention (CDC), the World Health Organization (WHO) and the Association of Perioperative Registered Nurses (AORN) have published guidelines for hand hygiene practice (1,4,5,8,9). It is thought that health care workers' compliance with hand hygiene rules is less than 50% (1,13). Skin irritation, lack of access to hand hygiene products, perception of patient needs as a priority over hand hygiene, low number of personnel, insufficient time for hand hygiene, and lack of scientific knowledge are among the most important reasons for in compliance with hand hygiene practice recommendations (8). Although the effects of health care workers' compliance with the hygiene rules on health care-related infection rates is not fully known, it is thought that it decreases them significantly and prevention of these infections should be the priority of health care professionals (1,7,13).

Surgical hand washing practices differ according to countries/ health institutions. For this reason, it is recommended that each institution should develop their own written standard protocols for surgical hand preparation in accordance with the manufacturer's instructions for product use by considering recent developments (2, 9, 11, 12). Accordingly the aim of this research is

to examine the surgical hand washing practices of nurses and doctors.

Materials and Methods

Design

The study is a descriptive research. The study was conducted in the Operating Room Department of a university hospital between December 2016 and February 2017. There are two lounges and a total of 16 rooms in these two lounges in the operating room department. Two nurses and two assistant doctors work in each room. In this unit, a total of 50 scrub nurses are working. A surgical hand washing unit is located next to the entrance door of each room in the operating room department. In the department, three or four surgeries in average are performed on per day in each room *"depending on the unit and the length of the case"*.

Sampling

The research sample consists of a total of 100 health care workers (50 nurses and 50 doctors) working in the Operating Room Department and who agreed to voluntarily participate in the research. It was contacted to all the nurses who constituted the research universe.

Procedure and Instruments

Socio-demographic characteristics of the nurses and the doctors who voluntarily participated in the study were collected using face-to-face interview method and procedures for surgical hand scrub were collected using informed observation technique.

In the informed observation technique, nurses and doctors were observed during the surgical hand scrubs and the data collection form containing the procedures for surgical hand scrub was marked. Observation results are marked as yes/ no in the observation form. Since it is hard to understand some of the questions -"*which antiseptic solution do you use, do you maintain short fingernails, is nail polish worn, are skin and fingernails clean, do nurses and doctors with a scratch, cut use sterile waterproof tape*"- in the data collection form containing procedures of surgical hand scrub by observation, the form was filled by making sonar observations for these questions. Each health care worker was observed once. Data collection time for one participant was approximately 15-20 minutes. The research data were collected using Introductory Information Form and Data Collection Form for Surgical Hand Washing.

Introductory Information Form

The introductory information form was prepared by the researcher in accordance with the relevant literature. In the form, there are a total of 13 questions related to socio-demographic characteristics (*age, gender, marital status, occupation, educational status, occupational experience, years of experience in the operating room*) and surgical hand washing practices (*status regarding having in-service training for surgical hand washing, going into surgery while having a scratch/cut on hand, the time*

difference between the first wash of the day and the subsequent washes, the use of moisturizer, procurement of the moisturizer, the dryness of the hands) (2).

Data Collection Form for Surgical Hand Washing Practices

The form was established by the researchers in the light of the literature, mainly the latest evidence-based guidelines on hand hygiene (1,4,5,8,9). There are 18 questions in the form, including procedures for surgical hand scrub (1,2,4,5,8,9).

Statistical Analysis

The data in the study were analyzed in computer environment using SPSS Windows 18 (Statistical Packet for Social Sciences for Windows) packet program. Number, percentage, mean and chi-square test were used in the evaluation of the data.

Ethical considerations

The written approval (date: 13.07.2016, number 11926) was obtained from the institution in which the study was carried out. Verbal and written permissions were obtained from the health care workers who met the criteria for inclusion in the research sample and agreed to participate in the study. Written permission was obtained from health care workers by Informed Consent Form containing information regarding purpose, duration and implementation of the study, collection of the data, and that participation in the study is voluntary, they can quit any time they want, and their names will be kept hidden.

Results

Socio-Demographic Characteristics of Nurses and Doctors

48% of the nurses taken in the research sample were in the age range of 31-40, 76% of them were women, 64% were married, 52% were undergraduate, 30% were working as a nurse for 6-10 years and 36% were working in the operating room for 6-10 years. 44% of the doctors were in the age range of 31-40 years, 88% of them were male, 68% were married, 62% had master degree, 38% were working as a doctor for 6-10 years, 76% were working in the operating room for 1-5 years. 100% of the nurses stated that they received training for surgical hand preparation, 90% of them stated that they performed surgery while they had a scratch on their hands, 64% stated that there was a time difference between the first hand wash and the subsequent hand washes, 82% stated that they used moisturizer, 78% stated that they bought the moisturizer by themselves.

58% of the doctors stated that received training for surgical hand preparation, 56% of them stated that they performed surgery while they had a scratch on their hands, 42% stated that there was a time difference between the first hand wash of the day and the subsequent hand washes, 44% stated that they used moisturizer, 54% stated that they bought the moisturizer by themselves.

When the feeling of dryness in the nurses' hands is evaluated between 0-10, the average value was found to be 7.72 and the doctors' was 6,38. There is a statistically significant difference between the nurses and the doctors in terms of operating room experience, being trained in surgical hand scrub, performing surgery when they have a scratch on hand, the time difference between the first hand wash of the day and the subsequent washes, moisturizer use and feeling of dryness on hands (Table 1).

Table 1. Socio-Demographic Characteristics of Nurses and Doctors

Socio-Demographic Characteristics	Nurse (n: 50) Number (%)	Doctor (n: 50) Number (%)	*p
Age			0.028
18-20	3 (6.0)	...	
21-30	17 (34.0)	21 (42.0)	
31-40	24 (48.0)	22 (44.0)	
41 and above	6 (12.0)	7 (14.0)	
Gender			0.000
Female	38 (76.0)	6 (12.0)	
Male	12 (24.0)	44 (88.0)	

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Marital Status			0.673
Single	18 (36.0)	16 (32.0)	
Married	32 (64.0)	34 (68.0)	
Educational Status			0.000
Medical Vocational High School	9 (18.0)	...	
Associate Degree	10 (20.0)	...	
Undergraduate	26 (52.0)	3 (6.0)	
Graduate	5 (10.0)	31 (62.0)	
Postgraduate	...	16 (32.0)	
Occupational Experience			0.209
1-5 year	13 (26.0)	19 (38.0)	
6-10 year	15 (30.0)	19 (38.0)	
11-15 year	11 (22.0)	6 (12.0)	
16-24 year	11 (22.0)	6 (12.0)	
Operating Room Experience			0.000
1-5 year	21 (42.0)	38 (76.0)	
6-10 year	18 (36.0)	...	
11-24 year	11 (22.0)	12 (24.0)	
Having training regarding surgical hand scrub			0.000
Trained	50 (100.0)	29 (58.0)	
Not Trained	...	21 (42.0)	
Performing surgery while having a scratch on hand			0.000
Yes	45 (90.0)	28 (56.0)	
No	5 (10.0)	22 (44.0)	
Time difference between first hand wash of the day and subsequent washes			0.028
Yes	32 (64.0)	21 (42.0)	
No	18 (36.0)	29 (58.0)	
Moisturizer use			0.000
Yes	41 (82.0)	22 (44.0)	
No	9 (18.0)	28 (56.0)	
Procurement of the Moisturizer			0.275
Buying own	39 (78.0)	27 (54.0)	
Given by the institution	3 (6.0)	23 (46.0)	
Feeling of dryness on hands*	7,72*	6,38*	0.008 <i>t test_-2.713</i>

*The average value was given.

Practices for Surgical Hand Washing of Nurses and Doctors

68% of the nurses used chlorhexidine during surgical hand scrub, 60% of the doctors used povidin-iodine. All the nurses and doctors stated that they removed their accessories before performing a surgery and did not wear artificial nails. 14% of the nurses and 2% of the doctors worn nail polish. 4% of the nurses and 14% of the doctors used waterproof tape. While 22% of nurses used brush, 12% of doctors used it. 90% of the nurses and 78% of the doctors washed their hands and

four surfaces of the forearm effectively. 56% of the nurses and 54% of the doctors splashed water their surgical attire during the washing. 62% of the nurses and 58% of the doctors washed their hands for 2-6 min. 90% of the nurses and 72% of the doctors used the separate sterile towels for each hand. There is a statistically significant difference between the nurses and the doctors regarding the antiseptic solution that was used and using separate sterile towels for each hand (Table 2).

Table 2. Practices for Surgical Hand Washing Practices of Nurses and Doctors

Practices for Hand Washing	Nurse (n: 50) Number (%)	Doctor (n: 50) Number (%)	*p
Antiseptic solution that is used			0.028
Povidin-iodine	19 (38.0)	30 (60.0)	
Chlorhexidine	31 (68.0)	20 (40.0)	
Removing accessories			--
Yes	50 (100.0)	50 (100.0)	
No	
Shortness of nails			0.749
Yes	44 (88.0)	45 (90.0)	
No	6 (12.0)	5 (10.0)	
Artificial nail use			---
Yes	
No	50 (100.0)	50 (100.0)	
Nail polish use			0.160
Yes	7 (14.0)	2 (4.0)	
No	43 (86.0)	48 (96.0)	
Having clean skin and fingernails			1.000
Yes	49 (98.0)	48 (96.0)	
No	1 (2.0)	2 (4.0)	

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Waterproof tape use			0.338
Yes	4 (8.0)	7 (14.0)	
No	46 (92.8)	43 (86.0)	
Brush use			0.183
Yes	11 (22.0)	6 (12.0)	
No	39 (78.0)	44 (88.0)	
Adequate amount of antiseptic use			0.242
Yes	50 (100.0)	47 (94.0)	
No	...	3 (6.0)	
Washing hands and four surfaces of forearms			0.102
Yes	45 (90.0)	39 (78.0)	
No	5 (10.0)	11 (22.0)	
Keeping hands elevated			0.117
Yes	50 (100.0)	46 (92.0)	
No	...	4 (8.0)	
Rinsing from fingertips to elbows			0.495
Yes	50 (100.0)	48 (96.0)	
No	...	2 (4.0)	
Water splashing surgical attire			0.841
Yes	28 (56.0)	27 (54.0)	
No	22 (44.0)	23 (46.0)	
Keeping arms elevated and away			---
Yes	100	100.0	
No	
Going into the operating room hands elevated			0.495
Yes	50 (100.0)	48 (96.0)	
No	...	2 (4.0)	
Drying each hand with separate sterile towel			0.022
Yes	45 (90.0)	36 (72.0)	
No	5 (10.0)	14 (28.0)	
Wearing gloves at waist level			0.495
Yes	50 (100.0)	48 (96.0)	
No	...	2 (4.0)	
Surgical hand wash duration			0.683
1-3 min.	19 (38.0)	21 (42.0)	
2-6 min.	31 (62.0)	29 (58.0)	

Discussion

When the percentage of procedures for surgical hand washing practices performed by nurses and doctors in the research sample, it is generally seen that they were performed in accordance with the literature, but for some procedures the compliance was lower than the others. It was also seen that the nurses taken into the research sample were wearing nail polish but not at a high rate (14%), and the rate of waterproof tape use of the nurses (4%) and the doctors (14%) was low when they had a scratch on their hands. Average half of the nurses and the doctors splashed water their surgical attire during hand washing and approximately 40% of them washed their hands for 1-3 min. While 22% of the nurses used brush, 12% of the doctors used it. There is a statistically significant difference between the nurses (68% chlorhexidine) and the doctors (60% povidin-iodine) in term of the antiseptic solution that they used. It was determined in a study that 17.2% of the nurses used brush, 5% of the doctors used brush, 3% of the employees worn nail polish, 54% used chlorhexidine, and 38% used povidon-iodine (11). Although there are discussions regarding brush and nail polish use in the literature, in the latest evidence-based guidelines of the Perioperative Nurses Association, it is suggested that the ultraviolet-cured nail polish can be worn, fingernails can be cleaned with disposable nail cleaner, and forearms and arms can be

cleaned with a soft sponge (9). It is thought that brush use causes damage to the hand and exuviating, and causes the bacteria to replicate, and in recent years, brush use is not recommended almost in any research (2,4). Even though there are discussions on the antiseptic solutions and washing durations (2-3-5 min.) used in the literature, it has been indicated that the solution use is important and chlorhexiding gluconate or povidone-iodine are mostly used solutions (8,11,14). There was a statistically significant difference between the nurses and the doctors in the research sample regarding the training for surgical hand preparation and use of separate sterile towels for each hand. In the study, it is determined that all nurses received surgical hand preparation training and almost half of the doctors (42%) were not trained. It is thought that this is because working period of the nurses working in the operating room is more. In the light of these findings, it is recommended that noncompliance with the procedures and differences in practice should be reduced by updating trainings of the health care workers with orientation and in-service trainings according to the latest evidence-based guidelines (1,2,11).

When characteristics of the research sample were examined, 90% of the nurses stated that they performed surgery while they had a scratch on their hands, 82% stated that they used moisturizer, 78% stated that

they bought the moisturizer by themselves. 56% of the doctors stated that they performed surgery while they had a scratch on their hands, 44% stated that they were used moisturizer, 54% stated that they bought the moisturizer by themselves. When the feeling of dryness in the nurses' hands was evaluated between 0-10, the average value was found to be 7.72 and the doctors' was 6,38. When the research findings are examined, it is seen that health care workers feel high dryness on their hands and that more than half of them buy the moisturizer by themselves. There is a statistically significant difference between the nurses and the doctors in terms of performing a surgery while they have a scratch on their hands, the use of moisturizer, and feeling of dryness on hands. Despite the fact that nurses use more moisturizer, it is seen that they feel more dryness on their hands. In a study conducted in our country, it was found that 89% of the nurses felt dryness, "*the average value was 6.58 when evaluated between 0-10*", and 88.4% of them bought the moisturizer by themselves (2). In this research, it is seen that findings regarding feeling of dryness and procurement of the moisturize are similar. In this respect, it is stated that the institution should carry out studies related to the selection of hand hygiene products approved by health institutions (9). The irritation to the used agents and the lack of suitable hand hygiene agents are two most important reasons

of the noncompliance with hand hygiene "e.g., hand washing duration, washing frequency" (2,6). It is stated in the literature that health care workers should be trained on the identification and prevention of the development of skin dermatitis since it is important for patients and health care workers in terms of getting infected each other (9).

Limitations

The low number of research samples is considered as the limit of the research.

Recommendations

In line with these findings, it is recommended that knowledge of the nurses and the doctors should be refreshed/ updated during orientation and then with in-service training programs according to the latest guidelines. It is thought that the preparation of surgical hand scrub protocols and the use of hand hygiene products recommended by healthcare institutions in the direction of institutions' latest evidence-based guidelines (WHO, AORN, CDC, etc.) may increase the level of compliance with surgical hand washing.

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