

## Determining knowledge and administration of nurses in preventing surgical site infections

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### Abstract

**Objective:** This study was conducted to define the knowledge and administrations of nurses working in surgical clinics for the prevention of surgical site infections.

**Material and Methods:** The research sample consisted of 199 nurses who were working in surgical clinics and operating rooms of a university hospital between 02 October and 29 December 2017 and who were volunteers to participate in the study and met the limitations of the study. Data were collected by the researchers through face to face interviews with the nurses included in the study. Data collection tools were developed by the researchers in line with the literature. Sociodemographic characteristics information form, SSI Information Questionnaire and Practice Evaluation Form of Nurses in Preventing SSI were used as data collection tools.

**Results:** The mean age of nurses participating in the study was  $35.2 \pm 6.2$  years, 97.5% of them were women, 89.4% of them were graduate's degree, 36.2% of them were working in surgical units between 13-60 months, 58.3% in the last two years, 48.7% of them have received training in the site of surgical site infections in the last two years. It was found that 62.3% of the nurses' knowledge status was "moderate". The average score of the practice statements answered by the clinical nurses participated in the research was found out to be  $65,16 \pm 6,11$ , by the operating room nurses participated in the research was found out to be  $64,09 \pm 6,93$ . It was found that there was a statistically significant relationship between the training status of the operating room nurses participating in the study and their administration scores ( $p < 0.05$ ).

**Conclusion:** Results obtained from the study; the knowledge and administration scores of the nurses who were trained in CAE were found to be higher.

**Key words:** Surgical wound, infection, nurses, knowledge, administration

### Introduction

Nosocomial infections (NI), which are indicator of quality in inpatient treatment institutions, cause problems such as increased mortality / morbidity rates, prolonged hospital stay and treatment process. NI rates in inpatient treatment institutions can be reduced by following up the surveillance results, comparing these results with other institutions' infection rates and taking effective infection control measures (1). The World Health Organization states that 20% of NI in developed countries and more than 40% in developing countries are preventable (2). Surgical site infection (SSI) is one of the most serious surgical complications and causes serious mortality, morbidity and economic losses. Factors related to the patient and the surgical process influence the improvement of SSI (3,4).

It is vital to fully apply the asepsis rules to prevent SSI which occurs in 2-5% of the surgeries and ¼ of all the nosocomial infections. In the surgical wound care which is the responsibility of the nurse and the physician; the most important main goal is to be able to discharge the patient from hospital as soon as possible, before the infection occurs (5). Nurses are one of the primary health workers who interacts the most with patients. Therefore, the contribution of nurses to the prevention of healthcare-related infections is significant (2). The knowledge, attitudes and administrations of nurses to prevent surgical site infections must be up to date and evidence-based (6,7). This study was conducted to define the knowledge and administrations of nurses working in surgical clinics for the prevention of surgical site infections.



## Material and Methods

This study is descriptive. The population of the study consisted of 288 nurses working in surgical clinics and operating rooms of a university hospital between 02 October and 29 December 2017. The research sample consisted of 199 nurses who were working in surgical clinics (138 nurses) and operating rooms (61 nurses) and who were volunteers to participate in the study and met the limitations of the study and the 69.0% of these samples were reached. Data were collected by the researchers through face to face interviews with the nurses included in the study. Data collection tools were developed by the researchers in line with the literature. Sociodemographic characteristics information form, SSI Information Questionnaire and Practice Evaluation Form of Nurses in Preventing SSI were used as data collection tools.

In Sociodemographic Characteristics Information Form there are ten questions in total on nurses' age, gender, educational status, the department in which they work, working time in the unit, the status of training received on hospital infections and surgical site infections in the last two years, determining the resources of the trainings received. Surgical Site Infections Information Questionnaire includes 10 information questions prepared in line with current guidelines on SSI (8,9). There are information questions about the definition of SSI, types of SSI, risk factors related to surgical process, patient risk factors, results of surgical site infections, surgical site hair removal tool, place of hair removal in surgical site, prophylactic antibiotic renewal time and solutions used in skin preparation. According to the answers given to the information questions by the nurses who participated in the study, their knowledge status was rated as "weak", "moderate" and "good. According to the information questions, 0-40 points were classified as "weak", 41-70 points were classified as "moderate" and 71-100 points were classified as "good".

Practice Evaluation Form of Nurses in Preventing Surgical Site Infections, which includes evidence based nurse administrations in the light of current guidelines, was prepared as two separate questionnaires for clinical and operating room nurses by taking the differences in their administrations into account. There are 15 questions in each form. A 5 points likert-type scale (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always) was used for the answers of the questions. In converting the score into a system of 100, the scores were calculated as; 1 = 0, 2 = 25, 3 = 50, 4 = 75, 5 = 100. In the questions prepared for clinical nurses; new developments related to nosocomial infections, if they follow the current guidelines, their hand washing times, changing gloves when passing from one patient to another, paying attention and compliance with sterility in invasive procedures, recording the medications used routinely by patients and informing the related physician, suggesting patients to stop smoking in the preoperative period, suggesting patients to take a shower with antiseptic solutions at least one day before surgery, checking the blood glucose levels of patients with diabetes before and after surgery, the status of applying prophylactic antibiotics, checking the saturation value of patients in the

postoperative period and applying the relevant nursing interventions, following the nutritional status of the patients in the postoperative period, taking appropriate isolation measures according to the microorganism that grows in culture results (contact, droplet, respiration), paying attention to signs and symptoms of infection around the operated area in the postoperative period (swelling, redness, gleet, pain, fever), supporting the hydration of the patients if there is no restriction in the postoperative period, informing patients about infection symptoms before discharge from the hospital were questioned. The Cronbach alpha internal consistency coefficient of the form was found to be 0.806.

In the questionnaire prepared for operating room nurses; new developments related to hospital infections, if they follow the current guidelines, frequency of changing their uniforms, using nail varnish or nail polish during working hours, their compliance with the principles of surgical asepsis, notifying the infection control committee about any operating room personnel with respiratory system infection or nasal colonization, if they leave the operating room in their operating room uniforms, their applying the surgical hand washing processes, wearing goggles and face protection against the possibility of splashing blood to the eyes and mucous membranes, wearing masks, changing gloves / aprons during surgery if there are visible contaminations or damage, ensuring that surgical sets are opened just before use, controlling the indicators of the sets that come from the sterilization unit, their performing flash sterilization administrations, keeping the traffic, temperature, ventilation and humidity of the operating room under control were questioned. A 5 point likert-type scale (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always) was used for the answers of the questions. In converting the score into a system of 100 the scores were calculated as; 1 = 0, 2 = 25, 3 = 50, 4 = 75, 5 = 100. The Cronbach alpha internal consistency coefficient of the form was calculated as 0.765. In order to carry out the research, approval of the Scientific Research and Publication Ethics Committee of the related university, application permission from the institution where the research will be conducted and informed consent forms were obtained from the nurses participating in the research.

**Statistical Analyzes:** Statistical Package for Social Science (SPSS) package software was used. The research population consisted of 288 nurses working in surgical clinics and operating rooms of a university hospital. The research sample included 199 nurses who were working in surgical clinics and operating theaters, volunteered to participate in the research and met the limitations of the study, and 69.0% of the populations were reached. The reliability of the questionnaires was checked with Cronbach alpha coefficients. The normal distribution assumption of knowledge and practice scores was tested by Kolmogorov Smirnov and Shapiro-Wilk tests. As the knowledge and practice scores were not normally distributed, these scores were evaluated using non-parametric tests (Mann Whitney U). When the p value, which is the significance value of all tests, was less than 0.05, it was evaluated as statistically significant.

## Results

The age average of the nurses participated in the study was calculated as  $35.2 \pm 6.2$  years. The 97.5% of the nurses participating in the study were women and 89.4% had bachelor's degree. When the term of employment of the nurses in their current units was analyzed, it was found that 36.2% worked between 13-60 months and 30.7% worked over 120 months (Table 1).

The 30.7% of the nurses participated in the study worked in the operating room and 69.3% worked in the clinic. It was found that 58.3% of the nurses participated in the research received training on nosocomial infections in the last two years and 48.7% received training on surgical site infections in the last two years. It was determined that 17.6% of the nurses participated in the research received the training on nosocomial infections during their undergraduate education and 62.3% of them received it during an in-service training program. It was determined that 18.3% of the nurses participated in the research received their training on surgical site infections during their undergraduate education and 65.0% of them received it during an in-service training program.

The average score of the nurses participated in the research was found out to be  $40 \pm 12.45$  and the lowest score was 20 and the highest score was 70, according to their answers to the information questions. The average score of the practice statements answered by the clinical nurses participated in the research was found out to be  $65.16 \pm 6.11$  and the lowest score was 42 and the highest score was 75. The average score of the practice statements were answered by the operating room nurses participated in the research was found out to be  $64.09 \pm 6.93$ , and the lowest score was 50 and the highest score was 75 (Table 2). It was found that 35.7% of the nurses' knowledge status was "weak", 62.3% was "moderate" and 2.0% was "good" (Table 3).

It was found that there was no statistically significant relationship between the SSI training status and the knowledge scores of the nurses who participated in the research ( $p > 0.05$ ). It was found that there was no statistically significant relationship between the SSI training status of clinical nurses and their practice scores ( $p > 0.05$ ). It was found that there was a statistically significant relationship between the SSI training status and practice scores of operating room nurses participated in the study ( $p < 0.05$ ) (Table 4).

**Table 1.** The distribution of Sociodemographic and Professional Life Characteristics of Nurses

Sociodemographic Characteristics		Number	Percentage
Age	25 and below	8	4.1
	26-30	43	21.6
	31-35	55	27.6
	36-40	58	29.1
	41 and above	35	17.6
Gender	Male	5	2.5
	Female	194	97.5
Graduation status	High school-Associate degree	4	2.0
	Bachelor's degree	178	89.4
	Master's degree-PhD	17	8.6
Term of employment in the current unit	6 -12 months	19	9.5
	13-60 months	72	36.2
	61-120 months	47	23.6
	Above 120 months	61	30.7
Total		199	100.0

**Table 2.** Distribution of Average Knowledge and Practice Scores of Surgical Site Infections of Nurses

Measurements	Number	The Lowest Score	The Highest Score	Average Score	SD	Median	Range
Knowledge Scores of Nurses	199	20	70	40	12.45	40.0	50.0
Practice Scores of Clinical Nurses	138	42	75	65.16	6.114	66.0	33.0
Practice Scores of Operating Room Nurses	61	50	75	64.09	6.932	65.0	25.0

**Table 3.** Distribution of Knowledge Scores of Nurses on Surgical Site Infections

Knowledge Score	Number	Percentage
Weak	71	35.7
Moderate	124	62.3
Good	4	2.0
<b>Total</b>	<b>199</b>	<b>100.0</b>

**Table 4.** The Effect of Training Status of Nurses on Surgical Site Infection on their Knowledge and Administrations

Measurements	Training Status	n	$\bar{x} \pm SD$	Test	p
<b>Knowledge Score of Nurses</b>	Received	116	41.64 $\pm$ 12.44	Z=-1.899	0.058
	Not received	83	37.83 $\pm$ 12.20		
<b>Practice Scores of Clinical Nurses</b>	Received	84	65.71 $\pm$ 6.47	Z=-1.825	0.068
	Not received	54	64.30 $\pm$ 5.46		
<b>Practice Scores of Operational Room Nurses</b>	Received	32	66.0 $\pm$ 6.22	Z=-2.193	0.028*
	Not received	29	62.0 $\pm$ 7.18		

\*: p&lt;0.05 significant

## Discussion

Although there have been improvements in asepsis and antisepsis administrations, sterilization methods, operating room ventilation, surgical techniques and appropriate antibiotic prophylaxis, SSI is still an important problem in surgery. This situation leads to more postoperative antibiotic use, prolonged length of hospital stay and increased treatment costs. When the risk factors of SSI are examined, it is stated in the literature that more than half of it can be prevented. It is important that nurses make accurate and rapid decisions to prevent infections and know evidence-based recommendations to ensure quality nursing care.

It was seen that 58.3% of the nurses participated in the research received training on nosocomial infections in the last two years and 51.3% did not receive any trainings on surgical site infections in the last two years. When the literature is reviewed, the ratio of those who received training on nosocomial infections varies between 64.0-95.3% (2,10,11). Although there are many studies in the literature defining the status of nurses receiving in-service training related to NI, the rates vary in all studies. Among the reasons of this variability are the educational policies of the institutions, the number of patients per nurse / workload, the volunteering of nurses / encouraging participation in training and etc. When the information sources of the nurses included in the research were analyzed, it was found out that there were mostly in-service trainings. It shows that in-service training has an important place in updating information on behalf of nursing care. Although the source of information is secondly during undergraduate, graduate and PhD education, the rate is lower. As it is known that most of the nurses participated in the research had bachelor's degree, this ratio suggests that the undergraduate curricula should give more importance to NI and SSI issues. 98% of the nurses included in the research gave the "correct" respond to the statement about SSI results.

The post-operational infection extends the hospital stay for 5-20 days (8,12,13) reported that SSI increased hospital costs by 0.5% on average for all patients (13). SSI has been reported to increase mortality twice, to 60% prolong the length of hospitalization in intensive care units and to increase the readmissions to the hospital by 5 times, resulting in economic loss (14,15). When the relationship between the knowledge score and graduation status of the nurses is analyzed, according to the result of Kruskal Wallis test, there was no statistically significant difference between knowledge score and graduation status. It is similar in literature. Graduation status and knowledge score could not be associated significantly (3,16,17,18). When the relationship between term of employment and knowledge score of the nurses was examined, no statistically significant relationship was found between the two. In support of our study, Mankan and Kaşıkçı (2015) and Tank (2016) reported in their studies that there was no significant difference between term of employment of the nurses and their knowledge level in preventing infections (2,19). Contrary to our study, in Naharcı's (2006) research which was conducted with intensive care nurses, when the duration of professional experience and the number of correct questions answered by nurses are compared; as the duration of professional experience increased, the number of correct answers increased (20). It was found that nurses who were trained on SSI had higher knowledge score. In the studies comparing the training status and knowledge level in literature, different results have been obtained. This is thought to be due to factors such as sample size, duration of training received and its effectiveness. When the relationship between SSI training status and practice score of operating room nurses was examined, it was found that there was a statistically significant relationship. In a research conducted by Hasanoğlu on the SSI knowledge level of nurses working in the surgical ward, as a result of the Mann Whitney-U test which was applied in order to determine whether the average scores show a significant



difference according to the variable whether they received training related to surgical site infections or not, the difference between the group averages was found to be statistically significant (21).

## Conclusion

The results of the research show that the knowledge and practice scores of nurses who received SSI training were higher. It was determined that the practice score of the operating room nurses who got trained about SSI was significantly higher.

According to the results of the research, it is recommended for the consciousness it will create in nurses in preventing SSI more effectively that, to include more SSI related subjects in undergraduate and graduate education programs, to present in-service training programs related to SSI to healthcare workers in line with current guidelines, to emphasize the importance of sharing the results of surveillance performed in hospital with all nurses responsible for the care of surgical patient, to share the result of the study with the related institution and to organize the in-service training program, since this study, which is carried out as a master thesis, is limited in terms of the number of volunteers and the place of study, to recommend that similar studies should be conducted in broader time periods and with increased number of people.

**Acknowledgments:** None

**Conflict of Interest:** The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Author's Contributions:** PS, YCD; Research concept and design, Research the literature, preparation of the article YCD; Revision of the article.

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