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SURGICAL SITE INFECTION AMONG SAUDI POPULATION IN SAUDI ARABIA: KNOWLEDGE AND AWARENESS ASSESSMENT

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Abstract:

Background: Infections that are established 30 days after operation or contained within a year among people who have implants at or near the surgical site are referred to as surgical site infections (SSIs). About 2% of surgical complications are considered surgical site infections, and they present about 20% of healthcare-related infections. Previous studies discovered that there are not enough levels of knowledge and awareness regarding surgical site infections in Saudi Arabia. Therefore, determining knowledge and awareness of SSI can be helpful in developing preventive measures that will reduce complications, hospital stays, and readmission rates that are associated with surgical site infections (SSI). This study aimed to assess the knowledge level among the Saudi population About the risk of Surgical Site Infection.

Methods: A cross-sectional study was conducted among the Saudi population in 2024. The questionnaire was covering socio-demographic information, clinical characteristics, and knowledge and awareness of SSIs. Data analysis was performed using SPSS to determine the level of knowledge and awareness among the population.

Results: Regarding knowledge and awareness levels of surgical site infections (SSIs), only 37.2% out of 575 participants correctly defined SSIs as infections of both skin and deep organs, while 61.6% had never heard of them. A majority of participants (91%) believe SSIs are preventable, with 41.6% citing wound cleanliness and 38.2% emphasizing hand hygiene as key measures; however, only 3.8% exhibited high knowledge and 19.0% had high awareness levels. Notably, 84.7% had not received any educational materials about SSIs, and 81.4% reported that healthcare workers did not discuss SSIs with them prior to surgery. Despite this lack of awareness, a considerable 94.8% affirmed SSIs can be treated, recognizing interventions like drainage and debridement as important.

Conclusion: The study highlighted a critical gap in awareness and knowledge of surgical site infections (SSIs) among the Saudi population, the findings indicate that a substantial majority had not received

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adequate educational resources on SSIs or were engaged in discussions concerning preventive measures prior to surgery. Given the significant implications of SSIs on patient outcomes, healthcare costs, and overall surgical morbidity, there is an urgent need for targeted community-based education programs. Such initiatives should focus on increasing awareness and understanding of SSIs, thereby empowering patients to contribute actively to their own surgical care and potentially reducing the incidence of these infections in the future.

Keywords: surgical site infection, knowledge, awareness, SSI, surgical wound infection, infection, cross-sectional study.

Introduction:

The term "surgical site infection" has replaced the older term "surgical wound infection." The US Centers for Disease Control and Prevention (CDC) introduced the name SSI in 1992 [1]. Infections that occur 30 days after an operation or contained within a year among people who have implants at or near the surgical site are referred to as surgical site infections (SSIs) [2]. The infection becomes harder to prevent by procedures that disrupt the natural defenses of the skin towards infection [3]. The frequency of SSI can provide insight into the performance of the staff and the facility. Considering its importance and financial impact, it is regarded as one of the undesirable results [4].

About 2% of surgical complications are considered surgical site infections, and it presents about 20% of healthcare-related infections [5]. It has been seen to be rising in low-income nations, with an estimated global frequency of 0.5% to 3%, and SSI being the most prevalent healthcare-associated infections [6]. SSIs are linked to extended postoperative illness and significant extra healthcare expenses, making them a critical issue for surgical teams [7]. Recent studies on patients having orthopedic or cardiac surgery indicate that nasal colonization by Staphylococcus aureus, particularly the methicillin-resistant strain, can increase the risk of developing an SSI after surgery [8]. In addition to the definition, one sign or symptom should present (as purulent discharge, signs of inflammation, documentation of SSI from a professional, surgeon's purposeful opening of the incision, organism obtained by aseptic acquisition of culture, abscess, or other infection-related symptoms during testing, a surgical procedure, or histological results) [9].

A cross-sectional study was conducted on the general population of Makkah region, Saudi Arabia, in 2023 and found that the majority of the participants had average awareness and knowledge about wound care. However, 27.5% of respondents demonstrated inadequate knowledge, suggesting the requirement of community-based education programs to increase understanding of the details and proper handling of wound care. More extensive and precise information in this regard would be possible with the completion of research assessing the general public's knowledge and perceptions of wound care in Saudi Arabia [10]. In 2023, on the public of Jazan region, Saudi Arabia. A cross-sectional observational study was conducted to assess the knowledge, attitude, and practices toward surgical wound and healing discovered that the study's participants possessed a good general understanding of surgical wounds, but they lacked specific knowledge about wound care and surgical site infections, so only 17% demonstrated a high level of knowledge regarding surgical site infection and wound care, the only significant predictor of possessing a high level of knowledge regarding surgical site infection (SSI) and wound care was being a medical student [11].

At King Abdulaziz University Hospital in Jeddah, Saudi Arabia, in 2018 A hospital-based cross-sectional study was conducted to assess the awareness and knowledge about SSI and wound infection risks at the Department of Surgery, it found that just 6.7% of doctors had a good understanding, hence the study advocates improving the level of awareness and knowledge of SSI among medical interns,

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residents, and specialists by giving more seminars and workshops [12]. To evaluate of awareness and knowledge regarding surgical site infections in Riyadh city hospitals, Saudi Arabia, in 2022. A cross-sectional hospital-based study was conducted and discovered that half of the study subjects had moderate to low levels of comprehension and understanding regarding surgical site infection; the researchers suggest that this would be improved by providing additional activities and programs [13].
Due to the significant impact of patient education on lowering complications, hospital stays, and readmission rates, a study on the general public's knowledge and awareness of surgical site infections (SSI) is being done. Also, to ascertain the patient's degree of awareness and knowledge to improve the patient's education of SSI symptoms, preventive measures, and postoperative treatment; additionally, the previous articles conducted in Saudi Arabia had a small sample size and a variation in results.
In this survey-based study, the researchers targeted to assess knowledge and awareness of the Saudi population regarding surgical site infection.

Methodology:

Study design and Setting:

A community-based observational analytical cross-sectional study was conducted in Saudi Arabia. Which is quick, feasible, and helpful for knowledge assessment. The study population consisted of individuals who live in Saudi Arabia, participants were recruited when the questionnaire was administered during the period between July to November 2024.

Sample size:

Using a sample size calculator, the sample size was established. Raosoft (Raosof Inc., USA) is a product. The minimum sample size has been determined to be 377 when a 95% confidence interval and a 5% margin of error were taken into account. Nevertheless, taking into account the possibility of missing data, we expanded the number of participants to 575.

Inclusion and Exclusion criteria:

The Inclusion criteria we used to collect our sample according to is being aged 18 years and older, living in Saudi Arabia, willing to participate in the study. While, the exclusion criteria we used is to exclude individuals who cannot read or understand Arabic or English, individuals who do not provide informed consent, Individuals younger than 18 years, and individuals with cognitive impairment that might affect their ability to understand and respond to the survey.

Method for data collection, instrument and score system:

The data in this study was collected using structured, validated, and reliable questionnaires from previous studies [14, 15]. These questionnaires, designed to be inclusive and comprehensive, served as our study tool. The questionnaire was prepared using the Google Forms website and distributed randomly among the general population through data collectors in Saudi Arabia using various social media platforms. The final version was administered to participants, and consent was obtained prior to participating. The questionnaire is organized into four sections.
The first section covers socio-demographic information such as gender, marital status, age, residential location, type of resident, educational qualification, nature of work, income, and smoking. The second section focuses on clinical characteristics and includes questions about the patient's admission history, hospital stay duration, reason for admission, and history of surgical site infection. The third section involved knowledge questions consisting of eight items. The fourth and last section involved awareness questions that consisted of six items. The knowledge and awareness items have a combination of true-false and multiple-choice questions.

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Scoring system:
In the questionnaire used in our study, we measured awareness and knowledge through 28 statements divided between all the parts of the questionnaire and the personal data (Socio-demographic, Clinical characteristics, Knowledge level, and awareness level). The correct answer is counted as 1 point, incorrect answers are counted as 0, and the questioner's total points are 38 if all questions are answered completely correctly.
The socio-demographic part contains 9 statements, and their total point is 0. The part of Clinical characteristics contains 4 statements, and their total points are 0. The part of the Knowledge level contains 8 statements, and their total capture is 0-29. At last, the awareness part contains 6 statements and their total capture is 0-9.
Below, we wrote the classification of the awareness and knowledge levels according to Bloom's cut-off points which is ≥80% considered a high level, 80%-60% considered a moderate level, ≤60% considered a low level.
About our questions, ≥ 23 Points in the score is considered a high level, 17 –22 Points in the score is considered a moderate level, and ≤ 16 Points in the score is considered a low level. While the awareness, ≥ 7 Points in the score is considered a high level, 6 –5 Points in the score is considered a moderate level, and ≤ 4 Points in the score is considered a low level.
Pilot test:
The researcher checked the feasibility and simplicity of the questionnaire by taking 20 responses from the population, and excluding the results from the final data before analysis.
Analyzes and entry method:
The "Microsoft Office Excel Software" (2019) for Windows was used to enter data into the computer and do the analysis. After that, the data was statistically assessed using SPSS version 29.

Results:

Table (1) displays various demographic parameters of the participants with a total number of (575). A majority of participants (57.6%) are female, with a predominant age group of 20 to 22 years (28%). Notably, a substantial portion (65.2%) identifies as single, highlighting a youthful demographic trend. Geographically, the Southern region hosts the largest number of respondents (28%), while the majority reside in urban areas (84.7%). Educational attainment is predominantly high, with 56% holding a bachelor's degree, indicative of a well-educated participant pool. Occupationally, students make up the largest group (51.5%), reflecting the focus on younger individuals. Furthermore, the data shows that 87.3% of participants are non-smokers, which may correlate with health-related factors. Monthly income data reveals that 44% earn less than 1000 SAR, suggesting potential economic challenges.

Table (1): Sociodemographic characteristics of participants (n=575)

Parameter		***No.***	***Percent (%)***
Age	Less than 20 years old	93	16.2
	20 to 22	161	28.0
	23 to 24	68	11.8
	25 to 30	88	15.3
	31 to 40	77	13.4
	more than 40	88	15.3
Gender	Female	331	57.6
	Male	244	42.4

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Marital status	Single	375	65.2
	Married	184	32.0
	Divorced	10	1.7
	Widowed	6	1.0
Region of residence	Northern region	88	15.3
	Southern region	161	28.0
	Central region	131	22.8
	Eastern region	70	12.2
	Western region	125	21.7
Place of residence	Village	88	15.3
	City	487	84.7
Educational level	Primary school	3	.5
	Middle school	15	2.6
	High school	195	33.9
	Bachelor's degree	322	56.0
	Postgraduate degree	31	5.4
	Uneducated	9	1.6
Occupational status	Student	296	51.5
	Health sector employee	43	7.5
	Non health sector employee	76	13.2
	Unemployed	105	18.3
	Freelancer	33	5.7
	Retired	22	3.8
Smoker	No	502	87.3
	Yes	56	9.7
	Ex-smoker	17	3.0
Monthly income	Less than 1000 SAR	253	44.0
	1000 to 5000	130	22.6
	5001 to 10000	81	14.1
	10001 to 15000	48	8.3
	More than 15000 SAR	63	11.0

As shows in figure 1, the data on participants' understanding of surgical site infections (SSI) reveals varying levels of awareness regarding its definition. A significant portion, 37.2% (214 respondents), correctly identifies SSI as an infection of both skin and deep organs at the surgical site. Additionally, 33.9% (195 respondents) associate SSI with infection of the skin where the incision was made. However, only 5.4% (31 respondents) recognize it as an infection of deep organs, and 23.5% (135 respondents) describe it as redness and pain at the suture site.

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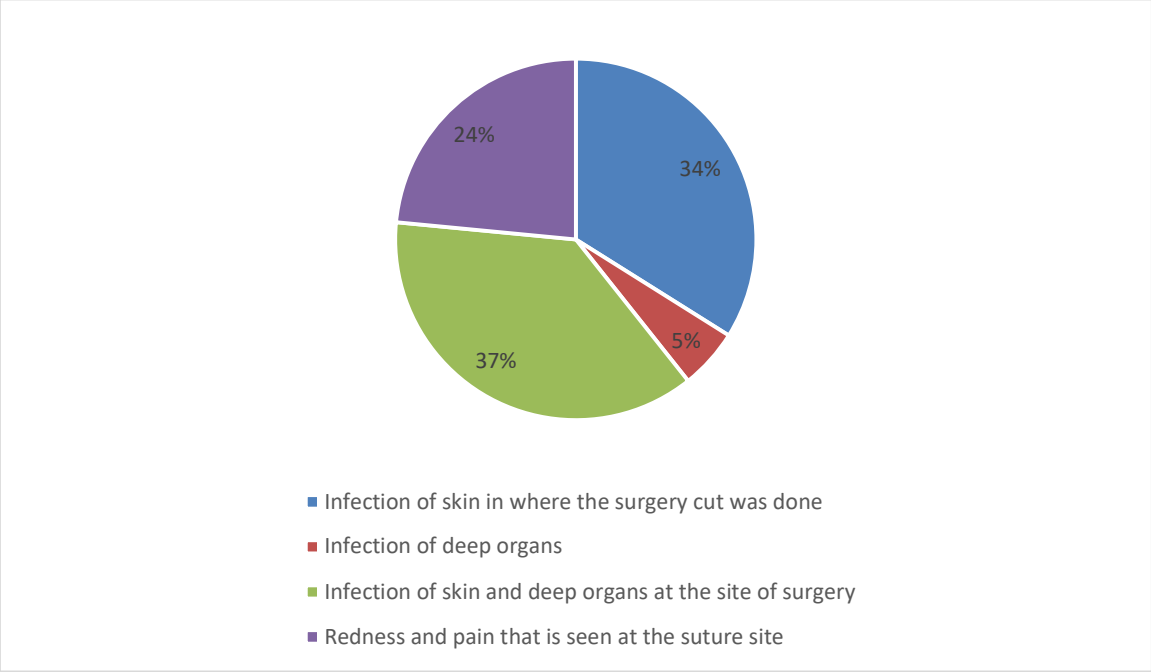
Figure (1): Illustrates definition of SSI among participants.



As illustrated in table (2), the clinical characteristics and knowledge regarding surgical site infections (SSI) among the 575 participants reveal critical insights into healthcare awareness. Approximately 46.8% have a history of hospitalization, predominantly for surgical reasons (45.3%). Interestingly, 83.5% report no prior SSI, suggesting a relatively low incidence within this group. However, awareness of SSI definitions varies; while 37.2% recognize it as an infection of both skin and deep organs at the surgical site, many participants still exhibit gaps in understanding. The data indicate that 91% believe SSIs are preventable, with common preventive measures identified, such as keeping wounds clean and dry (41.6%) and using clean hands (38.2%). Notably, 50.4% endorse a combination of all suggested prevention strategies. Regarding treatment, an overwhelming majority (94.8%) affirm that SSIs can be treated, with many recognizing the importance of interventions like drainage and debridement.

Table (2): Parameters related to clinical characteristics and knowledge about SSI (n=575).

Parameter		***No.***	***Percent (%)***
Have you Been admitted to the hospital before?	No	306	53.2
	Yes	269	46.8
How many days have you been hospitalized? (n=269)	1-7	213	79.2
	8-14	23	8.5
	more than 14 days	26	9.6
	I don't know	7	2.6
What's the reason for admission? (n=269)	Surgical	122	45.3
	Medical	77	28.6
	Others	70	26.0
	No	480	83.5

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Do you have a history of surgical site infection?	Yes	22	3.8
	I don't know	73	12.7
What is surgical site infection (SSI)?	Infection of skin in where the surgery cut was done	195	33.9
	Infection of deep organs	31	5.4
	Infection of skin and deep organs at the site of surgery	214	37.2
	Redness and pain that is seen at the suture site	135	23.5
Which of these signs and symptoms of surgical site infections do you know? (Please select all you know) *	Redness	265	46.1
	Delayed healing	171	29.7
	Fever	163	28.3
	Pain	218	37.9
	Tenderness	146	25.4
	Warmth	166	28.8
	Drainage	190	33.0
	All of above	236	41.0
	None of the above	16	2.8
	I don't know	98	17.0
Which of these are considered risk factors? (Please select all you know) *	Age	142	24.7
	Prolonged hospitalization	161	28.0
	Smoking	220	38.3
	Malnutrition	192	33.4
	Corticosteroid and other immunotherapy	145	25.2
	Obesity	169	29.4
	Diabetes mellitus	220	38.2
	Renal failure	145	25.2
	Anemia	112	19.5
	All of the above	182	31.7
	None of the above	14	2.4
	I don't know	90	15.7
Do you think that SSI is preventable?	No	52	9.0
	Yes	523	91.0
How can SSI be prevented? (you can select more than one answer) *	Clean hands	220	38.2
	Preoperative prophylactic antibiotics	216	37.6
	Stop smoking 4 weeks before surgery	156	27.1
	Keep the wound clean and dry	239	41.6
	Shaving the site of surgery	181	31.5
	All of above	290	50.4
	None of the above	13	2.2
	I don't know	71	12.3

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Do you think that SSIs can be treated?	No	30	5.2
	Yes	545	94.8
If yes, what is the first-line treatment?	No need for treatment because it is self-limiting	51	8.9
	Sutures removal, drainage, debridement, and wound dressing	210	36.5
	Use antibiotics only	104	18.1
	Open the wound, debridement, and use antibiotics	210	36.5
If you have thick hair on the site of surgery and you are asked to remove it, what do you use?	Razor	279	48.5
	Hair clipper	117	20.3
	Scissor	52	9.0
	Hair removal cream	70	12.2
	Other	57	9.9

***Results may overlap**

As shown in figure (2), the data on participants' knowledge of individuals diagnosed with surgical site infections (SSI) highlights a significant lack of personal connection to this health issue. A substantial 75.5% (434 respondents) report not knowing anyone affected by SSI, indicating a potential underestimation of its prevalence and seriousness. In contrast, only 5% (29 respondents) know a family member diagnosed, while 4.3% (25 respondents) mention a relative, and 5.4% (31 respondents) have a colleague or friend with the condition. Additionally, 9.7% (56 respondents) cite other connections.

Figure (2): Illustrates if participants know someone who has been diagnosed with SSI before.

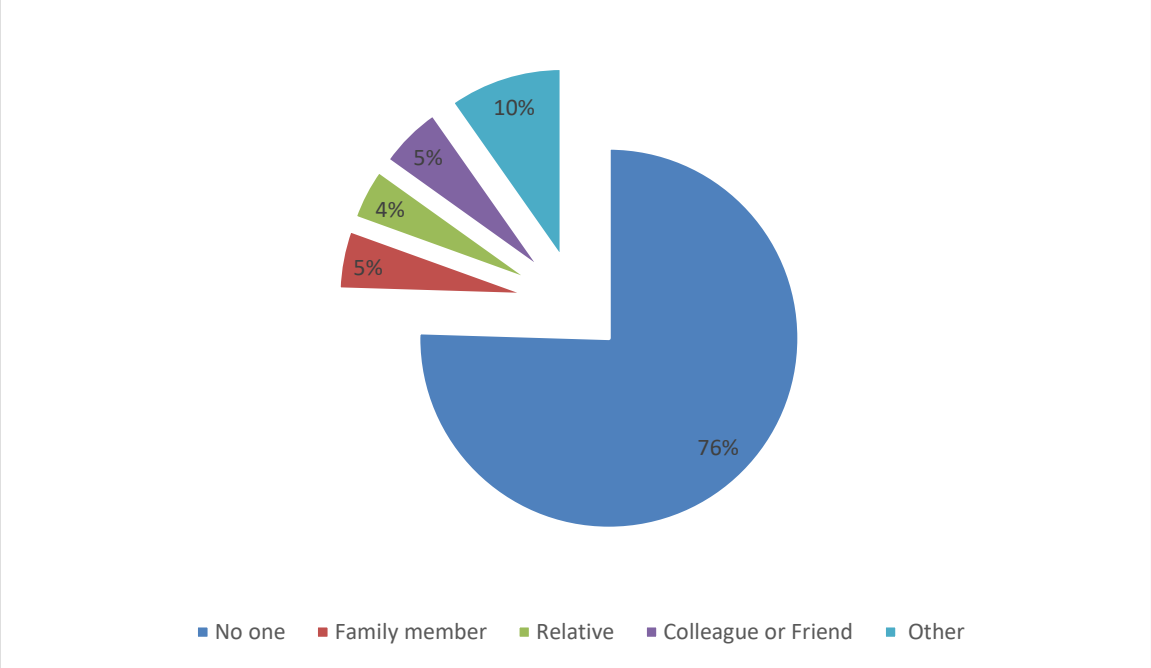

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Table (3) reveals significant gaps in knowledge among the population. A substantial 61.6% of respondents have never heard of SSI, and 75.5% do not know anyone diagnosed with it. This lack of awareness is further reflected in the fact that 81.4% reported that healthcare workers did not discuss SSI with them prior to surgery, and 84.7% have not received any educational materials on the topic. Despite these gaps, a commendable 85.6% of participants do wash their hands before handling surgical sites, suggesting some level of awareness regarding hygiene practices.

Table (3): participants' awareness regarding SSI (n=575).

Parameter		***No.***	***Percent (%)***
Have you ever heard about surgical site infection (SSI)?	No	354	61.6
	Yes	221	38.4
Do you know anyone who has been diagnosed with surgical site infection (SSI)?	No one	434	75.5
	Family member	29	5.0
	Relative	25	4.3
	Colleague or Friend	31	5.4
	Other	56	9.7
Did the healthcare worker discuss surgical site infection (SSI) with you before the surgery?	No	468	81.4
	Yes	107	18.6
Have you ever been given any educational material by healthcare workers?	No	487	84.7
	Yes	88	15.3
Have you ever learned about surgical site infection (SSI) outside the hospital?	No	468	81.4
	Yes	107	18.6
Do you wash your hands before handling the site of surgery?	No	83	14.4
	Yes	492	85.6

As illustrates in table (4), the knowledge assessment regarding surgical site infections (SSI) among the Saudi population reveals concerning results. A mere 3.8% of participants exhibit a high level of knowledge, while only 13.7% demonstrate moderate knowledge. Alarmingly, 82.4% fall into the low knowledge category, indicating a significant gap in understanding about SSI. This lack of awareness is critical, as it may contribute to increased risks of infection and adverse surgical outcomes.

Table (4): Shows knowledge about SSI among Saudi population score results.

	Frequency	**Percent**
High level of knowledge	22	3.8
Moderate knowledge	79	13.7
Low knowledge level	474	82.4
Total	575	100.0

As illustrates in table (5), the awareness levels regarding surgical site infections (SSI) among the Saudi population indicate significant room for improvement. Only 19.0% of participants demonstrate a high level of awareness, while 27.3% fall into the moderate category. Alarmingly, over half of the

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respondents (53.7%) possess a low awareness level. This lack of awareness is concerning, as it may impede patients' ability to recognize the risks associated with SSIs and the importance of preventive measures.

Table (5): Shows awareness about SSI among Saudi population score results.

	Frequency	**Percent**
High awareness level	109	19.0
Moderate awareness level	157	27.3
Low awareness level	309	53.7
Total	575	100.0

Table (6) shows that knowledge level regarding SSI has statistically significant relation to gender (P value=0.029), age (P value=0.018), occupational status (P value=0.028). It also shows statistically insignificant relation to marital status, region of residence, place of residence, educational level, smoking status, and monthly income.

Table (6): Relation between knowledge level regarding SSI and sociodemographic characteristics.

Parameters		***Knowledge level***		***Total (N=575)***	***P value****
		High or moderate knowledge	**Low knowledge level**		
Gender	Female	68	263	331	0.029
		67.3%	55.5%	57.6%	
	Male	33	211	244	
		32.7%	44.5%	42.4%	
Age	Less than 20 years old	13	80	93	0.018
		12.9%	16.9%	16.2%	
	20 to 22	40	121	161	
		39.6%	25.5%	28.0%	
	23 to 24	15	53	68	
		14.9%	11.2%	11.8%	
	25 to 30	16	72	88	
		15.8%	15.2%	15.3%	
	31 to 40	8	69	77	
		7.9%	14.6%	13.4%	
	more than 40	9	79	88	
		8.9%	16.7%	15.3%	
Marital status	Single	77	298	375	0.065
		76.2%	62.9%	65.2%	
	Married	23	161	184	
		22.8%	34.0%	32.0%	
	Divorced	1	9	10	
		1.0%	1.9%	1.7%	
	Widowed	0	6	6	

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		0.0%	1.3%	1.0%	
Region of residence	Northern region	12	76	88	0.223
		11.9%	16.0%	15.3%	
	Southern region	35	126	161	
		34.7%	26.6%	28.0%	
	Central region	19	112	131	
		18.8%	23.6%	22.8%	
	Eastern region	9	61	70	
		8.9%	12.9%	12.2%	
	Western region	26	99	125	
		25.7%	20.9%	21.7%	
Place of residence	Village	15	73	88	0.889
		14.9%	15.4%	15.3%	
	City	86	401	487	
		85.1%	84.6%	84.7%	
Educational level	Primary school	0	3	3	0.482
		0.0%	0.6%	0.5%	
	Middle school	1	14	15	
		1.0%	3.0%	2.6%	
	High school	32	163	195	
		31.7%	34.4%	33.9%	
	Bachelor's degree	61	261	322	
		60.4%	55.1%	56.0%	
	Postgraduate degree	4	27	31	
		4.0%	5.7%	5.4%	
	Uneducated	3	6	9	
		3.0%	1.3%	1.6%	
Occupational status	Student	64	232	296	0.028
		63.4%	48.9%	51.5%	
	Health sector employee	7	36	43	
		6.9%	7.6%	7.5%	
	Non health sector employee	9	67	76	
		8.9%	14.1%	13.2%	
	Unemployed	19	86	105	
		18.8%	18.1%	18.3%	
	Freelancer	1	32	33	
		1.0%	6.8%	5.7%	
	Retired	1	21	22	
		1.0%	4.4%	3.8%	
Smoking status	No	94	408	502	0.154
		93.1%	86.1%	87.3%	
	Yes	5	51	56	
		5.0%	10.8%	9.7%	
	Ex-smoker	2	15	17	

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		2.0%	3.2%	3.0%	
Monthly income	Less than 1000 SAR	43	210	253	0.233
		42.6%	44.3%	44.0%	
	1000 to 5000	29	101	130	
		28.7%	21.3%	22.6%	
	5001 to 10000	10	71	81	
		9.9%	15.0%	14.1%	
	10001 to 15000	11	37	48	
		10.9%	7.8%	8.3%	
	More than 15000 SAR	8	55	63	
		7.9%	11.6%	11.0%	

P value was considered significant if ≤ 0.05.

Table (7) shows that awareness level regarding SSI has statistically significant relation to age (P value=0.005), occupational status (P value=0.001). It also shows statistically insignificant relation to gender, marital status, region of residence, place of residence, educational level, smoking status, and monthly income.

Table (7): Awareness level regarding SSI in association with sociodemographic characteristics.

Parameters		***Awareness level***		***Total (N=575)***	***P value****
		High or moderate knowledge	**Low knowledge level**		
Gender	Female	152	179	331	0.849
		57.1%	57.9%	57.6%	
	Male	114	130	244	
		42.9%	42.1%	42.4%	
Age	Less than 20 years old	36	57	93	0.005
		13.5%	18.4%	16.2%	
	20 to 22	73	88	161	
		27.4%	28.5%	28.0%	
	23 to 24	44	24	68	
		16.5%	7.8%	11.8%	
	25 to 30	47	41	88	
		17.7%	13.3%	15.3%	
	31 to 40	34	43	77	
		12.8%	13.9%	13.4%	
	more than 40	32	56	88	
		12.0%	18.1%	15.3%	
Marital status	Single	183	192	375	0.396
		68.8%	62.1%	65.2%	
	Married	77	107	184	
		28.9%	34.6%	32.0%	
	Divorced	4	6	10	

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		1.5%	1.9%	1.7%	
	Widowed	2	4	6	
		0.8%	1.3%	1.0%	
Region of residence	Northern region	46	42	88	0.359
		17.3%	13.6%	15.3%	
	Southern region	76	85	161	
		28.6%	27.5%	28.0%	
	Central region	51	80	131	
		19.2%	25.9%	22.8%	
	Eastern region	34	36	70	
		12.8%	11.7%	12.2%	
	Western region	59	66	125	
		22.2%	21.4%	21.7%	
Place of residence	Village	41	47	88	0.946
		15.4%	15.2%	15.3%	
	City	225	262	487	
		84.6%	84.8%	84.7%	
Educational level	Primary school	1	2	3	0.051
		0.4%	0.6%	0.5%	
	Middle school	5	10	15	
		1.9%	3.2%	2.6%	
	High school	78	117	195	
		29.3%	37.9%	33.9%	
	Bachelor's degree	161	161	322	
		60.5%	52.1%	56.0%	
	Postgraduate degree	19	12	31	
		7.1%	3.9%	5.4%	
	Uneducated	2	7	9	
		0.8%	2.3%	1.6%	
Occupational status	Student	140	156	296	0.001
		52.6%	50.5%	51.5%	
	Health sector employee	30	13	43	
		11.3%	4.2%	7.5%	
	Non health sector employee	22	54	76	
		8.3%	17.5%	13.2%	
	Unemployed	49	56	105	
		18.4%	18.1%	18.3%	
	Freelancer	18	15	33	
		6.8%	4.9%	5.7%	
	Retired	7	15	22	
		2.6%	4.9%	3.8%	
Smoking status	No	235	267	502	0.481
		88.3%	86.4%	87.3%	
	Yes	22	34	56	

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		8.3%	11.0%	9.7%	
	Ex-smoker	9	8	17	
		3.4%	2.6%	3.0%	
Monthly income	Less than 1000 SAR	109	144	253	0.382
		41.0%	46.6%	44.0%	
	1000 to 5000	60	70	130	
		22.6%	22.7%	22.6%	
	5001 to 10000	45	36	81	
		16.9%	11.7%	14.1%	
	10001 to 15000	21	27	48	
		7.9%	8.7%	8.3%	
	More than 15000 SAR	31	32	63	
		11.7%	10.4%	11.0%	

P value was considered significant if ≤ 0.05.

Discussion:

Surgical site infections (SSIs) refer to infections that develop within 30 days post-surgery, impacting either the surgical incision or the deeper tissues at the site of operation, often necessitating surgical management.[16] Despite improvements in surgical practices, SSI rates remain alarmingly high, with recent meta-analyses estimating a global incidence of 11% following general surgeries and 7% post-appendectomies.[17] The prevalence of SSIs varies by country, influenced by several factors. In Saudi Arabia, reported SSI rates are 2.5%, 3.4%, and 12.9% after orthopedic surgeries, foot and ankle operations, and trauma laparotomies, respectively.[18] SSIs present a significant health challenge, as they lead to increased hospital stays, elevated costs, and higher mortality rates.[19] For instance, in the United States, SSIs extend the average hospital stay by 9.7 days and raise patient costs by approximately $20,000, culminating in an annual extra financial burden of $3.3 billion. In low- and middle-income countries, SSIs can impose considerable economic strain.[20] Consequently, reducing SSI rates globally is essential. One effective approach to preventing SSIs is enhancing patient engagement.[21] A recent scoping review indicated a lack of patient involvement in SSI prevention efforts; however, most research in this area originates from high-income nations.[22] To formulate effective engagement strategies, it is crucial to assess the current knowledge and awareness among patients. Unfortunately, there are no existing studies addressing this issue in Saudi Arabia. Thus, we aimed in this study to assess knowledge and awareness of the Saudi population regarding surgical site infection.

Regarding knowledge and awareness levels of surgical site infections (SSIs), we have found that only 37.2% correctly defined SSIs as infections of both skin and deep organs, while 61.6% had never heard of them. A majority of participants (91%) believe SSIs are preventable, with 41.6% citing wound cleanliness and 38.2% emphasizing hand hygiene as key measures; however, only 3.8% exhibited high knowledge and 19.0% had high awareness levels. Notably, 84.7% had not received any educational materials about SSIs, and 81.4% reported that healthcare workers did not discuss SSIs with them prior to surgery. Despite this lack of awareness, a considerable 94.8% affirmed SSIs can be treated, recognizing interventions like drainage and debridement as important. On the other hand, a multi-center cross-sectional study conducted among surgical patients in Saudi Arabia [23], findings revealed that a significant proportion of participants exhibited inadequate awareness and knowledge of surgical site infections (SSIs). Specifically, 49.1% of respondents demonstrated poor awareness, while 35.2% had poor knowledge, with 45.8% classified as having fair knowledge. Similar to our findings, a significant

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correlation was observed between awareness and factors such as literacy and surgical history. Alarmingly, only 32.8% recalled receiving education from healthcare workers, which is similar to the findings of Anderson *et al.*,[24] who reported that only 40% of surgical patients at risk of developing SSI recalled education by HCWs. However, in a study conducted in the Jazan region [25], only 17% of participants demonstrated a high level of knowledge regarding surgical site infections (SSIs) and wound management, despite a general understanding of surgical wounds. This contrasts with our findings, where only 3.8% exhibited high knowledge levels and 19.0% had high awareness of SSIs. Similar to our results, a significant proportion, 84.7%, lacked prior exposure to educational materials about SSIs, emphasizing the need for improved patient education. Moreover, a recent survey assessing patient awareness and knowledge of surgical site infections (SSIs) [26], only 26% of respondents identified a need for improved education on SSI prevention, while 16% could not recall any discussion with healthcare workers regarding SSI risks. Furthermore, only 60% reported receiving informational flyers during their hospital stay. These findings highlight a significant gap in patient awareness, paralleling our study where only 37.2% accurately defined SSIs, and 84.7% had not received educational materials. Both studies underscore the necessity for enhanced educational initiatives that actively engage patients to improve their understanding of SSI risks and prevention strategies. in contrast to our results, another study conducted by Haifaa M. Malaekah [27] revealed high percentages of correct responses, such as 91.1% recognizing the importance of good nutrition and 89.6% prioritizing hand hygiene for wound dressing. Moreover, our study indicated a pervasive lack of educational resources, with 84.7% of participants not having received any materials on SSIs. In contrast, the second study acknowledges misconceptions prevalent in wound care, such as the use of unconventional treatments like perfumes and Zamzam water, which were backed by a significant portion of respondents.

Conclusion:

In conclusion, this study highlights a critical gap in knowledge and awareness regarding surgical site infections (SSIs) among the Saudi population. Despite a general belief that SSIs are preventable, only a small fraction of participants demonstrated a comprehensive understanding of their risks and management. The findings indicate that a substantial majority had not received adequate educational resources on SSIs or were engaged in discussions concerning preventive measures prior to surgery. Given the significant implications of SSIs on patient outcomes, healthcare costs, and overall surgical morbidity, there is an urgent need for targeted community-based education programs. Such initiatives should focus on increasing awareness and understanding of SSIs, thereby empowering patients to contribute actively to their own surgical care and potentially reducing the incidence of these infections in the future.

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Ethical approval:

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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Conflict of interests:

The authors declare no conflict of interest.

Informed consent:

Written informed consent was acquired from each individual study participant.

Data and materials availability:

All data associated with this study are present in the paper.

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