Original Research Article

Knowledge and Awareness about Wound Infection after Surgery among Population in Saudi Arabia

ABSTRACT

Background: Surgical site infections (SSI) continue to be one of the most common post-operative consequences following surgery, it is an infection that develops in the incision made during a surgical operation is a significant cause of hospital morbidity, increasing ICU admission rates, hospital readmission, lengthening total hospital stay and tripling death rates. To assess knowledge and awareness about wound infection after surgery among population in Saudi Arabia.

Materials and Method: A cross-sectional study was conduct in Saudi Arabia during July to December 2021, we distributed our questionnaire in Kingdome of Saudi Arabia, the participants involving general population adult living in Saudi (>15). The sample size was 3357 participants. The sample size was estimated using the Qualtrics calculator with a confidence level of 95%. Our inclusion criteria were Age,15 years old and older, residency in Saudi Arabia, Male and female, Saudi and non-Saudi, agree to participate. Analyzes was done by using the "Microsoft Office Excel Software" (2019) for Windows was used to enter data on the computer. The data was then statistically evaluated using the SPSS program, version 23.

Results: 63.8% of the participants were females. More than half of the respondents were younger than 25 years old. Most of the respondents (9.1%) had a university degree or higher education. Regards area of residence, 10.1% lived in Riyadh, 14.0% in Medina. The prevalence of SSI was 8.0%. There are 50.2% of respondents have reported that times being admitted to hospital were 5 or less, 53.9% have denied history of undergoing other previous surgeries. Also, 95.5% of respondents denied having a hospital acquired infection besides surgical site infection.

Conclusion: SSI is one of the commonest healthcare related infections which have a great impact on patient morbidity and mortality. The causes of SSIs are multi-factorial. The antimicrobial regimen isn't much more effective than the persuasive strategy in controlling antimicrobial use in the long-term. Moreover, in many settings, there may be inadequate personnel for a restrictive approach and restriction strategies are unable to consider the appropriateness of use of non-restricted antibiotics, which forms the vast majority of antibiotics used in hospital.

Keywords: Wound Infection, Surgical site infections, consequences following surgery

1. INTRODUCTION

Infection at the surgical site (SSI), previously known as postoperative wound infection, occurs up to a month after surgical procedure if there was not prosthetic is planted and up to

a year if the patient undergoes a surgical procedure with a prosthetic implant [1]. Surgical site infections (SSI) rank among the most common hospital-acquired infections with an estimated prevalence of 2-11 percent for all surgical procedures. SSIs are associated with higher mortality, treatments costs, and longer hospital stays. They may also leave patients with chronic health problems [2].

A study published in 2019 was conducting in Saudi Arabia at King Abdulaziz University Jeddah found the incidence of Surgical Site Infection was 35 percent for open versus 4 percent for laparoscopic, for 337 patients were included in the study [3]. other Study in Saudi Arabia at King Khalid University Hospital, Riyadh found the Raye of infection was 6.8%. diabetic patients and emergency operation Compared to their peers, they have far more higher infection rates [4]. The prevalence of Health care–associated infections (HCAIs) was 7.59 percent and 14.5% of this infection was associated with SSIs in study done among 75,694 patients in Republic of Ireland, England, Wales and Northern Ireland, SSIs are among the most preventable HCAIs, according to the World Health Organization and the Centers for Disease Control and Prevention (CDC) [5]. In Europe SSIs prevalence 21.6% that's mean SSIs become now the most common hospital-acquired infection [6]. In 2017, research has been conducted on reducing surgical site infection with negative therapy and the result has shown 71 patients, comprising 33 in an Experimental Group and 38 in the Control Group, were included in this study between May 2014 and December 2015. There were 10 incision complications with 14.1 percent incidence, all superficial infections. the surgical site infection incidence was statistically different between the experimental and control groups (3.0 percent vs 23.7 percent, $p = 0.031$). That is mean surgical site infection can be reduced by negative therapy [7]. There is research was conducted in 2016–2017 at the Department of General Surgery, IQ City Medical College, Durgapur, West Bengal, with 250 patients admitted to this department. Most patients (82 percent) believed that the SSI risk factor was low immune system, 42 percent thought that malnutrition was a danger, and 63 percent agreed that the high number of patients were more vulnerable to SSI. The majority of the patients (95%) said that doctors are accountable for SSI pre-venations, 93% thought it was possible to avoid SSI using clean clothing [8].

Due to no comprehensive study has been done about this topic on Saudi Arabia and Recent studies presented certain limitations, such as small sample sizes, substantial variations in the inclusion criteria, and marked differences in patients baseline characteristics. Therefore, more evidence is still needed to define more precisely the risk factors for developing SSI also A descriptive study in France revealed that 80% of patients stated that during their hospitalization they had received no information regarding SSI.

The aim of this study is to assess knowledge and awareness about wound infection after surgery among population in Saudi Arabia.

2. MATERIAL AND METHODS

A cross-sectional study was conduct in Saudi Arabia during July to December 2021, we distributed our questionnaire in Kingdome of Saudi Arabia, the participants involving general population adult living in Saudi (>15). The sample size was 3357 participants. Sample size was estimated using the Qualtrics calculator with a confidence level of 95. The inclusion criteria was Age,15 years old and older, residency in Saudi Arabia, Male and female, Saudi and non-Saudi, agree to participate. and Our Exclusion criteria was Under than 15 years old, Not living in Saudi Arabia, disagree to participate, Data was collected by using a questionnaire. The questionnaire was be validated by consultants who are expert in questionnaire construction (e.g., general surgery consultant and statistician). The questionnaire has 5 categories: population, SSI issues, treatment knowledge questions,

protection knowledge questions. Also, we was asked if they had previous surgery and what is their information about SSI. Medical students was collected the information using google form. Analyzes was done by using the “Microsoft Office Excel Software” (2019) for Windows was used to enter data on the computer. The data was then statistically evaluated using the SPSS program, version 23

3. RESULTS AND DISCUSSION

A total of 3357, 63.8% of the participants were females. More than half of the respondents were younger than 25 years old. Most of the respondents (9.1%) had a university degree or higher education. Regards area of residence, 10.1% lived in Riyadh, 14.0% in Medina. (Table 1)

Table (1): Socio-demographic characteristics, smoking status & history of chronic illness among the participants, KSA, 2021 (N=3357).

Variables	Frequency (N=3357)	Percent (%)
Sex		
Male	1216	36.2
Female	2141	63.8
Age groups		
Less than 25 Years	1837	54.7
25-34 years	596	17.8
35-44 years	510	15.2
45 years or older	414	12.3
Educational level		
Secondary school or lower	300	8.9
University or higher	3057	91.1
Area of residence		
Riyadh region	339	10.1
Medina region	469	14.0
Makkah region	801	23.9
Eastern region	261	7.8
Jouf region	32	1.0
Northern border region	8	.2
Qassim region	72	2.1
Jazan region	65	1.9
Najran region	354	10.5
Tabuk region	513	15.3
Hail region	443	13.2
Type of residence		
City	2852	85.0
Villages	505	15.0
Smoking status		
Active smoker	480	14.3
Not	2877	85.7
History of chronic illness		
Yes	536	16.0
No	2821	84.0

Table (2): Shows times being admitted to hospital, history of undergoing surgery, prevalence of SSI and questions about knowledge regards SSI. The prevalence of SSI was 8.0%. There are 50.2% of respondents have reported that times being admitted to hospital were 5 or less, 53.9% have denied history of undergoing other previous surgeries. Also, 95.5% of respondents denied having a hospital acquired infection besides surgical site infection. There are 93.4% of respondents have reported that times have the health care workers discussed SSI with them were only one time or none with 12.7% reported that the duration of the session was less than 5 minutes, there are 76.9 of respondents have no knowledge about SSI, and 67.9% have denied receiving information about SSI from outside the hospital setting, there are 89.9% thought that it is possible to enhance the knowledge about SSI, and there are 65.1% being not satisfied with their knowledge about SSI.

Table (2): Times being admitted to hospital, history of undergoing surgery, and questions about knowledge regards SSI, KSA, 2021 (N=3357).

Variables	Frequency (N=3357)	Percent (%)
Times being admitted to hospital		
• 5 time or less	1686	50.2
• 6 or more	1671	49.8
History of other previous surgeries		
• Yes	1548	46.1
• No	1809	53.9
If yes, within last 2 years (N=1548)		
• Yes	543	35.1
• No	1653	64.9
having a hospital acquired infection besides surgical site infection		
• Yes	150	4.5
• No	3207	95.5
History of SSI		
• Yes	270	8.0
• No	3087	92.0
If yes, within last 2 years (N=270)		
• Yes	135	50.0
• No	135	50.0
Times have the health care workers discussed SSI with you		
• One time or none	3135	93.4
• Two or more times	222	6.6
For how long have the health care workers discussed SSI with you (in minutes)		
• I haven't been discussed with	2733	81.4
• Less than (5) minutes	427	12.7
• Between five (5) and fifteen (15) minutes	197	5.9

Knowing medical facts about SSI		
• Yes	774	23.1
• No	2583	76.9
Receiving information about SSI from outside the hospital setting		
• Yes	1078	32.1
• No	2279	67.9
If yes, sources of information (N=1078)		
• Work	212	19.7
• The clinic	104	9.6
• Newspaper/magazine	35	3.2
• Tv	38	3.5
• Internet	529	49.1
Thinking it is possible to enhance the knowledge about SSI		
• Yes	3017	89.9
• No	340	10.1
Confidence of knowledge about SSI		
• Yes	1172	34.9
• No	2185	65.1

Table (3): Illustrates the relation between participants being satisfied with their knowledge about SSI and sociodemographic characteristics, risk factors of SSI, and history of SSI among the studied population. There was a significant relation between participants being satisfied with their knowledge about SSI and times have the health care workers discussed SSI with them, length of discussing SSI with the health care worker (in minutes), and history of SSI. On the other hand, it shows insignificant relation with gender, age group, residence type, educational level, smoking status, and history of chronic illness.

Table (3): Relation between participants being satisfied with their knowledge about SSI and sociodemographic characteristics, risk factors of SSI, and history of SSI among the studied population, KSA, 2021 (N=3357).

		Confidence of knowledge about SSI		**Total (N=3357)**	**P value**
		Yes (N=1172)	**No (N=2185)**		
Gender	Male	407	809	1216	0.100
		34.7%	37.0%	36.2%	
	Female	765	1376	2141	
		65.3%	63.0%	63.8%	
Age group	Less than 25 Years	649	1188	1837	0.119
		55.4%	54.4%	54.7%	
	25-34 years	221	375	596	
		18.9%	17.2%	17.8%	
	35-44 years	178	332	510	
		15.2%	15.2%	15.2%	
	45 years or more	124	290	414	
		10.6%	13.3%	12.3%	
Residence type	Villages	178	327	505	0.450
		15.2%	15.0%	15.0%	
	Cities	994	1858	2852	
		84.8%	85.0%	85.0%	
Educational level	Secondary school or lower	101	199	300	0.342
		8.6%	9.1%	8.9%	

	University or higher	1071	1986	3057	
		91.4%	90.9%	91.1%	
Smoking status	Active smoker	170	310	480	0.420
		14.5%	14.2%	14.3%	
	Not	1002	1875	2877	
		85.5%	85.8%	85.7%	
History of chronic illness	Yes	192	344	536	0.332
		16.4%	15.7%	16.0%	
	No	980	1841	2821	
		83.6%	84.3%	84.0%	
Number of times health care workers discussed SSI with them	One or none	1032	2103	3135	0.0001
		88.1%	96.2%	93.4%	
	Two or more	140	82	222	
		11.9%	3.8%	6.6%	
length of discussing SSI with the health care worker	Haven't been discussed with	836	1897	2733	0.0001
		71.3%	86.8%	81.4%	
	Less than (5) minutes	202	225	427	
		17.2%	10.3%	12.7%	
	Between five (5) and fifteen (15) minutes	134	63	197	
		11.4%	2.9%	5.9%	
History of SSI	Yes	131	139	270	0.0001
		11.2%	6.4%	8.0%	
	No	1041	2046	3087	
		88.8%	93.6%	92.0%	

Table (4): Illustrates the relationship between history of SSI and sociodemographic characteristics, smoking status, history of chronic illness, and patients being satisfied with their knowledge about SSI.

		History of SSI		**Total (N=3357)**	**P value**
		Yes (N=270)	**No (N=3087)**		
Gender	Male	105	1111	1216	0.188
		38.9%	36.0%	36.2%	
	Female	165	1976	2141	
		61.1%	64.0%	63.8%	
Age group	Less than 25 Years	158	1679	1837	0.132
		58.5%	54.4%	54.7%	
	25-34 years	43	553	596	
		15.9%	17.9%	17.8%	
	35-44 years	30	480	510	
		11.1%	15.5%	15.2%	
	45 years or more	39	375	414	
		14.4%	12.1%	12.3%	
Residence type	Villages	41	464	505	0.501
		15.2%	15.0%	15.0%	
	Cities	229	2623	2852	
		84.8%	85.0%	85.0%	
Educational level	Secondary school or lower	26	274	300	0.371
		9.6%	8.9%	8.9%	

	University or higher	244	2813	3057	
		90.4%	91.1%	91.1%	
Smoking status	Active smoker	47	433	480	0.079
		17.4%	14.0%	14.3%	
	Not	223	2654	2877	
		82.6%	86.0%	85.7%	
History of chronic illness	Yes	58	478	536	0.008
		21.5%	15.5%	16.0%	
	No	212	2609	2821	
		78.5%	84.5%	84.0%	
Confidence of knowledge about SSI	Yes	131	1041	1172	0.0001
		48.5%	33.7%	34.9%	
	No	139	2046	2185	
		51.5%	66.3%	65.1%	

Table (4): Shows the relationship between history of SSI and sociodemographic characteristics, smoking status, history of chronic illness, and patients being satisfied with their knowledge about SSI. There was a significant relation between history of SSI with history of chronic illness and confidence of knowledge about SSI. There was no significant relation between history of SSI with gender, age group, residence type, educational level, and smoking status.

Discussion:

SSIs occur as a result of pathogens gaining access to surgical wounds either hematogenously, through drains, or through slowly healing wounds due to systemic anticoagulation or other factors, particularly in the setting of high compliance with standard perioperative antibiotic prophylaxis[9] . Despite nearly 2 centuries of medical progress, the management of surgical infection remains a pressing concern, and SSIs continue to be a leading component of nosocomial morbidity and mortality. The causes of SSIs are multi-factorial, recognized risk factors include the length of hospital stay, smoking, obesity, patient co-morbidities, duration and complexity of the surgery [10].
The aim of the present study was to assess knowledge and awareness about wound infection after surgery among patients in Saudi Arabia.
Among our participants who undergone surgery, the prevalence of SSI was 8.0%. SSI varies across surgical procedures and conditions with a range of 0.1–50.4% as reported in a 2017-systematic review [11]. A prevalence survey in the UK National Health Service (NHS) indicated that approximately 8% of all patients (5743 out of 75,694 patients over a four-month period) admitted to hospital suffered healthcare-associated infections, with 15% of these infections being SSIs, and similar estimates have been found in France[12]. In Africa, the impact of SSIs ranged from 6.8–26% with predominance in the general surgeries [11].

Our results showed that there is no significant relationship between age group and knowledge about SSI (p value = 0.119). Another study conducted in Ethiopia that did multivariate logistic regression of factors associated with knowledge about SSI prevention

activities among nurses found that there is not significant relation between age group and being knowledgeable about SSI, which is comparable to our results [13].

Although smoking is a documented independent risk factor for surgical site infections as smoking causes endothelial dysfunction, inflammation, and progression of atherothrombotic disease[14], our results showed no significant relation between smoking and occurrence of SSI. This might be caused by that the exposure variable (smoking) was not quantified, and we took only current smokers at the time of implant assessment into account. So, the time between smoking ceased and the inclusion is unknown among non-smokers. The prevalence of active smoking in our study was 14.3%, which is less than Saudi Arabia average of 17.5%[15].

Our study reports that there is lack of awareness programs from the health care workers, more than 81% of the patient reports that their health care providers never discussed the SSIs during their hospital stay. Moreover, among those who were discussed by their health care workers, 58% stated that it took only less than 5 minutes. In a similar study that examined patients' awareness and understanding of SSI risks and consequences, it showed that more than 40% of the patient reports that the health care workers never discussed the SSIs during their hospital stay. These findings are more disturbing because 86% of the patients among the SSI prevention discussed category stated that hospital workers took only less than 5 minutes during their entire hospitalization for the discussion regarding the SSIs [16].

Gender was not significantly related to knowledge about SSI in our findings. Another study had opposite findings and revealed that sex of the study participants was significantly associated with knowledge about prevention of surgical site infection. Male participants were found to be three times more likely to be knowledgeable about prevention of surgical site infection when compared with female participants [13].

Regarding risk factors among patients and its relation with their knowledge about SSI, our results showed an insignificant relationship between smoking status and history of chronic illness with knowledge about SSI. There also was a significant relation between number of times health care workers discussed SSI with the patients and their confidence of knowledge about SSI. This shows how important patient engagement is. It also was stated that patient engagement in preventing SSI might be an effective and useful strategy adding to the already existent surgical site care bundles[17].

4. CONCLUSION

SSI is one of the commonest healthcare related infections which have a great impact on patient morbidity and mortality. The causes of SSIs are multi-factorial. The antimicrobial regimen isn't much more effective than the persuasive strategy in controlling antimicrobial use in the long-term. Moreover, in many settings, there may be inadequate personnel for a restrictive approach and restriction strategies are unable to consider the appropriateness of use of non-restricted antibiotics, which forms the vast majority of antibiotics used in hospital. Patients have a crucial role in the management and prevention of SSIs. Hence, better strategies are needed to promote patient awareness of

and engagement in reducing SSI risks and complications and promoting SSI preventive measures.

Consent

Informed consent was obtained from all participants included in the study.

Ethical approval

Ethical approval was obtained from Research Ethics Committee at Specialized Medical Center hospital with IRB no (H-01-R-056).

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