KNOWLEDGE TOWARDS THE PREVENTION OF SURGICAL SITE INFECTION AND SOME ASSOCIATED FACTORS AMONG MEDICAL STAFF WORKING AT 19-8 HOSPITAL, MILITARY OF PUBLIC SECURITY IN 2020

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Abstract

Objectives: To assess knowledge and some associated factors toward surgical site infection (SSI) prevention among medical staff working at 19-8 Hospital, Ministry of Public Security in 2020. ***Methods:*** A cross-sectional descriptive study analysing 189 medical staff in 10 surgical departments in 19-8 Hospital, Ministry of Public Security by direct interview. ***Results:*** The percentage of medical staff that had good knowledge about SSI prevention was found to be 83.6%. 75.1% of participants had good preoperative knowledge while 72% of them had good postoperative knowledge. Taking more than 3 times on SSI prevention training programs were found to be significantly associated with the knowledge regarding SSI prevention ($p < 0.05$). ***Conclusion:*** Knowledge of medical staff in 19-8 Hospital, Ministry of Public Security was quite sufficient, indicating the need for ongoing training programs for medical staff to preserve or enhance their understanding of infection prevention.

Keywords: Surgical site infection; Knowledge; Medical staff; Hospital.

INTRODUCTION

Surgical site infection is a significant clinical problem that affects the quality of healthcare services globally, particularly in developing countries. A great number of bodies of literature have revealed that SSI is the most common and costly of all hospital-acquired infections,

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and the rates of SSI ranged from 4.09% to 26.7% [1]. In Vietnam, SSI is the most common type of infection, with the largest number of nosocomial infections, occurring in 5 - 10% of the approximately 2 million patients who undergo surgery every year [2]. A number of studies have indicated that most medical staff lack the required knowledge regarding the prevention of SSIs, and a majority of them do not fully comply with evidence-based guidelines and recommendations [3, 4]. Besides, factors associated with the knowledge of medical staff towards SSI prevention include work experience, level of education, and training on SSI prevention [4, 5, 6]. A report by Nasiri et al. (2019) shows that poor knowledge of infection control among healthcare workers is one of the important reasons for high infection rates [5]. This study has shown that the proportion of medical staff with adequate knowledge of infection control measures depends on the characteristics of the hospital where the research is conducted [5].

19-8 Hospital, Ministry of Public Security is a general level-I hospital with a scope of 600 beds and 41 departments, with nearly 20 - 30 surgeries each day. In recent years, this hospital has been striving to improve quality and service delivery by applying new technologies, providing training for medical staff, and upgrading infrastructure. Despite the increased number of studies on SSI prevention in Vietnam, few studies have been reported in Vietnam, especially in level-I hospitals. Thus, identifying existing knowledge of infection control among healthcare workers is the first step in developing successful infection control programs. Hence, our study aimed: *To assess knowledge of SSI prevention and some associated factors among medical staff working in 10 surgery departments in 19-8 Hospital, Ministry of Public Security in 2020.*

MATERIALS AND METHODS

1. Subjects

189 doctors and nurses in 10 surgery departments of 19-8 Hospital, Ministry of Public Security.

* *Inclusion criteria*: Doctors and nurses working in 10 surgery departments in

19-8 Hospital, Ministry of Public Security (permanent vs contracted staff) agreed to participate in this study; have been permanently employed or contracted for more than 6 months.

* *Exclusion criteria:* Staff attending higher degrees; go on a mission or personal leave as prescribed; not present at the hospital at the time of data collection.

2. Methods

* *Research design:* A cross-sectional, descriptive study.

* *Sample size and sampling method:*

The sample size for this study was determined using the single population proportion formula considering the assumptions: The proportion of nurses having good knowledge regarding the prevention of SSIs was 67.7% from a previous study (p = 0.68) [3]. Level of significance 5% (α = 0.05), Z α/2 = 1.96, and margin of error 5% (d = 0.05). Adding a 10% non-response rate, the total sample size required for this study appeared to be 189.

Sampling method: The entire sample was selected based on the list of medical doctors and nurses in surgery departments who meet the inclusion and exclusion criteria. The total number of participants in this study was 189.

* *Research tools and data collection techniques:*

This study was used as the questionnaire in the study of Humaun Kabir Sickder (2010) in Bangladesh about "Nurses' knowledge and practice regarding prevention of SSI in Bangladesh" [6]. This tool was also adjusted in accordance with the condition of Vietnam and 19-8 Hospital, Ministry of Public Security, and was tested before data collection. The data collection teams were recruited and trained about the content of the research instruments and the way to conduct an interview.

* *Study variables:*

- Personal information: Gender, age, role of medical staff, working experience in the surgical field, training regarding infection control.

- Knowledge of the prevention of SSIs.

- General knowledge: Definition of SSI, classification of SSI, methods of SSI prevention, routine surveillance about SSI prevention

- Preoperative care: Showering before elective surgery, hair removal, antiseptic for skin before surgery, dressing solution, prophylaxis antibiotic, surgical hand washing, risk of SSI for malnourished surgical patients, level of blood sugar.

- Postoperative care: Surgical wound care with aseptic precaution, wound assessment and monitoring of SSI, the appropriate time to shower or bathe with an uncovered incision after surgery, and nutrition support for postoperative care.

* *Measurement criteria:*

- Assess the level of knowledge of medical staff:

The correct response for each item was received a score of "1" or "0". The scores ranged from 0 - 27 and were transformed into percentages. We divided the knowledge level of medical staff with a cut-off point as follows: Good knowledge (≥ 70% total score) and not good knowledge (< 70% total score).

* *Data analysis:*

After data collection, quantitative data was cleaned and entered into the computer by Epidata 3.1 software and analyzed by Stata 18.0. A descriptive analysis was used to create a frequency table of variables. An inference analysis was used to define the correlation between knowledge and practice of medical staff with demographic information. Using the Chi-square test ($\chi 2$) and calculating the odds ratio (OR). The statistically significant level used in this study was $\alpha = 0.05$.

3. Ethics

The study was approved by the Research Council of Vietnam Military Medical Academy and approved by the Board of Directors of 19-8 Hospital, Ministry of Public Security before data collection. The participants were also informed of their right to participate or withdraw at any time from the study. All data was kept anonymous and confidentially guaranteed by the use of a coding number. We declare to have no conflicts of interest.

RESULTS

1. Knowledge regarding SSI prevention among medical staff at 19-8 Hospital, Ministry of Public Security

Table 1. Participants' demographic characteristics (n = 189).

Characteristics		Frequency (n)	Percentage (%)
Gender	Male	61	32.3
	Female	128	67.7
Age group (M = 36.7, SD = 6.1, Min = 27, Max = 59)	< 30 years old	18	9.5
	30 - 40 years old	135	71.4
	> 40 years old	36	19.1
Marital status	Single	12	6.4
	Married	172	91.0
	Separated/Divorced/Widowed	5	2.6
Role of medical staff	Doctors	46	24.3
	Nurses	143	75.7
Working experience in this surgical ward	1 - 5 years	41	21.7
	6 - 10 years	72	38.1
	11 - 15 years	50	26.5
	> 15 years	26	13.7
Attending SSI prevention training program	Never	18	9.5
	≤ 3 times	96	50.8
	> 3 times	75	39.7

The majority of participants were female (67.7%). The average age was 37.3 years old (SD = 7.5), ranging from 27 - 59 years old. Medical staff were also classified as the young group with most of them (71.4%) being in the 30 - 40 age group. The majority of the participants (91%) were married.

More than half of the participants (59.8%) have working experience in the surgical ward less than 10 years. Most participants (90.5%) have been trained in an SSI prevention program at least once.

Table 2. Correct knowledge regarding SSI control before surgery (n = 189).

Characteristics	Frequency (n)	Percentage (%)
The main purpose of preoperative showing	161	85.2
Which patients should take a bath	76	40.2
The best time for preoperative showing	141	74.6
Preoperative hair removal methods	26	13.8
The best time for preoperative hair removal	137	72.9
The purpose of preoperative skin preparation	185	97.9
The best antiseptic for the skin before surgery	177	93.7
Types of surgery should be used prophylaxis antibiotic	91	48.1
The best time to administer prophylaxis antibiotic	113	59.8
The average duration of antibiotic prophylaxis	149	78.8
Risks of SSI for malnourished surgical patients	183	96.8
Laboratories in assessing patient's nutritional status	134	70.9
The correct level of blood sugar which enhances the function of white blood cells adequate to prevent SSI	155	82,0
The main purpose for surgical hand washing	188	99.5
The correct steps of hand washing	179	94.7

The results showed that preoperation knowledge regarding SSI prevention of medical staff in 19-8 Hospital, Ministry of Public Security was quite good, with most of the correct knowledge being over 70% of the items. The highest percentage of participants with correct knowledge was regarding the main purpose of surgical hand washing (99.5%) and the purpose of preoperative skin preparation (97.9%).

The knowledge about preoperative hair removal was also inadequate, only 13.8% of participants knew that electric slippers should be used to remove hairs, not use razors for hair removal for patients. On the other hand, up to 40.2% of the staff knew that it is necessary to use antibacterial soap to take a bath before elective surgery. The knowledge about using prophylaxis antibiotics of participants was not adequate when 48.1% of them did not know the type of surgery that should be used for a prophylaxis antibiotic for clean and clean-contaminated operation.

Table 3. Correct knowledge regarding SSI prevention after surgery (n = 189).

Characteristics	Frequency (n)	Percentage (%)
How to protect a primarily closed incision	104	55.0
The main benefit of wound dressing	188	99.5
The appropriate time to change the surgical wound dressing	34	18.0
How do you select a dressing solution	176	93.1
The appropriate time to shower or bathe with an uncovered incision after surgery	67	35.5
The purpose of maintenance of normal nutritional status for surgical patients.	176	93.1
Kinds of diet should be provided for the postoperative	182	96.3

The results indicate that the participants had quite sufficient knowledge about postoperative SSI prevention. Most of them understood that the main purpose of wound dressing was to reduce SSI (99.5%). However, 55% of participants had correct knowledge about how to protect a primarily closed incision. Although 93.1% of medical staff knew how to select an appropriate dressing solution, a low proportion of respondents knew the appropriate time to change surgical wound dressing or to have a bath with an uncovered incision after surgery (18% and 35.5%, respectively). Regarding nutritional knowledge after surgery, the majority of participants knew the purpose of maintaining normal nutritional status for surgical patients (93.1%) and the kinds of diet that should be provided for postoperative patients (96.3%).

Table 4. Correct knowledge regarding SSI prevention in general (n = 189).

Characteristics	Frequency (n)	Percentage (%)
The time to assess SSI diagnosis	87	46.0
SSI classification	167	88.4
Good signs of no surgical site infection	128	67.7
The laboratory is used to ensure SSI	177	93.7
Role of routine surveillance about SSI	82	43.4

The number of medical staff who had the correct answer of time to define SSI diagnosis within 30 days after operation is quite low (46%). Most participants knew about SSI classification including superficial incisional SSI, deep incisional SSI, and organ/space SSI (88.4%). Nearly 94% of participants understood about which laboratory is used to ensure SSI and about 67.7% of them had fully understood about good signs of SSI. However, only 43.4% of medical staff understood the role of routine surveillance of SSI may reduce the incidence of SSI without any supplementary preventive measures.

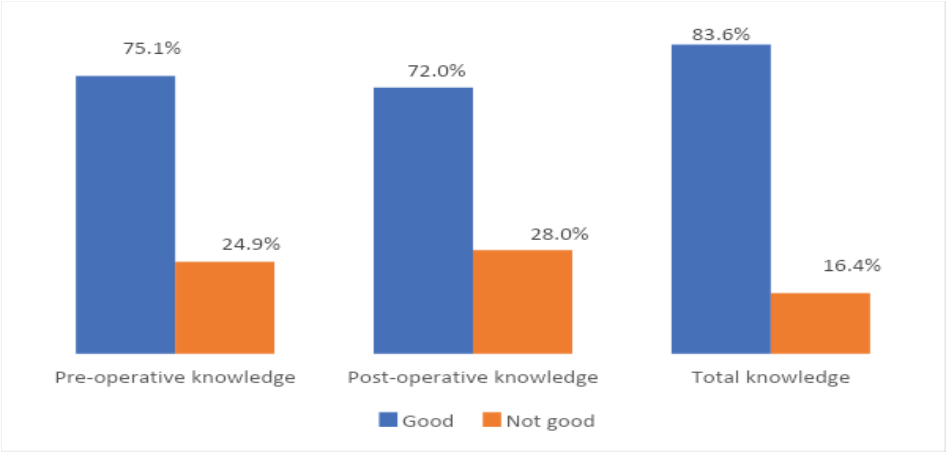

Figure 1. Levels of knowledge regarding SSI prevention among medical staff (n = 189).

The majority of medical staff had good knowledge regarding SSI prevention (83.6%). 75.1% of participants had good preoperative knowledge while 72% of them had good postoperative knowledge.

2. Some associated factors to knowledge of medical staff regarding SSI prevention

Table 5. Some associated factors to the knowledge of medical staff regarding SSI prevention (n = 189).

Characteristics		Good knowledge (n, %)	OR (95%CI)	p
Gender	Female	104 (81.3)	1.78 (0.71 - 4.42)	0.21
	Male	54 (88.5)		
Age group	≤ 40 years old	125 (81.7)	2.46 (0.7 - 8.7)	0.15
	> 40 years old	33 (91.7)		
Marital status	Single/Divorced	14 (82.4)	1.1 (0.3 - 4.1)	0.88
	Married	144 (83.7)		
Role of medical staff	Nurse	116 (81.1)	2.44 (0.8 - 7.5)	0.11
	Doctor	42 (91.3)		
Working experience in surgical ward	≤ 10 years	92 (81.4)	1.51 (0.66 - 3.42)	0.32
	>10 years	66 (86.8)		
Taking SSI prevention training program	≤ 3 times	89 (78.1)	3.23 (1.23 - 8.46)	0.01
	3+ times	69 (92.0)		

Note: Using the Chi-square test ($\chi 2$) and calculating the odds ratio (OR)

Results indicated that male medical staff, medical staff in the age group more than 40 years old, married workers, doctors, and medical staff having more than 10 years of working experience in the surgical ward had higher odds of achieving good knowledge compared to their counterparts but the difference between these groups was not statistically significant ($p > 0.05$).

However, the participants who had more than 3 times on the SSI prevention training program had 3.2 times higher odds of achieving good knowledge compared to the remaining group. There was a statistical difference with $p = 0.01$ (95%CI = 1.23 - 8.46).

DISCUSSION

This study indicated that 83.6% of the medical staff in 10 surgery departments across 19-8 Hospital, Ministry of Public Security had good knowledge regarding SSI prevention. This result is greater than the findings of many other studies, including the study conducted by Nam Dinh General Hospital (2020) [7] and the study conducted by Can Tho General Hospital (2017) [3], which found that 67.7% and 71.2% of nurses had good knowledge on SSI prevention, respectively. Compared to 19-8 Hospital, Ministry of Public Security in 2017, when just 27.4% of medical staff were found to be knowledgeable about SSI prevention, this outcome was significantly higher [8]. Consideration was given to each item of medical staff's knowledge regarding the prevention of SSI in this study; medical staff still lacked knowledge in some areas. Mapping out these kinds of misconceptions is important for understanding and meeting medical staff's specific educational needs.

Comparably, our study's findings regarding participants' proper understanding of the best preoperative shaving technique (13.8%) were lower than those of the Nam Dinh General Hospital study (59.6%) [7]. It has long been believed that shaving hair is essential to reveal skin. However, after reviewing the evidence, hair in the surgical site should be removed only if it would interfere with surgery. Shaving causes microscopic cuts and abrasions resulting in disruption of the skin's barrier defense against microorganisms. Clippers generally should be used instead of razors to remove hairs. As the World Health Organization recommends, there is a clear benefit to not removing hair or if absolutely necessary just clipping it instead of shaving [9].

Similarly, the correct answer rate about types of surgery that should be used for prophylaxis antibiotics in our study (48.1%) is lower than the research findings of Vu Ngoc Anh (69.2%) [7]. Guidelines on preventing microbiological infections published by the World Health Organization (2016) state that prophylactic antibiotics should only be used in clean and clean-contaminated procedures. The Ministry of Health has provided thorough guidelines on microbiological infection prevention in Decision 3671/QD-BYT (2012), which directs the use of prophylactic antibiotics as a crucial component in lowering the prevalence of SSI [2].

On the other hand, knowledge about SSI prevention was significantly associated with taking SSI prevention training programs. Those medical staff

who took more than 3 times on the SSI prevention training program had 3.2 times higher odds of achieving good knowledge compared to the remaining group ($p < 0.05$). This finding is consistent with other findings in the literature, which showed that taking on SSI prevention training was favorably associated with SSI preventive knowledge [10]. This might have happened as a result of the medical staff's knowledge of infection prevention being updated; this would have altered their prior comprehension and led to high knowledge scores.

CONCLUSION

The proportion of medical staff that had good knowledge about the prevention of surgical site infection was found to be 83.6%. 75.1% of participants had good knowledge on preoperative knowledge while 72% of them had good knowledge on postoperative knowledge.

Taking more than 3 times on SSI prevention training programs were found to be significantly associated with the knowledge regarding SSI prevention ($p < 0.05$). It is essential to offer ongoing training programs to medical staff to preserve or enhance their understanding and proficiency in infection prevention.

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