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Effect of Early Versus Late Wound Dressing Removal on Surgical Site Infection among Patients with Surgical Wounds

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Abstract: The closed surgical wound is covered at the end of the surgery with either adhesive tape or a dressing. Applying dressings are aiding hemostasis, absorbing secretions and protection against infection. The warmth, moisture, as well as darkness, all of which prevail beneath a surgical dressing are optimum conditions for bacterial proliferation. The aim of this study was to determine the effect of early versus late wound dressing removal on surgical site infection among patients with surgical wounds. The study was conducted at the surgical inpatient units and outpatient clinics departments of the Medical Research Institute Hospital, Alexandria University, Egypt. This is a quasi-experimental study. (70) Adult surgical patients who undergoing open surgical operations were recruited. The surgical wound assessment sheet was utilized for data collection. Results showed that the incidence of surgical site infection was significantly less in early dressing removal group (8.6% versus 34.3% and p=.018). Statistically significant associations were found between surgical site infection and age, level of education, hospital stay and duration of the operation (P = 0.042, 0.047, 0.000 & 0.037) respectively. It can be concluded that early dressing removal significantly reduces the incidence of surgical site infection and several factors were significantly associated with the occurrence of surgical site infection such as age, level of education, hospital stay and duration of operation.

Key words: Early Dressing Removal · Late Dressing Removal · Surgical Site Infection · Surgical Wounds

INTRODUCTION

Consistently countless surgeries are done wherever throughout the world [1, 2]. The majority of these procedures result in surgical wounds, it is a cut in the skin that is typically made by a surgical tool and empowers the expert to get to the more significant tissues or organs. Most surgical wounds are shut totally at the end of the surgical procedure; this is called primary closure [3]. Numerous techniques are used for wound closure, including using staples, stitches, Steri-strips and tissue or skin adhesives [4].

Surgical wound healing has generally been described to occur in three stages, regardless of the mechanism of injury. These stages are the inflammatory, proliferative and remodeling stages [5]. Hemostasis follows the initial insult and can take seconds to hours; it incorporates leukocyte migration and platelet aggregation. The inflammatory stage happens after hours to days and incorporates phagocytosis for pathogens and removal of foreign materials. The proliferative stage endures days to weeks, where collagen is synthesized by fibroblaststo form granulation tissue alongside with angiogenesis. At last, remodeling can last from weeks to months, even years; in which extracellular matrix is remodeled and wound elasticity builds [5-7]. There are two noteworthy kinds of wound healing, primary and secondary healing. Most surgical wounds undergo primary closure in which there is minimal tissue loss and the injury edges can be attractively approximated. This allows for primary healing in which there is quick epithelialization of the wound with insignificant scarring. A few investigations had announced various elements could influence post-operative wound healing such as haematomas, wound dehiscence and surgical site infection (SSI) [5, 8].

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Surgical site infection is viewed as one of the most widely recognized complications of surgical wounds that may postpone healing [9]. It refers to an infection that happens after surgery in the part of the body where the surgery took place. The Centers for Disease Control and Prevention (CDC) had classified SSI into three types: superficial incisional SSI that happens just in the skin or in subcutaneous tissue around the incision, deep incisional SSI that occurs beneath the incision area in the muscles and the tissues encompassing the muscles. Finally organ or space SSI which can be in any area of the body other than skin, muscle and surrounding tissue that was involved in the surgery [3, 10]. SSI could be caused by bacteria that get in through incisions made during surgery. Also, it threatens the lives of millions of patients annually and contributes to the spread of antibiotic resistance in low and middle income countries. Additionally, SSI could expand costs because of its treatment and expanded length of hospital stay [11, 12].

In this context, the risk of SSI varies according to the classification of surgical wounds. There are many classifications of surgical wounds as clean, clean-contaminated, contaminated and dirty wounds. Clean wounds are not inflamed or contaminated and do not involve operating on internal organ. The risk for an infection in this type of wound is usually less than 2%. Clean-contaminated wounds have no evidence of infection at the time of surgery, but do involve operating on internal organ. The risk for such an infection is usually less than 10%. Contaminated wounds involve operating on internal organ with a spilling of contents from the organ into the wound. The risk for this infection is usually less than 13 % -20%. Finally, dirty contaminated wounds refer to infection that is already present at the time of the surgery. The risk for an infection in these cases is usually about 40% [4, 11, 13, 14].

According to CDC data, SSI is the third most frequently reported nosocomial infections, representing up to 16% of all nosocomial infections among hospitalized patients and 38% of all surgical patients. Despite the significant modern technologies in the operating room and advances in surgical techniques, SSI stays a considerable reason for morbidity and mortality among hospitalized patients [15, 16]. Surgical nurses play a major role in prevention of SSI postoperatively through performing proper management, such as administration of prophylactic antibiotics and dressing of wounds [12, 16-19].The custom of dressing surgical wounds is as old as the historical backdrop of surgery. Wound dressings are grouped in various ways as indicated by their function, type of material and the physical form of the dressing [20].

Dressings can go about as a physical prevention to secure wounds until the progression of the skin has been accomplished and to absorb exudates from the wound. It keeps it dry and clean with the aim of avoiding bacterial contamination from the external environment. Another purpose behind wound dressing is to forestall contamination of the surrounding area by any wound discharge [21-23]. Some studies have announced that the damp condition made by certain dressings quickens wound healing, although others trust that it is a disadvantage, as excessive exudates can cause maceration of the wound and the incorporating healthy tissue [3, 24].

Dressing connected to surgical wounds at the time of surgery can be expelled earlier, changed consistently, or held until the expulsion of sutures. This may cause a burden to the patient and waste nursing time, as well as increase the costs associated with it. In recreated wounds, where dressings increase the chance of localized perspiring and can decrease moisture evaporation, the subsequent increased dampness potentially acts as a source of infection. In this way, there are some potential disadvantages to postponing dressing removal. Until now no guidelines are available about the ideal timing of wound dressing removal after the surgical procedure without the risk of wound sepsis [3, 25]. So this study was done to compare the effect of early versus late dressing removal on incidence of SSI.

Aim of the Study: The study aimed to determine the effect of early versus late wound dressing removal on surgical site infection among patients with surgical wounds.

Research Hypotheses:

- H_1: Early wound dressing removal reveals less surgical site infection than a late one among patients with surgical wounds.
- H_2: Late wound dressing removal reveals more surgical site infection than an early one among patients with surgical wounds.

Operational Definitions

Early Surgical Wound Dressing: Early removal of surgical wound dressing in this study refers to its removal on the second postoperative day followed by wound care.

Late Surgical Wound Dressing: Late removal of surgical wound dressing in this study refers to its removal on the fifth postoperative day followed by wound care.

MATERIALS AND METHODS

Materials

Research Design: A quasi experimental research design was utilized to conduct this study.

Setting: The study was conducted at the surgical inpatient units and outpatient clinics departments of the Medical Research Institute Hospital, Alexandria University, Egypt.

Subjects:

- A convenience sample of 70 adult surgical patients who were undergoing open surgical operations was recruited. They were divided into two study groups as follows:
- Group A(35 patients) was managed by early surgical wound dressing.
- Group B(35 patients) was managed by late surgical wound dressing.
- The patients were distributed into either the first or second group using a computer generated random table.
- EPI INFO program was used to estimate the sample size applying the following parameters:

- Population size = 68 for 3 months.
- Expected Frequency = 50%
- Acceptable Error = 5%
- Confidence Coefficient = 99%
- Sample size = 62

The patient inclusion criteria were:

- Surgical patients of both sexes with age ranging from 18 to 65 years old.
- Patients undergoing open surgeries not laparoscopy such as thyroid, breast and upper abdominal surgeries, were included in the study sample.
- Only patients, who had a clean type of surgical incision wounds and no contaminated or septic types of surgeries as lower abdominal operations such as abscesses or colorectal surgeries, were included in the study sample.
- Patients who had controlled chronic diseases.

Tool of the study: In order to fulfill the purpose of the study, one tool was used for data collection.

Surgical Wound Assessment Sheet: It was developed by the researchers based on reviewing the related literature for the purpose of the study [13, 22, 26, 27]. It included two main parts:

Part I: Sociodemographic and Clinical Data Sheet: This sheet was developed to obtain sociodemographic and clinical data of the patients related to the pre and postoperative state of the studied patients.

Sociodemographic Data: Included age, gender, occupation, level of education, residence and income.

Clinical Data: This part was divided into the following items:

- Duration of hospital stay.
- Any associated medical diseases such as diabetes mellitus and hypertension.
- Laboratory investigations such as complete blood count and coagulation profile.
- Name and duration of surgical operation.
- Postoperative duration of antibiotic administration.

Part II: Wound Assessment and Follow up Data Sheet: This section was developed to collect the necessary data about the appearance of clinical manifestations of surgical site infection. These manifestations include: erythema, hotness, swelling, pain, purulent discharge and separation of deep tissues. If the previously mentioned manifestations were detected at the surgical site, thus surgical site infection was confirmed.

Method:

- An official permission was secured from the hospital administrative staff to carry out the study.
- The study tool was tested by five experts in the fields of Medical Surgical Nursing and Surgery to test the tool for content validity, completeness and clarity of the items and the necessary modifications were carried out accordingly.
- Reliability of the tool was tested using Cronbach's Alpha Coefficient Test (= 0.84) which indicated that, the tool was reliable.

- A pilot study was initially carried out on ten patients prior to the actual data collection to assess the clarity and applicability of the tool and to identify the difficulties that may be encountered during data collection. These patients were excluded from the study subjects.

Data Collection:

- Data was collected within three months, during the period between March and May 2016.
- Patients eligible for the study were enrolled in either of the study groups after review of hospital records and consultation with attending surgeons.
- The patient's individual interview was conducted after the patients' admission to the surgical ward and lasted for maximum15-20 minutes to gain information about sociodemographic data.
- Study subjects sociodemographic and all clinical data using part I of the tool were initially obtained except the postoperative related data which was obtained immediately after the surgical operation was done.
- Review of patient's medical record was carried out to obtain the necessary data.

Nursing Interventions:

- The surgical wound care using strict aseptic technique was carried out for both group members.
- Initial surgical wound dressing removal and cleansing was done on the second postoperative day for group I and on the fifth day for group II.
- Surgical wound care was done subsequently in both groups every second day and until suture removal.

Patient's Follow Up:

- The importance of wound follow up care at the surgical outpatient clinic was emphasized on the day of the patient's discharge from the hospital.
- Each patient was assessed through schedule of follow up visits at the surgical outpatient clinic after being discharged on every day of wound care to suture removal using part II of the tool.
- The surgical wound was considered as being infected if there were any manifestations of hotness, erythema, swelling or pain and confirmed by the presence of purulent discharge.

Ethical Considerations:

- The purpose of the study was explained to all the studied patients and their approval and readiness to be included in the study were obtained initially before participation.
- All patients were assured about the privacy and confidentiality to participate in the study.

Statistical Methods: Data was fed to the computer and analyzed using IBM SPSS software package version 20.0 [28]. Qualitative data were described using number and percent. The significance of the obtained results was judged at the 5% level.

The Used Tests Were:

- Chi-square test, for categorical variables, to compare between different groups.
- Monte Carlo correction, for chi-square when more than 20% of the cells have expected count less than 5.

RESULTS

Table (1) shows the frequency distribution of the studied patients in both groups in relation to sociodemographic data. It can be noticed that, the majority of patients in the second and fifth day dressing groups had age group ranged from 50 up to 65 years (37.1% and 51.4%) respectively. Females were prevalent in the study sample than males. They constituted (71.4 % and 74.3%) of the second and fifth day dressing groups of patients respectively. Regarding the occupation, the majority of patients in both of the study groups (85.7 % and 82.8 % respectively) were unemployed. Additionally, nearly half of patients in the second day dressing group had low to moderate educational level. However, more than two thirds of the fifth day dressing group were illiterate (51.4 % and74.2 %) respectively. The majority of patients (85.7%) in both groups had urban residence. As regards the patient's income, the majority of patients in both groups (57.2 % and 71.5 %) had not enough income.

Table (2) presents the frequency distribution of the studied patients in both groups in relation to clinical data. It can be noticed that, the hospital stay duration was less than two days in the majority of both studied groups of patients representing (82.8 % and 60.0 %) respectively.

Table 1: The frequency distribution of the studied patients in both groups in relation to sociodemographic data

	Early dressing removal group (2nd day) (n= 35)		Late dressing removal group (5th day) (n= 35)	
Sociodemographic data	No	%	No	%
Age (years)				
18-<35	10	28.6	7	20.0
35-<50	12	34.3	10	28.6
50-<or equal 65	13	37.1	18	51.4
Gender				
Male	10	28.6	9	25.7
Female	25	71.4	26	74.3
Occupation				
Unemployed	30	85.7	29	82.8
Sedentary	2	5.7	2	5.7
Non-sedentary	3	8.6	4	11.5
Level of education				
Illiterate	12	22.9	22	74.2
Low or moderate	18	51.4	12	22.9
University	5	25.7	1	2.9
Residence				
Urban	30	85.7	30	85.7
Rural	5	14.3	5	14.3
Income				
Enough	15	42.8	10	28.5
Not enough	20	57.2	25	71.5

Table 2: The frequency distribution of the studied patients in both groups in relation to clinical data:

	Early dressing removal group (2nd day) (n= 35)		Late dressing removal group (5th day) (n= 35)	
Clinical data	No	%	No	%
Hospital stay duration				
< 2 days	29	82.8	21	60.0
>or equal 2 days	6	17.2	14	40.0
Associated diseases				
Absent	33	94.2	26	74.2
Present	2	5.8	9	25.8
Preoperative investigations				
Normal	15	42.8	16	45.7
Abnormal	20	57.2	19	54.3
Type of operation				
Thyroidectomy	5	14.1	8	22.8
Mastectomy	19	54.3	10	28.5
Herniorraphy	9	25.8	13	37.1
Cholecystectomy	2	5.8	4	11.6
Operation duration				
< 2 hours	15	42.8	10	28.5
> or equal 2 hours	20	57.2	25	71.5
Postoperative antibiotic duration				
<one week	17	48.5	12	34.2
> or equal one week	18	51.5	23	65.8

Additionally, (94.2 %) of patients of the second day dressing group had no associated diseases compared to (74.2 %) of the fifth day dressing group. Also, more than half of patients in both groups had abnormal preoperative investigations reported by (57.2 % and 54.3 %) respectively. Considerable numbers, i.e. (54.3 % and 28.5%) of patients in both groups, respectively had the mastectomy type of operation, whereas 14.1 % and 22.8 % of patients in both groups, respectively had thyroidectomy type of operation. It is noticed from the table that (57.2 % and 71.5 %) of patients in the second and fifth day dressing groups respectively had more than or equal 2 hours duration of operation.Interestingly, more than half of patients (51.5 % and 65.8 % respectively) in both groups had more than or equal week of postoperative antibiotic duration.

Table (3) displays that the incidence of surgical site infection (SSI) was (34.3 %) in the fifth day dressing group compared to (8.6 %) in the second day dressing group. It appears from the table that statistical significant difference was elicited between both studied groups regarding incidence of SSI where P = .018.

It can be noticed from the Table (4) that the majority of patients in the non-infected group had age ranged between35 to less than 50 and 50 up to 65 years (36.4 % & 36.4 %) respectively, whereas, (73.3%) of the infected group patients had age ranged from 50 up to 65 years. As regards gender, it appears that the majority of patients in the non- infected group and all patients of the infected group were female and unemployed (69.1% and 86.7 %) and (83.6 % and 86.6 %) respectively. Regarding the level of education (41.8 %) of patients in the non-infected and (73.3 %) of patients in the infected group were illiterate. Concerning residence, the majority of patients in both groups had urban residence and not enough income (87.3 % and 80.0 %) and (58.2 % and 86.7 %) respectively. Statistically significant differences were detected between the non-infected and infected groups regarding age, level of education and income where P =0.042, 0.047 and 0.041 respectively.

Table (5) shows that (80.0%) of patients in the non-infected group had less than two days of hospital stay duration compared to (60.0 %) in the infected group who had equal or more than 2 days. Moreover, (10.9 %) of the non-infected group and (33.3 %) of infected patients had associated medical disorders. The majority of patients in the non- infected and infected groups had abnormal preoperative investigations (52.7 % and 66.7 % respectively). Concerning the type of operation, (45.5%) of non-infected patient group had mastectomy operations,

Table 3: Comparison between both studied groups regarding to incidence of surgical site infection:

	Early dressing removal group (2nd day) (n= 35)		Late dressing removal group (5th day) (n= 35)		
Surgical site infection	No	%	No	%	Test of significance
Absent	32	91.4	23	65.7	X^2 = 6.873 P = .018 *
Present	3	8.6	12	34.3	

X^2 = Chi square test * = Significant at P ≤ 0.05

Table 4: Relationship between incidence of surgical site infection and sociodemographic data in both studied groups:

	Surgical site infection absent in both studied groups (Non-infected= 55)		Surgical site infection present in both studied groups (Infected= 15)		
Sociodemographic data	No	%	No	%	Test of significance
Age (years)					
18-<35	15	27.2	2	13.3	FET= 5.984
35-<50	20	36.4	2	13.4	P = 0.042*
50-<or equal 65	20	36.4	11	73.3	
Gender					
Male	17	30.9	2	13.3	X^2 = 1.841
Female	38	69.1	13	86.7	P = .211
Occupation					
Unemployed	46	83.6	13	86.6	FET= .428
Sedentary	3	5.5	1	6.7	P = 1.000
Non-sedentary	6	10.9	1	6.7	
Level of education					
Illiterate	23	41.8	11	73.3	FET=6.354
Low or moderate	26	47.3	4	26.7	P = 0.047*
University	6	10.9	0	0.0	
Residence					
Urban	48	87.3	12	80.0	X^2 = .509
Rural	7	12.7	3	20.0	P =.678
Income				8	
Enough	23	41.8	2	13.3	X^2=4.165
Not enough	32	58.2	13	86.7	P = 0.041*

FET = Fisher's Exact Test, X^2 = Chi square test * = Significant at P ≤ 0.05

Table 5: Relationship between incidence of surgical site infection and clinical data in both studied groups:

	Surgical site infection absent in both studied groups (Non-infected= 55)		Surgical site infection present in both studied groups (Infected= 15)		
Clinical data	No	%	No	%	Test of significance
Hospital stay duration					
< 2 days	44	80.0	6	40.0	X^2= 15.396
>or equal 2 days	11	20.0	9	60.0	P = .000*
Associated diseases					
Absent	49	89.1	10	66.7	X^2 = 4.474
Present	6	10.9	5	33.3	P = .034*
Preoperative investigations					
Normal	26	47.3	5	33.3	X^2 = .928
Abnormal	29	52.7	10	66.7	P = .335
Type of operation					
Thyroidectomy	8	14.5	5	33.3	FET=6.548
Mastectomy	25	45.5	4	26.7	P = .079
Herniorraphy	19	34.5	3	20.0	
Cholecystectomy	3	5.5	3	20.0	
Operation duration					
< 2 hours	25	45.5	0	0.0	X^2=4.354
> or equal 2 hours	30	54.5	15	100.0	P =.037*
Postoperative antibiotic duration					
<one week	28	50.9	1	6.7	X^2 = 9.507
> or equal one week	27	49.1	14	93.3	P = .002*

X^2 = Chi square test FET = Fisher's Exact Test * = Significant at P ≤ 0.05

whereas (33.3%) of patients among the infected group had a thyroidectomy. In relation to duration of operation, the majority of the non-infected group of patients and the entire infected group of patients had equal or more than two hours duration (54.5 % and 100.0 % respectively). Moreover, around half of the patients in the non-infected group (49.1 %) and the majority of patients in the infected group (93.3 %) had equal or more than week of postoperative antibiotic. Hospital stay duration, associated medical disease, duration of operation and postoperative antibiotic duration affected significantly the incidence of surgical site infection where P = .000, .034, .037 and .002, respectively.

DISCUSSION

Wound management is fundamental to the practice of surgery. Dressing of the primarily sutured surgical wound immediately after its closure with a sterile dressing is considered a routine and essential conclusion to an aseptic operation. However, each dressing has its advantages and disadvantages. The warmth, moisture and darkness are optimum conditions for bacterial proliferation. Thus, it is evident that surgical dressing might predispose to the development of a wound infection rather than protection [20].

Surgical Site Infection in Early and Late Dressing Removal Groups: Although advances in the operative techniques and better understanding of the pathogenesis of wound infection, postoperative SSI continues to be a major source of morbidity and mortality for patients undergoing operative procedures. The main findings of the current study revealed that, more than one third of the studied patients in the late dressing removal group had SSI c ompared to less than one quarter of them in the early dressing removal group. Also a statistical significant relationship was found between both groups regarding the presence of SSI. These findings could be due to the fact that, late wound dressing removal increases the chance of localized perspiring and can decrease moisture evaporation, the subsequent increased dampness potentially acts as a source of infection [3].

Similarly, Dumville *et al.* [1] reported a decline in the mean incidence of SSI was observed in the early dressing removal group. Also, Bansal *et al.* [20] reported that, early removal of dressing significantly reduces the incidence of SSI compared to late dressing removal. On the other hand, our findings of the current study are not in agreement with Toon *et al.* [3] who had found in a similar study that, there was no statistical significant difference in the proportion of patients who developed SSI between the early and late dressing removal groups.

Sociodemographic Data and its Relationship with SSI in Both Studied Groups: The main findings of the current study revealed that, the majority of patients in the both studied groups had age group ranged from 50 up to 65 years, unemployed, illiterate and females. These findings are supported by Ramamoorthy *et al.* [29] who found the same findings in a previous similar study. On the other hand, these findings are contradicting to Toon *et al.* [3] who reported that, more than half of their studied patients with both early and late dressing removal belonged to the 30-50 years age group; also the majority of them in both groups were males.

Moreover, the present study demonstrated positive significant relationship between age and presence of SSI. It could be due to that, associated diseases, malnutrition, low healing rate, increased catabolic processes, malabsorption and low immunity, all of these factors may be increased with the ageing process, which interferes with wound healing. Hence, occurrence of surgical site infection may be increased. In the same line with our findings, Korol *et al*. [30] reported that, age is considered a significant risk factor associated with the presence of SSI . Also, this finding was consistent with Elbur *et al*. [31] who reported that, SSI rate was higher among their studied patients aged ≥ 50 years.

The current study revealed no statistically significant differences were found between gender and the occurrence of SSI in both studied groups. This was similar to study done by Nobandegani *et al.* [32] who reported that, there was no significant difference in the incidence of SSI among their studied patients regarding gender. However, this finding is not in agreement with a study conducted by Nasser *et al.* [33] who illustrated that, the gender was significant with SSI which was higher in females than males.

Furthermore, this study indicated that, education and economic status were found significant with the occurrence of SSI in early and late dressing removal groups. This could be supported by Nasser *et al.* [33] and Rawabdeh *et al*. [34] who reported that, low levels of education and income were associated with SSI in their studied groups. This could be justified by that, income and education level, may influence the quality of health care patients receive, including insurance status, access to care, also patients nutritional status.

Clinical Data and its Relationship with SSI in Both Studied Groups: Regarding the clinical data of the studied patients, the results of the present study revealed that, the majority of patients in the early dressing removal group were discharged early compared to the late dressing removal group, This finding was congruent with Toon *et al.* [3] who reported that early dressing removal may result in significantly shorter hospital duration and significantly diminished costs, than covering the surgical wound with wound dressings past the initial 48 hours after surgery. This could be justified by that the early discharge of patients in the early dressing removal group was because of the earlier wound care and detection of SSI compared to the late dressing removal group. On brief discovery of SSI, suitable advances were taken to deal with the infection. Henceforth, wound healing could be improved faster in the early dressing removal group and patient recovery would be early. Another factor is that there is always relation between prolonged hospital stay of the patient and increasing susceptibility to infection. Unfortunately, in the current study, patients in the late dressing removal group had a prolonged hospital stay which increased the SSI rate among them.

In this study, it was found that, around one quarter of the patients studied in both groups had associated diseases, also statistical significant difference was observed between both groups regarding associated diseases and the occurrence of SSI. These findings are supported by Nasser *et al.* [33] and Rawabdeh *et al*. [34] who reported that, the contribution of chronic diseases to SSI and late dressing removal were both significant with SSI. ($P = 0.0251$). It could be attributed to that; associated diseases with general surgery may affect negatively on immunity and wound healing, which might lead to SSI easily.

The findings of this study showed also that, mastectomy and herniorraphy were the most common indications for surgery in the early and late dressing removal group, also no statistical significant relationship was observed between type of surgery and presence of SSI. This finding disagrees with Elbur *et al*. [31] who reported that, presence of SSI was significantly associated with the type of operation. Furthermore, the current study showed that, SSI incidence was observed when the duration of surgery was more than two hours in both studied groups. This finding is supported by Cheng *et al*. [35] who reported that the increasing operative duration is associated with a stepwise increase in SSI. It could be justified by that, prolonged duration of operation results in increased exposure of operation site to air and prolonged trauma, thus increasing the risk of SSI development postoperatively.

CONCLUSIONS

Based on the findings of the current study, it can be concluded that, early dressing removal significantly diminishes the incidence of surgical site infection (SSI); it additionally lessens the duration of hospital stay compared to late dressing removal. Age, level of education, income, hospital stay duration, associated diseases, type of operation and postoperative antibiotic duration were significantly associated with SSI development.

Recommendations:

- Standard of wound care management should be developed and focused on early dressing removal.
- Appropriate SSI preventive measures should be integrated into nursing practice for risky surgical patients.
- In- service training program for surgical nurses should be conducted about SSI manifestations and the best time of dressing removal postoperatively.
- Further nursing studies should be conducted on larger sample size to investigate effect of early dressing removal on surgical site infection.

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