Assessment of Factors Contributing to Abdominal Post-Operative Wound Infections in Sulaimani Teaching Hospital

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الخلاصة

الهدف: تهدف الدراسة إلى تقييم بعض العوامل المساهمة في حدوث خمج جرح البطن بعد العملية الجراحية، كذلك لإيجاد العلاقة بين خمج جرح البطن بعد العملية الجراحية وبعض الخصائص الديموغرافية مثل (العمر، الجنس، المستوى الثقافي، المهنة، محل السكن).

المنهجية: دراسة وصفية أجريت في مستشفى السليمانية التعليمي (اقليم كوردستان)، بدأت الدراسة من ١٥ كانون الثاني ولغاية ٣١ تشرين الأول ٢٠٠٩. لتحقيق اهداف الدراسةأُ ختيرت عيّنة غرضيّة غيراحتمالية مكوّ نة من (١٠٠) مريض بالغ من الرجال والنساء ممن يعانون خمج جرح البطن بعد العملية الجراحية واللذين أدخلوا إلى المستشفى المذكور اعلاه.
ولغرض جمع البيانات، صممت استمارة استبانة مكونة من (٢٥) فقرة تكوّ نت من ثلاثة أجزاء؛ الجزء الأولمكوّ ن من (٨) فقرات شملت الخصائص الديموغرافية للعيّنة، والجزء الثاني مكوّ ن من (٨) فقرات شملت العوامل المساعدة على الخمج قبل العملية، وشمل الجزء الثالث على (٩) فقرات تضمّنت العوامل المساعدة على الالتهاب بعد العملية. ولغرض التأكد من مصداقية الاستمارة، عرضت على (٢٣) خبير في الاختصاص وقد حدد الثبات باستعمال معامل بيرسون وكان (r =٩٢)، وبطريقة المقابلة الشخصية مع عيّنة البحث.تمّ جمع المعلومات وقد أستعملَ التحليل الوصفي وكذلك التحليل الاستنتاجي في إيجاد النتائج.

النتائج: بيّنت النتائج وجود علاقة بين بعض المعلومات الديموغرافية مع بعض المواصفات قبل العملية الجراحية مثل (العمرمع الهيموكلوبين والأمراض المزمنة) كذلك (الجنس، التدخين، السمنة، المهنة) مع الهيموكلوبين وكذلك (التدخين مع السمنة). كذلك وجود علاقة بين الخصائص الديموغرافية وعوامل الالتهاب بعد العملية الجراحية.

التوصيات: أوصت الدراسة بإجراء دراسة أخرى تتضمن العوامل المساهمة في حدوث الالتهابات أثناء العملية الجراحية وكذلك إرشاد المرضى حول كيفيّة القيام بالنظافة الشخصية لتقليل مخاطر الالتهابات.

Abstract

Objectives: The study aims to assess some of the contributing factors to abdominal postoperative wound infection and to find out the relationship between postoperative wound infections and some socio-demographic characteristics such as age, gender, level of education, occupation and residential area.

Methodology: A descriptive study was carried out in Sulaimani Teaching Hospital (Kurdistan Region). The study has started from January 15th up to October 31th, 2009. To achieve the study objectives, a purposive "non probability" sample of (100) patients who have abdominal postoperative wound infection, Adult female and male patients who were admitted to Sulaimani Teaching Hospital was selected.
The data were collected through the utilization of a constructed questionnaire. It contained (25) items, which consisted of three parts: the first one consists of (8) items which included the demographic characteristics, the second part consists of (8) items which included preoperative factors to surgical site infection (SSI) and the third part consist of (9) items that included postoperative factors to (SSI). The content validity of the instrument was established through a panel of (23) expert. Reliability of the instrument was determined through the split-half approach (r=0.92).
Data were gathered through interview technique by using the questionnaire format and they were analyzed by the application of the descriptive and inferential statistical methods.

Results: The results of the study indicated that there is a significant relationship between some socio-demographic characteristics and preoperative factors (age with Hb, and chronic disease) (gender, cigarette smoking, obesity, occupation with Hb) (cigarette smoking, with obesity). Also, the results indicated that there is no significant relationship between socio-demographic characteristics and postoperative factors.

Recommendations: Based on the study results, the researchers recommend that a further study could be carried out to assess factors that contribute to wound infection during the operation to decrease rate of SSI, and guidance about hygiene to decrease risk of infection.

Keywords: Assessment; Contributing Factors; Postoperative; Abdominal Wound Infection

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Introduction

Infection is defined as a biologic assault by infectious organisms such as bacteria, parasites, or viruses. These agents can challenge the host defense mechanisms, because of the infectious agent's virulence or specific host defense weakness [(1)].

The invasion of organisms through tissues following a breakdown of local and systemic host defenses, leading to cellulitis, lymphangitis, abscess and bacteraemia. Surgical Site Infection (SSI) has always been a major complication of surgery and trauma and has been documented for 4000-5000 years [(2)]. It causes significant postoperative morbidity and mortality, prolongs hospital stay, and adds between 10% - 20% to hospital costs [(3)].

Wound infection is caused by exogenous or endogenous bacteria, and it is defined as one with bacterial concentrations greater than 10^{10} organisms /gram tissue [(4)].

Postoperative wound infections are categorized into three general categories: superficial, deep, and organ space [(5)].

Most postoperative SSIs are caused by bacteria include, staphylococcal, enterococcal, pseudomonal, and streptococcal species. Staphylococcus aureus is by far the most frequently identified organisms. Gram- positive cocci, as a group, are the most common cause of SSIs [(6)].

According to (Nandi, PL and Soundara, R) wounds are classified according to the likelihood of bacterial contamination to:

1- Clean
2- Clean-contaminated
3- Contaminated
4- Dirty

Factors that affect the incidence of post-operative wound infection include pre-existing illness, length of operation, wound class, and wound contamination. Other factors such as extremes of age, malignancy, metabolic diseases, malnutrition, immune suppression, cigarette smoking, remote site infection, and emergency procedure [(3)].

A wound culture is a diagnostic laboratory test in which microorganisms such as bacteria or fungi from an infected wound are grown in the laboratory on nutrient-enriched substance called media—then identified. The purpose of a wound culture is to isolate and identify bacteria or fungi causing an infection of the wound. Only then can antibiotics that will be effective in destroying the organism be identified [(7)].

Treating wound infections depends on the nature of the wound, degree of infection, and the bacteria responsible for the infection [(8)].

Methodology

A descriptive study was conducted in Sulaimani Teaching Hospital to assess the factors contributed to abdominal postoperative wound infection. The study was carried out from January 15th up to October 31th, 2009. A purposive "non probability" sample of (100) patients who have an abdominal postoperative wound infection, adult female and male patients who were admitted to Sulaimani Teaching Hospital was selected. For the purpose of data collection, a questionnaire was designed and constructed. It contained (25) items and consists of three parts: the first part consists of (8) items which include the demographic characteristics. The second part consists of (8) items that include preoperative factors to surgical site infection (SSI), and the third one consists of (9) items that include postoperative factors to (SSI). The content validity of the instrument was established through a panel of (23) experts. Reliability was determined by split-half approach

which was estimated as average (r=92). Data were collected from patients themselves and gathered, organized, and coded into computer files by using the statistical package of social science (SPSS).

Appropriate statistical means were used in the data analysis which includes descriptive statistics (frequencies, percentage, mean of scores). Correlation coefficient was calculated as following:

A score fore Always=3, Sometimes=2, and Never=1

A mean of score of less than 1.66 was considered low significant

More than1.66 and less than2.32 was considered moderate significant

More than 2.32–3 was considered high significant

Results:

Table 1. Patients' demographic characteristics

Age (Years)		**Frequency**	**Percent**
18-27 years		20	20
28-37 years		35	35
38-47 years		25	25
48-57 years		8	8
≥ 58 years		12	12
Total		100	100
Gender			
Female		78	78
Male		22	22
Total		100	100
Level of education			
Illiterate		42	42
Unable to read and write		38	38
Primary school graduate		11	11
Secondary school graduate		3	3.0
High institute graduate		6	6.0
Total		100	100
Occupation			
Employed	Government employee	18	18
	Free employed	8	8
Unemployed	Retired	7	7
	Housewife	67	67
Total		100	100

Table (1) shows the distribution of (100) patients with SSI, which indicates that similar percentage of them (60%) was accounted for those who are (28-47) years old, (78%) were

females, and about 80% had a low educational level (illiterate and unable to read and write). Approximately 67% are housewives.

Table 2. Mean of scores for items of preoperative factors with frequency, percentage and severity

List	Items	0		1		2		3		4		5		MS	Severity
		f	%	f	%	f	%	f	%	f	%	f	%		
1	Type of operation	21	21	67	67	12	12	-	-	-	-	-	-	.91	L
2	Length of pre-op hosp.	71	71	6	6.0	3	3.0	20	20	-	-	-	-	.72	L
3	Hemoglobin	2	2	20	20	61	61	17	17	-	-	-	-	1.93	M
4	WBC	94	94	6	6.0	-	-	-	-	-	-	-	-	0.06	L
5	Blood sugar	91	91	4	4.0	5	5.0	-	-	-	-	-	-	0.014	L
6	Smoking	80	80	20	20	-	-	-	-	-	-	-	-	0.02	L
7	Number of cigarette/day	79	79	7	7.0	5	5.0	9	9.0	-	-	-	-	0.04	L
8	Duration of smoking /day	79	79	7	7.0	5	5.0	9	9.0	-	-	-	-	0.44	L
9	Obesity	4	4.0	33	33	23	23	36	36	4	4.0	-	-	2.03	M
10	Hair removal technique	65	65	35	35	-	-	-	-	-	-	-	-	0.35	L
11	Time of hair removal	68	68	32	32	-	-	-	-	-	-	-	-	0.32	L
12	Bathing	37	37	63	63	-	-	-	-	-	-	-	-	.63	L
13	Therapeutic drug uses	62	62	2	2.0	2	2.0	3	3.0	20	20	11	11	1.5	M
14	Preoperative antibiotic	12	12	13	13	75	75	-	-	-	-	-	-	2.5	H
15	Chronic Disease	60	60	3	3.0	7	7.0	7	7.0	3	3.0	20	20	1.5	M

F= frequency; H=High; L=Low; M=Moderate; M.S=Mean of scores; %= Percent

Table (2) shows that the mean of score is of high level on item (14), moderate level on items (3, 9, 13, 15), and low level on the remaining items.

Table 3. Mean of scores for postoperative factors with frequency, percentage and severity

List	Item	0		1		2		3		4		5		MS	Severity
		f	%	f	%	f	%	f	%	f	%	f	%		
1	Length of post-op. Hosp	17	17	34	34	8	8.0	41	41	-	-	-	-	1.73	M
2	Mobilization	6	6.0	53	53	33	33	8	8.0	-	-	-	-	1.43	L
3	Cough	41	41	3	3.0	4	4.0	6	6.0	24	24	22	22	2.35	H
4	Vomiting	43	43	36	36	15	15	2	2.0	4	4.0	-	-	0.88	L
5	Bathing	51	51	3	3.0	4	4.0	42	42	-	-	-	-	1.37	L
6	Presence-of pain	25	25	75	75	-	-	-	-	-	-	-	-	0.75	L
7	Presence-of fever	42	42	58	58	-	-	-	-	-	-	-	-	0.58	L
8	Presence of drain	53	53	47	47	-	-	-	-	-	-	-	-	0.47	L
9	Presence of oozing	40	40	60	60	-	-	-	-	-	-	-	-	0.6	L
10	Presence of discharge	23	23	77	77	-	-	-	-	-	-	-	-	0.77	L
11	Hosp. change of dressing	54	54	46	46	-	-	-	-	-	-	-	-	0.46	L
12	Hosp.drain removal	64	64	36	36	-	-	-	-	-	-	-	-	0.36	L
13	Home-care dressing	61	61	39	39	-	-	-	-	-	-	-	-	0.39	L
14	Guidance of wound care	95	95	5	0.05	-	-	-	-	-	-	-	-	0.05	L
15	Surgical site infection	56	56	40	40	4	4.0	-	-	-	-	-	-	0.48	L
16	Wound swab test	74	74	14	14	12	12	-	-	-	-	-	-	0.38	L

F= frequency; H=High; L=Low; M=Moderate; M.S=Mean of scores; %= Percent

The finding of this table reveals that the mean of score is highly significant on item (3), of moderate level on item (1), and of low level at the remaining items.

Table 4. Correlation coefficient between some socio-demographic characteristics with preoperative factors of wound infection

		Spearman's rho														
		Type of Operation	Length of preoper. Hosp.	Hb	White Blood Cell	Fasting Blood sugar	Smoking	No. of cigarette /day	Duration of smoking /year	Obesity	Hair removal technique	Hair removal method	Bathe	Drug use	Preopera-tive Antibiotic	chronic diseases
Age	Correlation	-.287	.247	.268	.312	.343	.318	.212	.239	.097	-.233	-.237	-.145	.297	-.077	.513**
	Sig.(2-tailed)	.519	.628	.540	.619	.233	.327	.348	.183	.488	.462	.532	.427	.269	.522	.012
Gender	Correlation	-.334	-.2534	.378*	.262	.239	.498**	.582**	.499**	-.510**	.218	.218	-.232	.091	-.174	.115
	Sig.(2-tailed)	.234	.222	.010	.358	.318	.007	.006	.007	.005	.175	.175	.071	.484	.232	498
Level of education	Correlation	-.065	.192	.212	.218	.167	-.098	-.082	-.152	-.020	.178	.208	.088	-.021	-.1228	-.203
	Sig.(2-tailed)	.590	.316	.419	.368	.086	.511	.627	.5492	.910	.333	.399	.547	.914	.300	.270
Occupation	Correlation	.188	-.098	-.397*	-.141	-.072	-.413**	-.488**	-.459**	.388*	-.066	-.066	.187	-.011	-.017	-.060
	Sig.(2-tailed)	.361	.617	.012	.381	.709	.003	.005	.003	.021	.684	.684	.128	.948	.968	.719
Residence area	Correlation	-.010	-.014	.091	-.141	-.258	.255	.295	.294	.028	-.038	-.054	.154	-.134	-.011	-.313
	Sig.(2-tailed)	.880	.782	.566	.389	.108	.134	.122	.168	.815	.812	.912	.344	.418	.934	.129

Table (4) reveals that there is a significant relation between some socio-demographic characteristics and some preoperative factors.

Table 5. Correlation coefficient between some socio-demographic characteristics and postoperative factors of wound infection

		Spearman's rho																	
		Length of post-oerati-e hosp.	Mobil-ization	Cou gh	Vomiting	Bathe	Patient complain presence of:					wound-care in hospital			home-health-care			Surgical Site infection	wound swab test
							Pain	fever	Drain	Bleedi ng	Discharg e	change of Dressing	Remove of Drain	Remove of suture	change of dressing	Guidanc e about Wound care	Remov e of suture		
Age	Correla-tion	.211	.258	-.098	.171	.073	.049	.140	.287	-.084	.177	.109	.225	.082	-.111	-.212	.273	.053	.126
	Sig.(2-tailed)	.385	.213	.534	.317	.504	.776	.390	.217	.464	.327	.492	.194	.544	.404	.153	.182	.797	.516
Gen-der	Correla-tion	.211	.093	-.198	.055	-.080	-.280	.029	-.085	.281	-.149	.202	.029	.039	.001	-.080	-.025	-.314	-.144
	Sig.(2-tailed)	.220	.554	.414	.648	.625	.077	.810	.624	.089	.304	.291	.822	.883	1.100	.643	.879	.088	.598
Level of educ-ation	Correla-tion	.014	-.204	.084	-.077	-.187	-.183	-.129	.088	.169	-.249	-.067	.017	.019	.212	.082	-.288	.126	-.089
	Sig.(2-tailed)	.874	.218	.639	.697	.336	.233	.337	.493	.374	.129	.819	.966	.999	.941	.619	.072	.361	.632
Occu-pation	Correla-tion	-.096	-.084	.075	-.051	.096	.252	-.051	.099	-.161	.182	-.222	-.046	.063	.033	.099	.0918.475	.316*	.219
	Sig.(2-tailed)	.581	.596	.548	.983	.585	.119	.656	.555	.421	.241	.088	.878	.698	.247	.565		.048	.147
Resi-dent area	Correla-tion	.039	-.087	-.136	-.129	-.187	-.039	-.188	-.019	.085	-.233	.133	-.060	-.277	.059	-.099	.141	-.082	-.153
	Sig.(2-tailed)	.715	.527	.322	.363	.410	.454	.343	.854	.525	.188	.597	.661	.193	.642	.445	.388	.472	.320

P< 0.05

Table (5) reveals that there is no significant relation among some socio-demographic characteristics and postoperative factors

Discussion

Through the course of the present study, it has been noticed that the age of the highest percent of (100) patients of SSI is (60 %) on age (28-47) years old (Table 1). The finding is contrary to an impressive study which compared patient age of 65 years was significantly associated with an increased risk of SSI, with patient age <65 years, and it has found that the infection risk is increased about 1 percent per year between the ages of 17 to 65 years, but then decreased about 1 percent per year after age 65 [(9)].

In relation to gender, the majority of the study sample (78%) was females and (22%) was male. There is no previous study or literature that reported the effect of gender on SSI. No significant correlation could be found between Gender and SSI rate [(10)].

Regarding to their educational status, the majority of the sample was illiterate and unable to read and write (80%). Illiteracy, in general (who are unable to read and write), and low-health literacy (low-health education) specifically, affects an individual's ability to access health services and make effective decisions about their health care [(11)].

The majority of the sample was unemployed; housewives (67%). Female workers had a better health status than housewives, although this pattern was more consistent for women of low educational level [(12)].

Regarding (Table 2), data analysis revealed that the mean of scores was of high level in item of preoperative antibiotic, moderate level in items of hemoglobin, obesity, therapeutic drug use, and chronic disease, and low level in the remaining items. ICHE, (2008) measured the percentage of procedures in which antimicrobial prophylaxis was appropriately provided to decrease SSI. Appropriateness includes (1) correct type of the drug, (2) start of administration of the agent within 1 hour before incision (2 hours allowed for vancomycin and fluoroquinolones) and (3) discontinuation of the agent within 24 hours after surgery [(13)].

Relative to (Table 3), it showed that the mean of scored was highly significant in item (3), moderately significant in items of length of postoperative hospitalization, and bathing, and of low significance at the remaining items. Postoperative coughing also leads to high frequency of a burst abdomen. It usually occurs because of respiratory tract infection, possibly post-anesthesia could increase intra-abdominal pressure. Thus, tension over the freshly sutured wound can cause it to burst. In the same way, postoperative abdominal distention also increases tension on the freshly stitched wound leading to burst [(14)].

Tables (4 and 5) revealed that there was a significant relation between some socio-demographic characteristics and preoperative factors, while there was no significant relation among some socio-demographic characteristics and postoperative factors.

Conclusion

Most of the patients had more than one predisposing factor responsible for the development of wound infection such as preoperative preparation (bathe, antibiotics), duration of surgery, postoperative cough, and postoperative wound care.

Recommendations

1- Further studies should be carried out to assess factors that contribute to wound infection during the operation to decrease rate of SSI.

2- Guidance about hygiene, (pre and postoperative bathing) for patients should be given to decrease risk of infection.

3-The patient should be admitted to the theatre one hour before the operation for taking appropriate and timely preoperative antibiotics.
4- Training courses for nurses to avoid and limit the factors affect on wound infection.

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