



Adherence to surgical site infection prevention practices in 7A Military Hospital in 2019

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General Note



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ABSTRACT

Background: Surgical site infection (SSI) is a common nosocomial ones results in many negative effects. Issues in compliance with SSI prevention guides are reported worldwide and need to be assessed for improvement in practices. **Objectives:** The study aimed to make a description and evaluation of the compliance with surgical site infection control practices amongst the medical staffs in 7A Military Hospital from March to September 2019. **Material and methods:** The sampling of investigated staffs was done by convenience with the sample size estimated as 240 people. The data of surveyed staffs was collected by monitoring and recording

by specialized personnel with a predesigned survey form. The correct practice percentage was calculated as the ratio of correct practice instances to total observed practice instances and the Likert scale was used to assess the adherence level. The data was input by EpiData 3.1. Software and processed by Stata 13. Chi-square test was used to test the difference between the percentages ($p < 0.001$). *Results:* Compliance rate was at “very good” and “good” level in most aspect except the proper use of surgical hand brush (54.6%). Compliance of hand antiseptic and wound was significantly different between professions and Departments, respectively. Discipline rate was 100% for hand antiseptic and wound dressing in nurse in training and in the Department of Odontostomatology, Otorhinolaryngology and Ophthalmology, respectively, but the sample size in these groups was too small. Compliance in doctors and in Department of Intensive Care took the second place in their corresponding aspects. *Discussion:* Compliance rate was high in comparison with other studies. Poor adherence in use of hand brush was due to misidentification and was solvable by implementation of more visible signs. Studies in larger scale of the abovementioned under populated professions and units are advisable. *Conclusion:* Discipline amongst the medical staff in surgical site infection control is satisfactory, nonetheless it is necessary to improve the intervention measures and perform further studies for maintaining the quality of practices. Active participation from the patients is useful in SSI control.

Keywords: SSI, compliance, adherence, practice, infection

1. INTRODUCTION

Surgical site infection (SSI) is the infection at or near the surgical incision within 30 days of an operative procedure or in one year for surgical with implant. It accounts for 15% of nosocomial infections and is the most common ones for surgical patients. Conditions resulted from SSI depend on the pathogen virulence and load, and the host defenses (Qvistgaard et al., 2019), but it may lead to as severe complications, escalated medical cost, and prolonged hospital stay, high rate of readmission and jeopardy of treatment outcome. In the U.S., there are 12000 joint arthroplasty infections annually whose cost is estimated as \$600 million (Cristina et al., 2017; Reichman and Greenberg, 2009) U.S. data shows that 38.7 – 50.9% of the pathogens have signs of antibiotics resistance (Zucco, 2019), and healthcare-related transmission contributed greatly to the spread of notorious multidrug resistant bacteria (Ong et al., 2013).

Issued guidelines are effective in reducing nosocomial and surgical site infection as they offer standardized guidance and improve utilization of available resources; it is estimated that half of SSI cases are preventable by evidence-bases guidance. However there are issues in knowledge and practices of the issued guidelines. In many cases, gap exists between knowledge and practice as poor adherence was recorded amongst people who were aware of the guidelines and acknowledged their importance. The reasons included not only inadequate training, intense workload, and forgetfulness, but also lack of proper facilities and protective means to materialize the protocols (Zucco et al., 2019; Ong et al; 2013; Adegboye et al., 2018; Gillespie et al., 2018).

The 7A Military Hospital, the end-line of the 7th Military Region, has carried out SSI prevention strategies based on the guidelines of the Ministry of Health (<https://thuvienphapluat.vn/van-ban/the-thao-y-te/Quy-dinh-3671-QD-BYT-2012-Huong-dan-kiem-soat-nhiem-khuan-205394.aspx>) (in Vietnamese). It is necessary to keep a good track of the practices and compliance of the hospital medical staffs to the SSI control regulations to devise appropriate measures for guarantee and improvement in this issue. Therefore this study was performed to make a description and evaluation of the adherence to SSI prevention practices amongst the medical staffs of the 7A Military Hospital.

2. MATERIALS AND METHODS

Study design

The study utilized a descriptive, cross-sectional approach.

Time, location, and surveyed population

The study was performed from March to September 2019 on the medical staffs related to pre, peri- and postoperative surgical procedures in 7A Military Hospital. Personnel not related to any mentioned surgical task was excluded from the study.

Sample size and sampling

The study employed sampling by convenience. The sample size was estimated using the formula

$$n = \frac{Z^2(1 - \alpha/2) \times p(1 - p)}{d^2}$$

In which Z is the standard score of the normal distribution (1.96), α is Type 1 error probability, d is the margin error, p is the expected value (80%, based on other studies) (Nguyen et al., 2014). The value of n was calculated as 240.

Data collection

For each day the practical data of medical staffs related to two surgical cases was investigated. The data was collected via monitoring of the clinical practices of the medical staff, investigation of the clinical history and patient interview if necessary. Monitoring of infection control practices and necessary intervention was done by the supervisors from the Department of Infection Control. The survey form was designed based on the guidelines in Resolution No. 3671/QĐ-BYT issued by the Ministry of Health (<https://thuvienphapluat.vn/van-ban/the-thao-y-te/Quyết-dinh-3671-QĐ-BYT-2012-Huong-dan-kiem-soat-nhiem-khuan-205394.aspx>) (in Vietnamese).

The correct practice percentage was calculated as the ratio of correct practice instances to total observed practice instances. The Likert scale (Sullivan and Artino, 2013) was used to assess the adherence level, with "very poor", "poor", "average", "good" and "very good" score was 0 – 20%, 21 – 40%, 41 – 60%, 61 – 80% and 81 – 100%.

Ethical declaration

Data of the surveyed participants were codified for secrecy and privacy and was used only for the declared study purposes. Medicine Scientific Research Ethics Committee of the 7A Military Hospital approved this study (Number: 63/QĐ-HĐYĐ-BV7A, date: 20.03.2019)

Data analysis

The data was input by EpiData 3.1 software and processed by Stata 13. Chi-square test was used to test the difference between the percentage. The difference was significant if $p < 0.001$.

3. RESULTS

General information

The study was performed on 240 medical staffs of 7A Military Hospital in 4 Departments and belonged to 4 types of professions (Figure 1). The Department of Intensive Care had the most surveyed staffs (38.3%) and the Department of Odonto-stomatology, Otorhinolaryngology and Ophthalmology had the least (2.9%). Most of the surveyed staffs were nurses (52.9%) and doctors (40.4%). All surveyed cases were in morning shift.

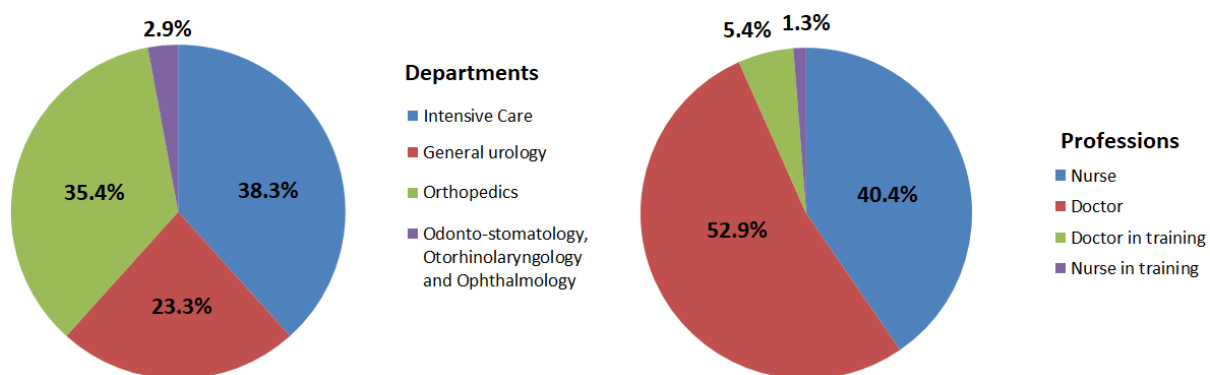


Figure 1 Percentage of staffs amongst departments and professions (n = 240)

Adherence to preoperative practices

Adherence level was "very good" in all aspects (over 90%). However for the preoperative showering only common sterilizing soap was used instead of the specialized medical soap. The data was presented in Figure 2.

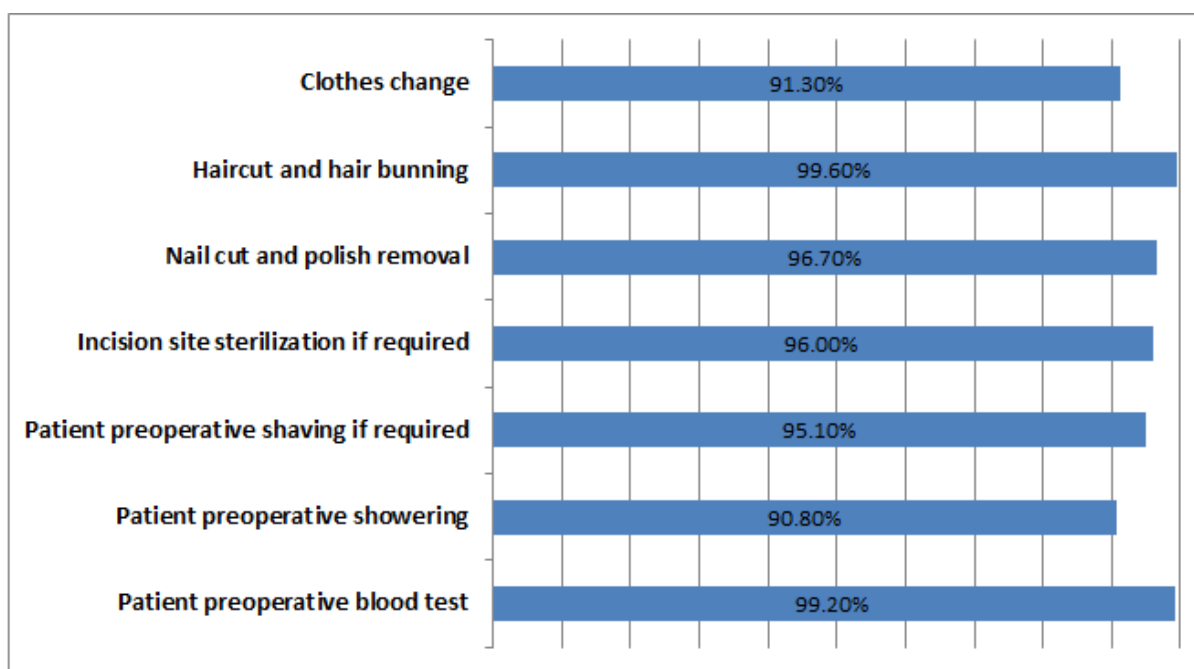


Figure 2 Adherence rate of preoperative practices. For patients preoperative shaving and incision site sterilization, n = 102. For other parameters, n = 240.

Adherence to infection risk assessment practices

Adherence to operation time recording and patient conditions assessment practices based on ASA scale was perfect (100%), and in preoperative incision classification practices was very good (97.9%) (Figure 3).

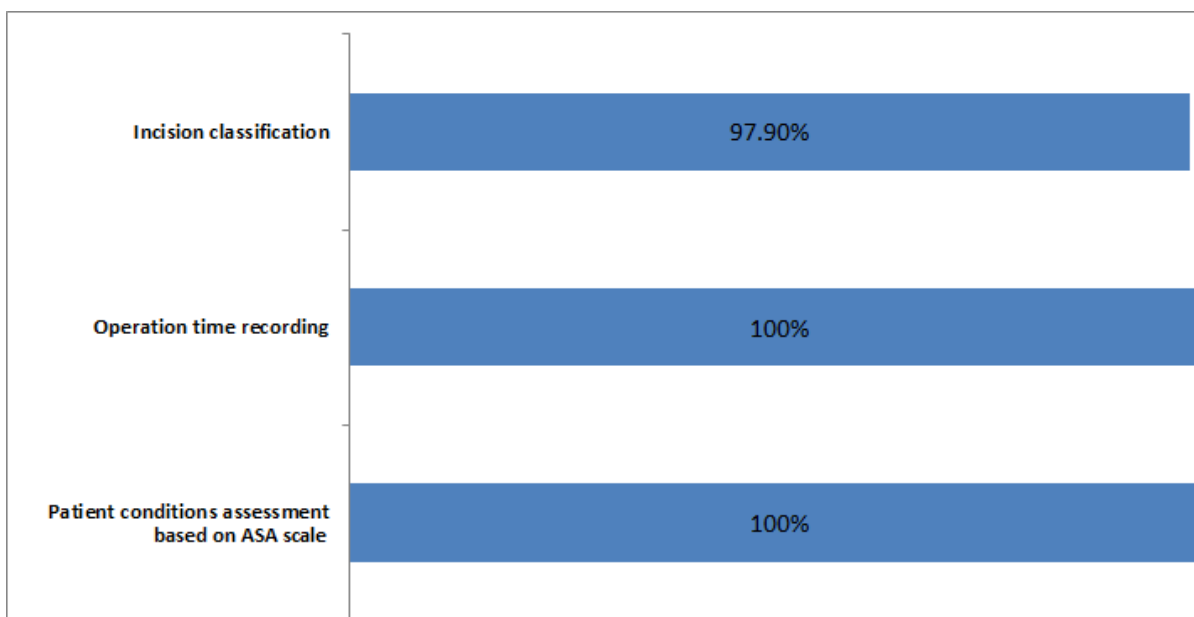


Figure 3 Adherence rate of infection risk assessment practices. (n = 240)

Adherence to surgical room entry and departure regulations

Adherence to regulations of surgical uniform, nail polish and jewelry prohibition, and number of staffs in surgical room was "very good" (over 90%) while discipline in keeping surgical room closed was "good" (74.6%) (Figure 4).

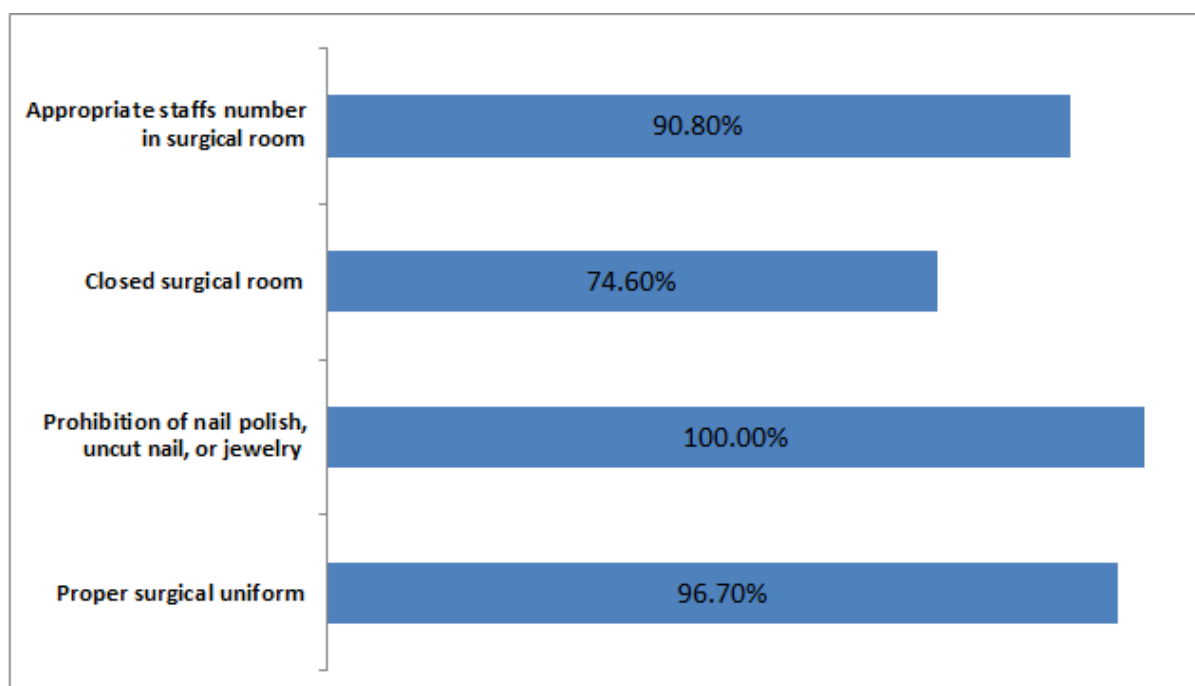


Figure 4 Adherence rate of surgical room entry and departure regulations. (n = 240)

Adherence to surgical hand hygiene

Adherence was “very good” in most aspects of hand hygiene (87.1 – 88.8%) except in proper use of specialized surgical hand brush (54.6%) due to misidentification (Figure 5). There was also misidentification of common water tap and aseptic water tap for surgery due to similarity in appearance.

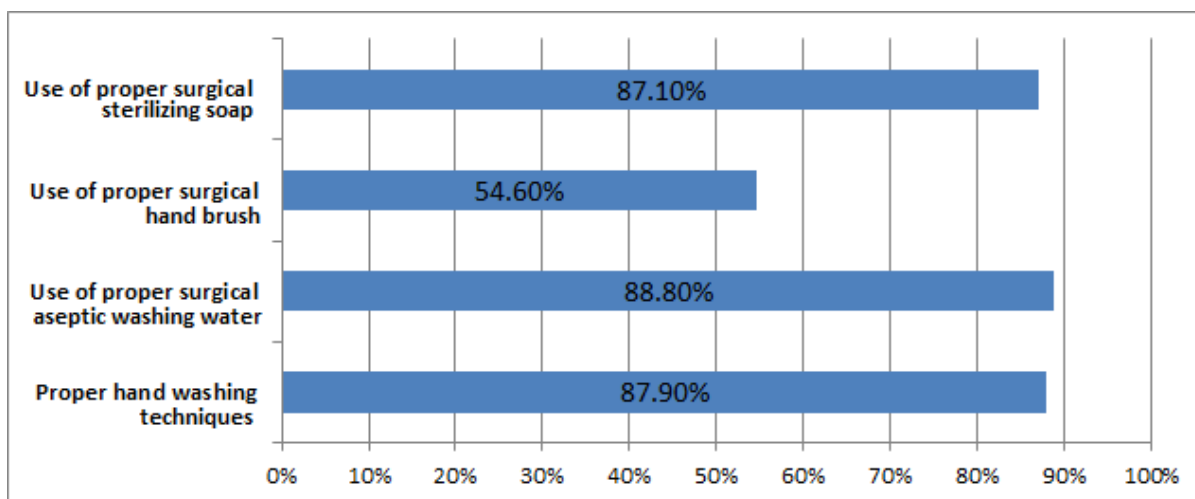


Figure 5 Adherence rate of surgical hand hygiene. (n = 240)

Adherence to tools and equipment sterilization

Adherence was “very good” in all investigated aspects (89.6 – 100%) (Figure 6). However time for tool preparation for surgery should be less than 10 minutes and the tool tray should not be wet.

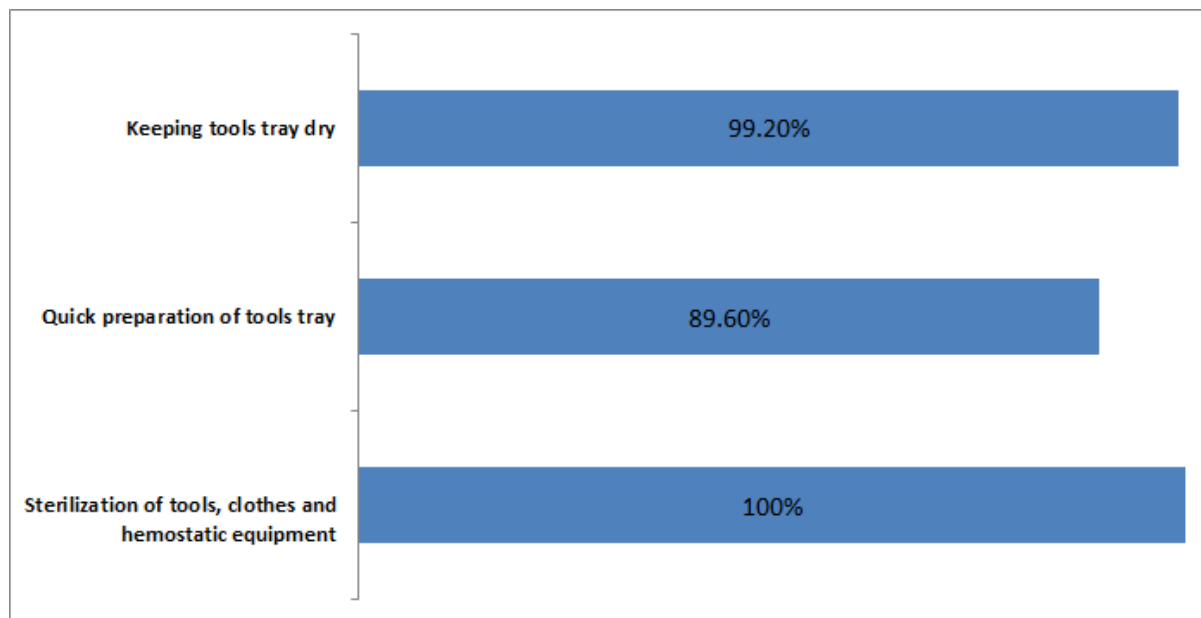


Figure 6 Adherence rate of tools and equipment sterilization. (n = 240)

Adherence to environmental hygiene

Adherence was “very good” (93.3 – 95.4%) in all surveyed aspects (Figure 7).

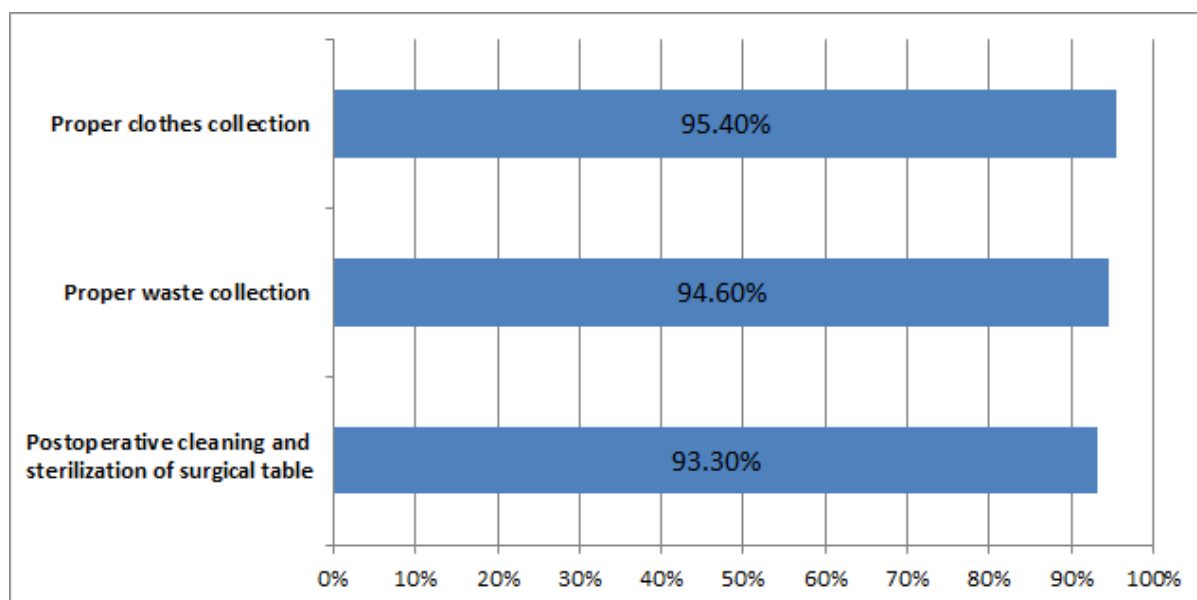


Figure 7 Adherence rate in environmental hygiene (n = 240)

Adherence to wound dressing practices

Adherence was at “good” level (79.6%). Adherence to surgical hand washing regulations is in different professions. There was significant difference adherence rate in surgical hand washing regulations between professions ($p < 0.001$). In comparison with the surgical doctor, adherence rate in nurses, doctor in training and nurse in training were at 0.91, 0.44, and 1.03 times, respectively, of the doctor level (Table 1).

Wound dressing practices adherence in different Departments

There was significant difference in surgical hand washing adherence between professions ($p < 0.001$). In comparison with the Department of Intensive Care, adherence rate in the Departments of General Urology, Orthopedics, and Odonto-stomatology, Otorhinolaryngology and Ophthalmology were at 0.61, 0.69 and 1.03 times, respectively, of the Intensive Care level (Table 2).

Table 1 Surgical hand washing adherence between professions

Profession	Proper hand washing		Improper hand washing		p	PR (KTC 95%)
	n	%	n	%		
Doctor	95	97.9	2	2.1	< 0.001	1
Nurse	108	85.0	19	15.0		0.91 (0.82 – 0.96)
Doctor in training	6	46.2	7	53.8		0.44 (0.24 – 0.81)
Nurse in training	3	100	0	0		1.03 (0.99 – 1.05)

Table 2 Wound dressing practices adherence in different Departments

Departments	Proper hand washing		Improper hand washing		p	PR (KTC 95%)
	n	%	n	%		
Intensive Care	50	96.2	2	3.8	< 0.001	1
General urology	21	60.0	14	40.0		0.61 (0.45 – 0.85)
Orthopedics	53	67.2	25	32.1		0.69 (0.58 – 0.83)
Odonto-stomatology, Otorhinolaryngology and Ophthalmology	6	100	0	0		1.03 (0.97 – 1.13)

4. DISCUSSION

Overall the adherence rate fell into “very good” level with adherence rate at least 87.1%, except the cases of discipline in use proper surgical hand brush (54.6%), keeping closed surgical room (74.6%) and wound dressing (79.6%). Discipline in closing operation door and wound dressing was lower than most cases, but still within the good level, and was high in comparison with studies such as de Olivera *et al.* (2017) or Mohsen *et al.* (2020). The reason for poor discipline in use of hand brush was the misidentification of the correct type. There were also reports of misidentification between surgical aseptic water tap and common water tap due to the similarity in appearance, although the disciplinary rate in water tap use was still high (88.8%). Hence highly observable labels, signs and signboards for specialized surgical hand brush, water taps, and other related facilities should be deployed; moreover for the surgical areas common equipment and facilities should be replaced by surgical aseptic ones to prevent misidentification.

There was significant difference between discipline compliance amongst the professions and Departments. Hand antiseptic discipline in nurse was significantly lower than in doctors albeit still within high value, and it was only mediocre amongst doctor in training. The reason probably was difference in training and education, as there was observed positive relationship between knowledge and practice in this issues. However, in other studies such as McGaw *et al.* (2012) and Stein *et al.* (2003), the nurse's attitude and compliance was significantly better than the doctors due to the latter's tendency to question and disagree with specific guidelines. The number of surveyed nurse-in-training was too low (3 people) for the adherence rate to be meaningful. The intensive care staffs had much better wound dressing practices than the urology and orthopedics personnel, and the compliance was satisfactory in comparison with other studies such as Mohsen *et al.* (2020). All staffs in the Odonto-stomatology, Otorhinolaryngology and Ophthalmology complied with the regulations, but the number of surveyed staffs was few (6 people).

There have been reported issues in the knowledge and practices of infection control in general and SSI in specific amongst the medical staffs (Woldegioris *et al.*, 2019). Even in the well-informed populations, compliance in practices may not be at the same level. It is fortunate that the adherence and discipline of the medical staffs in our study was satisfactory in most cases, and the outstanding problems were solvable as mentioned. The conventional measures of feedback, supervision, audit, and education in combination remain effective in keeping the quality of SSI control, although it is necessary for future studies in implementation of better types of intervention (Tomsic *et al.*, 2020). Studies in larger scale of the abovementioned underpopulated professions and units are advisable to have a better assessment of the situation. Most SSI preventive strategies have been focusing on the medical staff, however patient roles and participation is gaining more attention. Patient self-regulation of hand and body hygiene, showering, keeping body temperature, and active data and information sharing with the medical staff can be very useful in SSI control. In this issue the behavior, knowledge, and skills of the medical staff again is crucial for successful communication with patient and encouragement of patient participation. The staffs should be mindful of patient's needs and convey the needed

information in an understandable way, and stimulate the activities of the patients by allowing questions, clarification and discussion from the patients on the provided data (Tartari et al., 2017).

5. CONCLUSION

Amongst the investigated medical staffs in 7A Military Hospital, the compliance with SSI control regulations was satisfactory in general. Most surveyed aspects achieved “good” and “very good” level of adherence except the using of proper hand brush. The reason was due to misidentification of the tools and equipment types, hence more visible identification signs for each type of facilities should be implemented. Compliance of hand antiseptic in doctors was significantly better than in nurses and doctor in training, and adherence to wound dressing guidelines in Department of Intensive Care was significantly better than in the Departments of General Urology and Orthopedics. Discipline rate was 100% for hand antiseptic and wound dressing in nurse in training and in the Department of Odonto-stomatology, Otorhinolaryngology and Ophthalmology, respectively, but the sample size in these groups was too small and therefore further studies in larger scales are advisable.

Declaration

Scientific Responsibility Statement

The authors declare that they are responsible for the article’s scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

Contribution

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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