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Prevalence and Risk Factors of Surgical Site Infections in Tertiary Care Hospital of Lahore

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Abstract

Background: This cross-sectional study was conducted at Services Hospital, Lahore, over three months to determine the prevalence and associated risk factors of surgical site infections (SSIs) among healthcare staff, including registered nurses, doctors, and allied health professionals. A purposive sampling technique was used to gather data from 180 participants. **Objectives:** The primary objective of this study is to determine the prevalence of surgical site infections (SSIs) among patients undergoing surgical procedures in a tertiary care hospital in Lahore. This research aims to identify and analyze the key risk factors contributing to SSIs, such as patient demographics, comorbidities, type of surgery, duration of surgery, preoperative care, and postoperative practices. Additionally, the study seeks to assess the effectiveness of current infection prevention measures and identify gaps in infection control practices. By exploring these factors, the study intends to provide actionable insights for healthcare professionals to enhance infection control protocols, ultimately reducing the incidence of SSIs and improving patient outcomes in surgical wards.

Methodology: This cross-sectional study was conducted over three months at Services Hospital, Lahore, to assess prevalence and risk factors associated with surgical site infections (SSIs). A purposive sampling technique was used to select a sample of 180 participants, including registered nurses, doctors, and allied health staff. Inclusion criteria focused on registered healthcare professionals, while all other staff were excluded. Data was collected through structured interviews covering demographics, infection control practices, and perceptions on SSI risk factors.

Results: The study findings indicate that the majority of respondents were aged between 31-40 years (38.3%) and had professional qualifications ranging from a Diploma in Midwifery to a Post RN BSN. A considerable portion of the respondents had 6-15 years of experience. Awareness of SSIs varied, with approximately 45% indicating awareness, while 36% of participants expressed concerns about the adequacy of infection control policies. Regarding hand hygiene practices, 41.2% of participants reported non-compliance, highlighting a critical area for improvement.

Conclusion: Furthermore, 44.4% of respondents disagreed that bed availability impacts SSI risk, while 21.1% believed that antibiotic overuse contributes to SSIs. Compliance with aseptic techniques and handwashing practices revealed inconsistencies, with 45.5% of participants indicating insufficient adherence. Although 40% agreed that continuous training for SSI prevention is essential, a significant portion of the participants expressed doubts about current training adequacy.

Conclusion: The study highlights gaps in infection control practices and the need for standardized protocols, continuous education, and stricter adherence to aseptic techniques to mitigate SSI risks.

These findings underscore the importance of implementing targeted interventions to enhance infection control and reduce the incidence of SSIs in healthcare settings.

Keywords: Surgical Site Infections (SSIs), Prevalence, Risk Factors, Infection Control, Tertiary Care Hospital

Introduction

Infections that develop more than 48 hours after admission are classified as Surgical Site Infections or hospital-acquired or Nosocomial infections (Khurshid A., 2021). They are the sixth leading cause of death in the USA, accounting for 150,000 deaths per year, with an incidence ranging from 5-10%. Nosocomial infections are a significant cause of preventable morbidity and mortality, prolonging hospital stays by an average of eight days (Badaruddin A. M., 2023), and substantially increasing treatment costs and healthcare facility workloads. Among surgical patients, surgical site infections (SSIs) are one of the most commonly reported nosocomial infections, accounting for 16% to 38% of all such infections. SSIs can debilitate patients and dramatically increase healthcare costs. They are a leading cause of readmission, may lead to complications such as delayed wound healing and revision surgery, and with longer hospital stays, can render patients susceptible to infections from the hospital environment. The CDC definitions for the surveillance of surgical site infections consider three classes of wound infections: superficial, deep incisional SSI, and organ/space SSI (Smyth E. T. et al., 2020). Since ancient times, wound infections have markedly increased the suffering of postoperative cases; despite being largely preventable, they remain a major source of morbidity. To minimize postoperative surgical wound infections, it is important to create a safe environment by controlling four main sources of infection: personnel, equipment, environment, and patient's risk factors (Cruse P. J. et al., 2020). Knowledge of specific risk factors for SSI is essential to create a specific SSI risk stratification index and to develop strategies to confine the infection rate. The best approach is prevention, which is simpler, cheaper, and more rewarding for patients; at least one-third of SSIs are preventable by simple measures (Emmerson A. M. et al., 2021). Thus, every hospital needs to organize its infection control program. Failure to implement infection control policies and lack of awareness are factors contributing to hospital infections and disease outbreaks. On the other hand, studies provide evidence of a significant decreasing trend in SSI rates following infection control interventions (Olsen M. A. et al., 2020). In our hospitals, there are high rates of nosocomial infections with little effort to control them. The present study was conducted on patients operated on for various surgical problems in a major public sector tertiary care hospital in Islamabad to evaluate the frequency of surgical site infections. Postoperative nosocomial infections (NIs) are the most common class of complications that can reach excessive levels while attracting very little attention. Many healthcare providers and organizations, such as the US Centers for Disease Control and Prevention (CDC), the Joint Commission on Accreditation of Healthcare Organizations, and the Surgical Infection Society, consider periodic audits of postoperative NIs mandatory because such surveys decrease infection rates by raising awareness of the issue (Haley R. W., 2020). A standardized definition of SSIs was published by the Surgical Wound Infection Task Force USA in 1992. According to this definition: the presence of purulent drainage, spontaneous drainage of fluid from the wound regardless of whether it is culture positive for bacteria, localized signs of infection for superficial sites or radiological evidence of infection for deep sites, an abscess or other type of infection on direct surgical exploration, or a diagnosis of infection by a surgeon (Lizioli A. et al., 2003). Furthermore, SSIs have been categorized by the CDC into three categories: superficial, deep, and organ/space infections. Superficial infections involve the skin or subcutaneous tissue; deep infections involve the muscle or fascia; and organ/space infections involve the body cavity such as the pleural cavity or liver bed (Gastmeier P. et al., 2020). The National Research Council, USA developed a system

for categorizing incisions based on the degree of contamination (Gastmeier P. et al., 2003). The original classification was based on four categories: clean, clean-contaminated, contaminated, and dirty; but the contaminated and dirty categories were later amalgamated and are referred to as 'dirty'. SSIs are the second most common type of NIs, accounting for 20%–25% of the total. Surgical site infection (SSI) develops in 2%–5% of patients undergoing surgical procedures every year in the United States, resulting in at least 500,000 infections, 3.7 million excess hospital days, and US$ 1.6 billion in extra hospital charges (NNIS, 2020). ASA scores are categorized into four classes: Class-I normal healthy person; Class-II patient with mild systemic disease; Class-III patient with severe systemic disease that limits activity but is not incapacitating; Class-IV patient with incapacitating systemic disease that is a constant threat to life; and Class-V moribund patient who is not expected to survive 24 hours with or without surgery (Weiss C. A. et al., 2020).

Prevalence in Pakistan

Pakistan lacks basic healthcare. One study reported that 20.8% of hospital emergency department patients had to wait more than 6 hours. The main reason for the delay was the unavailability of beds, followed by several other factors. The risk of SSIs can be reduced with minimal hospitalization by avoiding the overuse of antibiotics, the reuse of suction catheters, and ensuring proper handwashing by medical staff. Proper aseptic sterilization in therapeutic procedures is crucial. As part of the healthcare team, nurses can play a very important role in preventing SSIs. Nurses must have sufficient information and skills in this area to successfully control SSIs. It is the duty of the nursing staff and everyone in the hospital to ensure that patients who come to the hospital for treatment or admission are well cared for and can go home as soon as possible without being infected with hospital-borne infections. Gaps in practices, non-sterile hospital equipment, or the nursing staff themselves can lead to SSIs. It is important to understand that SSI control and prevention strategies must be consistently and rigorously enforced. Various strategies include guidelines for disinfection and activities to prevent SSIs. Therefore, nurses have an important role to play in prevention efforts, and it is important to assess their knowledge, attitudes, and practices.

Aim of the Study: Aim of this study is to assess the level of knowledge and awareness of SSI and the actual gaps in prevention in teaching hospitals in Lahore. Incidence rates are projected to increase given the aging populations and the rise in the number of patients with comorbidities and compromised immune systems. Healthcare organizations have launched several initiatives to reduce surgical site infections. Nurses' education is essential to reduce these types of infections. Since nurses use their hands extensively to provide care, hand hygiene is particularly important to reduce the risk of contracting SSIs. The purpose of this project is to provide education on the importance of hand hygiene to reduce the incidence of surgical site infections. The implications for positive social change include decreasing healthcare costs, improving patient outcomes, easing the financial burdens on society, and improving the quality of care.

Literature Review:

Encounter with surgical site infection (SSI) has always been a universal distress for medical practitioners and still is the most common postoperative situation (Gottrup F. et al., 2022). The idea of infection is more than five millennia old. Egyptians were the first proficient healthcare providers, being masters in inhibiting putrefaction by mummification. Hippocrates, acknowledged as the father of medicine, used vinegar to clean open wounds and wrapped dressings around wounds to avoid further harm (Leaper D. J. et al., 2021). The theory of wound healing remained a mystery for a long time for prehistoric civilizations, but they recognized that pus needs to be drained. Although the perception of wound infection was modernized by Fleming's discovery of penicillin, even in the modern era, SSI remains a crucial impediment to trauma and surgery (Leaper

D. J. 2021). The quantity of SSI varies significantly in different areas of the world. A study from Japan reported SSI frequency up to 32.1% (Masanori W. et al., 2023). In an Indian study, the frequency of SSI in emergency abdominal surgery ranged from 16–23% (Rehman(2021,Khadilkar R. et al., 2022). A report from Uganda shows this rate to be 16.4%. In the United States, the burden of SSI after emergency abdominal surgeries was 15.5% - 25% in different hospitals (Ussiri E. V. et al., 2022). Local data shows a great variation in SSI frequency in different settings. Surgical site infection in emergency laparotomy is categorized into three types: superficial incisional SSI, deep incisional SSI, and organ/space SSI. Nearly two-thirds of all SSIs are restricted to the incision, while the rest are linked to organs or spaces involved in the surgical route. SSI is accompanied by catastrophic consequences such as delayed wound healing, use of antibiotics with consequent high cost, prolonged hospital stay, re-operation, and mortality (Hutchinson N., 2021). Several variables that increase the likelihood of SSI include extremes of age, smoking, malnutrition, diabetes, immune deficiency, duration of surgery, and malignancy. Preoperative regulation of co-morbid conditions, control of the operative environment, appropriate skin scrubbing, and use of aseptic surgical techniques are among the means recommended to avoid SSI (Emori T. G. et al., 2020). Proper antibiotic prophylaxis can reduce postoperative wound infections. Around 30-50% of antibiotic use in hospitals is for prophylaxis, and between 30-90% of this prophylaxis is incorrect due to wrong timing and duration (Malik Z. I. et al., 2023). Giving due consideration and certification to numerous independent causes associated with SSI will help limit nosocomial infections in general surgical patients by several preventive measures. Performing emergency abdominal surgeries in a developing country is challenging. It requires a lot of skills and management of logistics, especially in tertiary care hospitals of private teaching hospitals where patients have to bear all the treatment costs. Sterilization conditions, routine precautions, and antibiotic prophylaxis are not uniformly practiced. In most developing countries, including Pakistan, statistics about the prevalence of surgical site infection in emergency abdominal surgeries and adherence to standard recommendations for preventing SSI are deficient. Usually, the surveillance system is not strictly followed. Even in available local data, there is diversity in results ranging from 12.7% to 22.7% (Bibi S. et al., 2021). Therefore, it is essential that every setup documents their infection reports and recommends prophylactic antibiotics according to sensitivity reports. This prospective study was conducted in a general surgical ward of a tertiary care teaching hospital to record the rate of SSIs, identify the most common causative organism, and describe the sensitivity pattern (Abubaker L. et al., 2022). Healthcare workers should practice safe procedures to prevent the spread of surgical site infections (SSIs). The World Health Organization (WHO) has formulated guidelines to reduce the prevalence of healthcare-associated infections. Despite these guidelines, compliance with safe practices is poor, contributing to the spread of SSIs. Most SSIs (40%) are attributed to the cross-infection of healthcare workers' hands after encountering contaminated surfaces. Common medical and non-medical tools in healthcare facilities have been shown to harbor microbes. A study reported that bacterial colonization of stethoscopes and otoscopes is a significant cause of SSIs. Although the concentration of pathogens on inanimate surfaces in a healthcare facility is significantly lower compared to that on an ill patient's skin, the high virulence and infection potential of hospital-acquired pathogens mean that even a much lower dose of these infectious agents can cause significant disease (Olsen, M. A, 2020). The most frequent and common causes of healthcare-associated infections are surgical site infections (30%), followed by urinary tract infections (22%), lower respiratory tract infections (15%), and bloodstream infections (13%). The prevalence of SSIs is higher in critical care units (25%) than in medical (9%) and surgical wards (12%). The most common pathogen strains reported in healthcare settings are gram-negative bacilli. There is also a significant relationship between age, intubation, and tracheostomy with the rate of SSIs. Prolonged hospital stays and overcrowded facilities are the main reasons for SSIs (Smyth, E. T, 2020, khattak. 2021). Surgical

site infections have numerous risk factors that may contribute to their incidence, including any operation lasting over two hours, contaminated or dirty wound sites, and patients with three or more comorbidities at discharge. Additionally, high body mass index, reoperation, and the use of postoperative drains increase the risk of postoperative wound infection in lumpectomy and mastectomy patients (Khadilkar, R, 2022).

Significance

Despite evidence-based literature on reducing surgical site infections (SSIs), the number of patients diagnosed with these infections continues to increase yearly. According to Fox et al. (2015), approximately 2.5 million patients are infected with an SSI during hospitalization. Pertinent patient education needed to improve patient awareness of SSIs is limited. According to Kaye et al. (2018), using evidence-based literature to educate patients on the severity of SSIs and the importance of asking nurses to wash their hands before providing care is crucial.Several states have passed legislation mandating public reporting of SSI incidence in healthcare settings. Members of the public can access information on SSI statistics. The use of appropriate preventive practices can reduce associated infections by 70%, resulting in a saving of $31.5 billion in healthcare costs. SSIs impose significant financial hardship on healthcare systems, which is passed on to consumers in increased healthcare costs. The socioeconomic impact of SSIs is related to increased healthcare costs. Providing adequate information to the public can improve understanding and reduction of SSIs. In this project, I present the possible implementation to formulate social change by enhancing the importance of hand hygiene information for nurses before and after providing patient care to reduce SSIs. Optimizing nurses' knowledge, awareness, and understanding can positively impact societal impressions. Improving nurses' knowledge is imperative for positive patient outcomes. Providing effective patient education empowers patients to become their own advocates, and patients can hold nurses accountable by asking them to wash their hands before providing care. Patients and visitors are also asked to wash their hands regularly, especially before eating and after using the bathroom, to reduce the spread of harmful bacteria.

Objectives of the study

1. To determine the prevalence of surgical site infections (SSIs) among patients undergoing surgical procedures in a tertiary care hospital in Lahore, Pakistan.
2. To identify key demographic and clinical risk factors associated with the occurrence of SSIs, such as age, gender, comorbidities, and type of surgery.
3. To evaluate the impact of preoperative, intraoperative, and postoperative practices on the incidence of SSIs in a hospital setting, including factors like surgical hygiene protocols and sterilization techniques.
4. To assess the effectiveness of infection control measures currently implemented in the hospital and their role in reducing SSI rates.
5. To provide recommendations for improving SSI prevention practices based on identified risk factors and current gaps in infection control strategies in the hospital environment.

Methodology

Sample Size Calculation

Sample Size for Frequency in a Population

Population size(for finite population correction factor or fpc)(N):	1200
Hypothesized % frequency of outcome factor in the population (p):	50%+/-5
Confidence limits as % of 100(absolute +/- %)(d):	5%

Design effect (for cluster surveys-DEFF): 1

Sample Size(n) for Various Confidence Levels

ConfidenceLevel(%)	Sample Size
95%	180
80%	160
90%	170
97%	350
99%	690
99.9%	1024
99.99%	1378

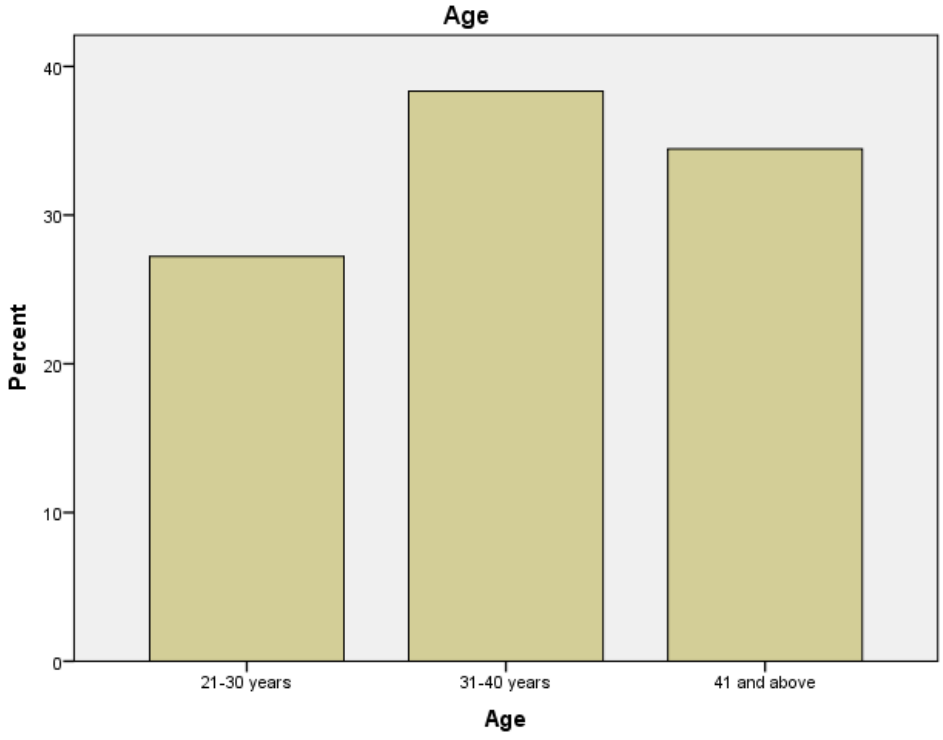
Equation

Sample size $\mathbf{n = [DEFFNp(1-p)]/ [(d^2/Z^2_{1-\alpha/2}(N-1)+p(1-p)]}$

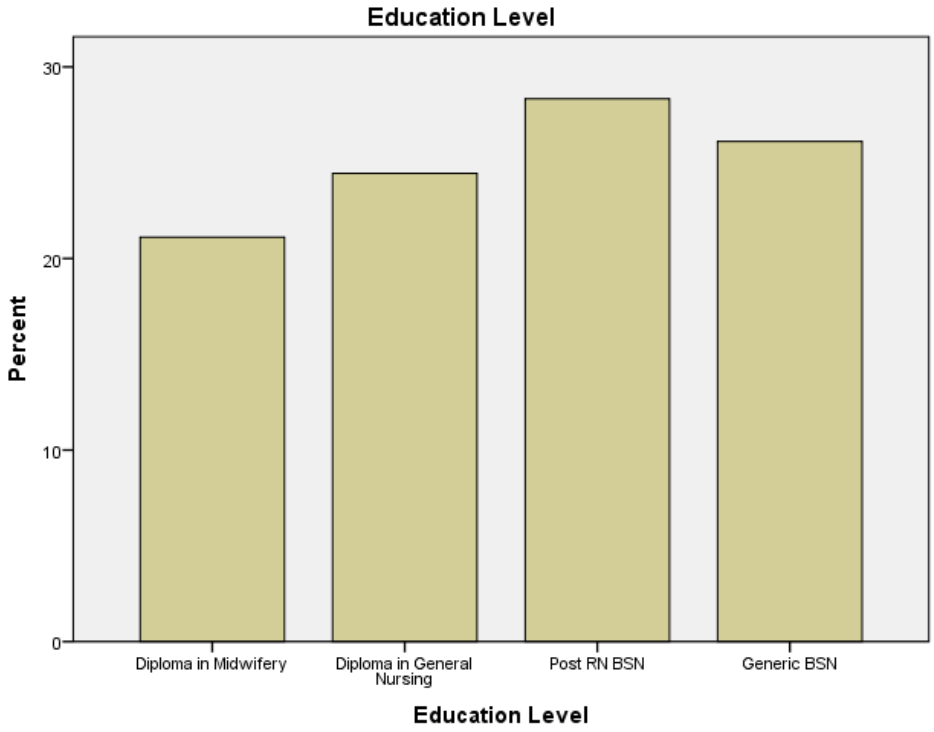
Results from OpenEpi, Version 3, open source calculator—SSPropor [16] Print from the browser with ctrl-P

Results

The study on the prevalence and risk factors of surgical site infections in a tertiary care hospital of Lahore reveals that 27.2% of the participants were aged 21-30 years (n=49), 38.3% were aged 31-40 years (n=69), and 34.4% were aged 41 years and above (n=62). Overall, 180 individuals participated, with the majority falling in the 31-40 age group. These age distributions may play a role in assessing the risk factors for surgical site infections.

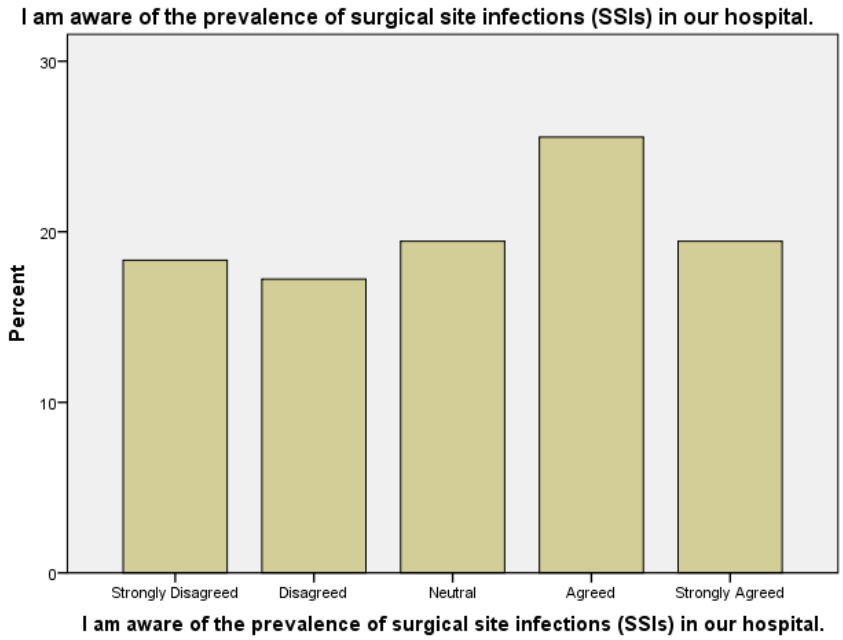


The education level of participants shows that 21.1% had a Diploma in Midwifery (n=38), 24.4% held a Diploma in General Nursing (n=44), 28.3% had completed a Post RN BSN (n=51), and 26.1% had a Generic BSN (n=47), indicating a fairly even distribution across qualifications.



Regarding working experience, 30.0% had 1-5 years of experience (n=54), 30.6% had 6-10 years (n=55), 34.4% had 11-15 years (n=62), and only 5.0% had more than 15 years of experience (n=9), showing that most participants had 6-15 years of experience.

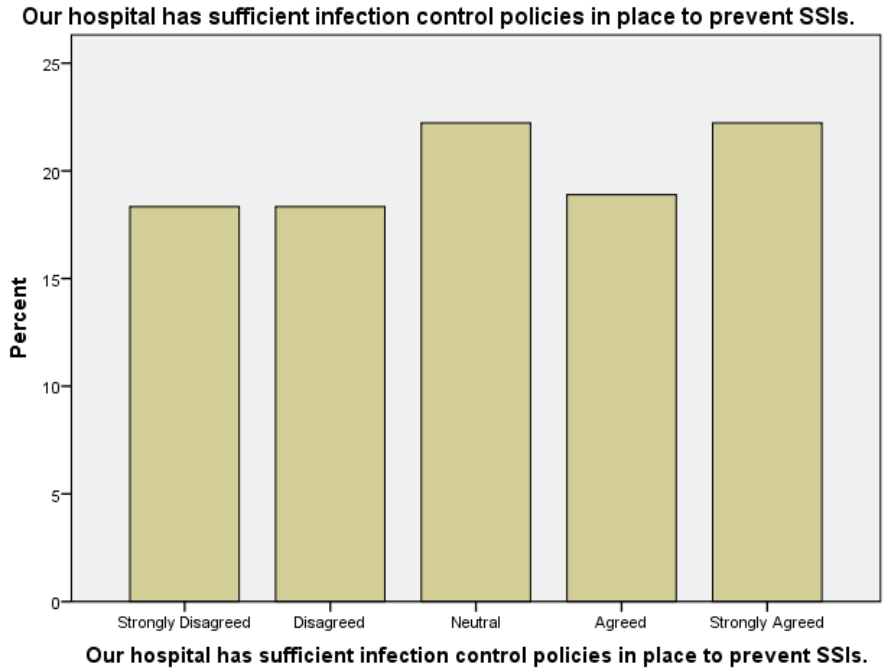
Regarding awareness of surgical site infections (SSIs) in the hospital, 25.6% of participants agreed (n=46), while 19.4% strongly agreed (n=35), indicating that nearly 45% are aware. However, 35.5% either disagreed (n=31) or strongly disagreed (n=33), and 19.4% remained neutral (n=35).



Our hospital has sufficient infection control policies in place to prevent SSIs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	33	18.3	18.3	18.3
	Disagreed	33	18.3	18.3	36.7
	Neutral	40	22.2	22.2	58.9
	Agreed	34	18.9	18.9	77.8
	Strongly Agreed	40	22.2	22.2	100.0
	Total	180	100.0	100.0	

As for infection control policies, 22.2% of participants strongly agreed (n=40) and 18.9% agreed (n=34) that their hospital has sufficient policies in place. On the other hand, 36.6% disagreed or strongly disagreed (n=33 each), with 22.2% neutral (n=40). This shows a mixed perception regarding the adequacy of infection control policies.



Hand hygiene practices are strictly followed by all staff in our hospital.

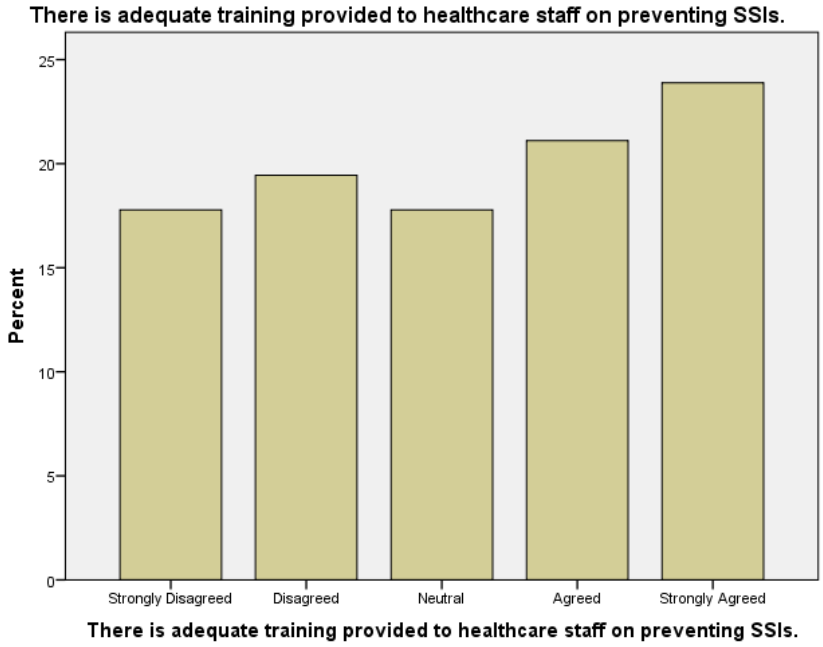
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	37	20.6	20.6	20.6
	Disagreed	37	20.6	20.6	41.1
	Neutral	27	15.0	15.0	56.1
	Agreed	41	22.8	22.8	78.9
	Strongly Agreed	38	21.1	21.1	100.0
	Total	180	100.0	100.0	

In terms of hand hygiene practices, 22.8% of participants agreed (n=41) and 21.1% strongly agreed (n=38) that all staff follow these practices, while 41.2% either disagreed or strongly disagreed (n=37 each), indicating that compliance is a concern for many. Additionally, 15.0% remained neutral (n=27).

There is adequate training provided to healthcare staff on preventing SSIs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	32	17.8	17.8	17.8
	Disagreed	35	19.4	19.4	37.2
	Neutral	32	17.8	17.8	55.0
	Agreed	38	21.1	21.1	76.1
	Strongly Agreed	43	23.9	23.9	100.0
	Total	180	100.0	100.0	

Regarding training for preventing surgical site infections (SSIs), 23.9% strongly agreed (n=43) and 21.1% agreed (n=38) that adequate training is provided. However, 37.2% either disagreed (n=35) or strongly disagreed (n=32), while 17.8% stayed neutral (n=32), reflecting a mix of perceptions on training adequacy.



The availability of beds impacts the risk of SSIs in our hospital.

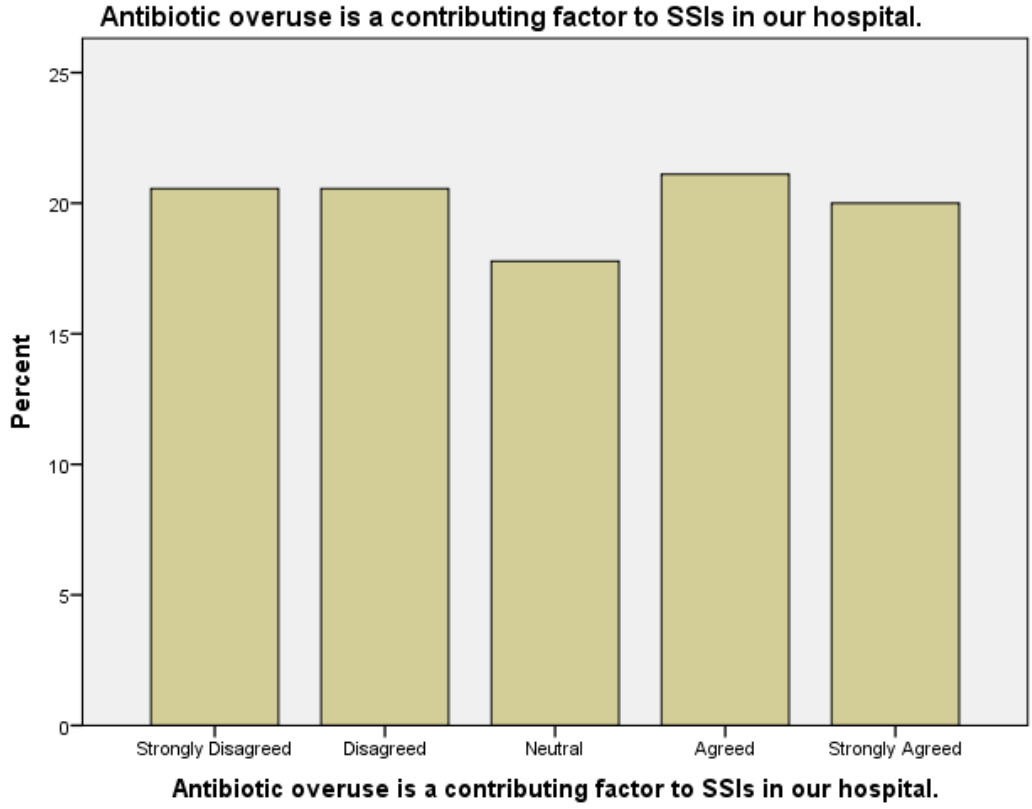
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	42	23.3	23.3	23.3
	Disagreed	38	21.1	21.1	44.4
	Neutral	32	17.8	17.8	62.2
	Agreed	37	20.6	20.6	82.8
	Strongly Agreed	31	17.2	17.2	100.0
	Total	180	100.0	100.0	

Regarding the impact of bed availability on the risk of surgical site infections (SSIs), 20.6% of participants agreed (n=37) and 17.2% strongly agreed (n=31), while 44.4% either disagreed or strongly disagreed (n=38 and n=42), suggesting divided opinions on this factor. Additionally, 17.8% remained neutral (n=32).

Antibiotic overuse is a contributing factor to SSIs in our hospital.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	37	20.6	20.6	20.6
	Disagreed	37	20.6	20.6	41.1
	Neutral	32	17.8	17.8	58.9
	Agreed	38	21.1	21.1	80.0
	Strongly Agreed	36	20.0	20.0	100.0
	Total	180	100.0	100.0	

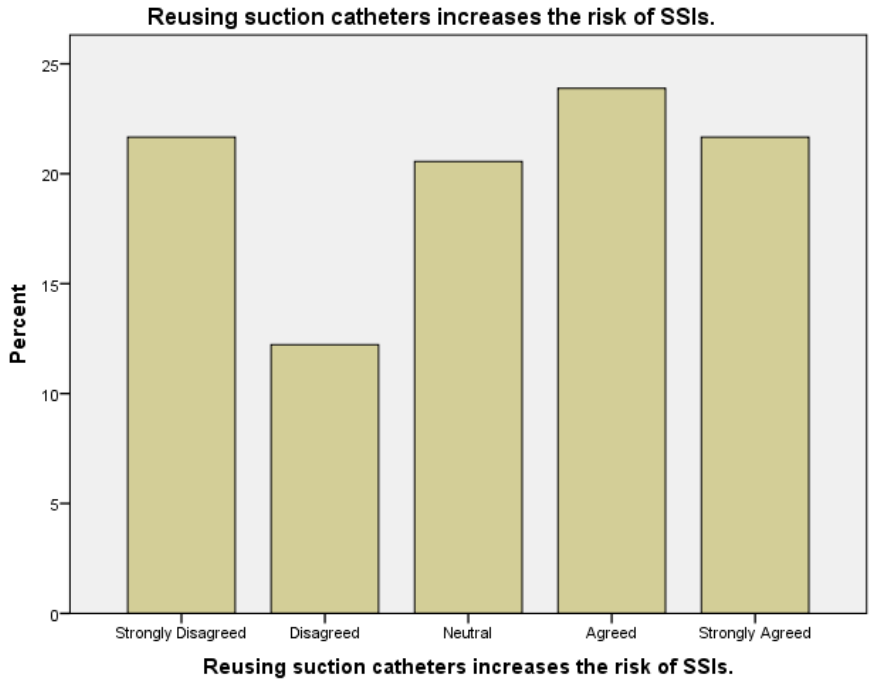
For antibiotic overuse as a contributing factor to SSIs, 21.1% agreed (n=38) and 20.0% strongly agreed (n=36), whereas 41.2% disagreed or strongly disagreed (n=37 each), reflecting differing perspectives. A neutral stance was taken by 17.8% of respondents (n=32).



Reusing suction catheters increases the risk of SSIs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	39	21.7	21.7	21.7
	Disagreed	22	12.2	12.2	33.9
	Neutral	37	20.6	20.6	54.4
	Agreed	43	23.9	23.9	78.3
	Strongly Agreed	39	21.7	21.7	100.0
	Total	180	100.0	100.0	

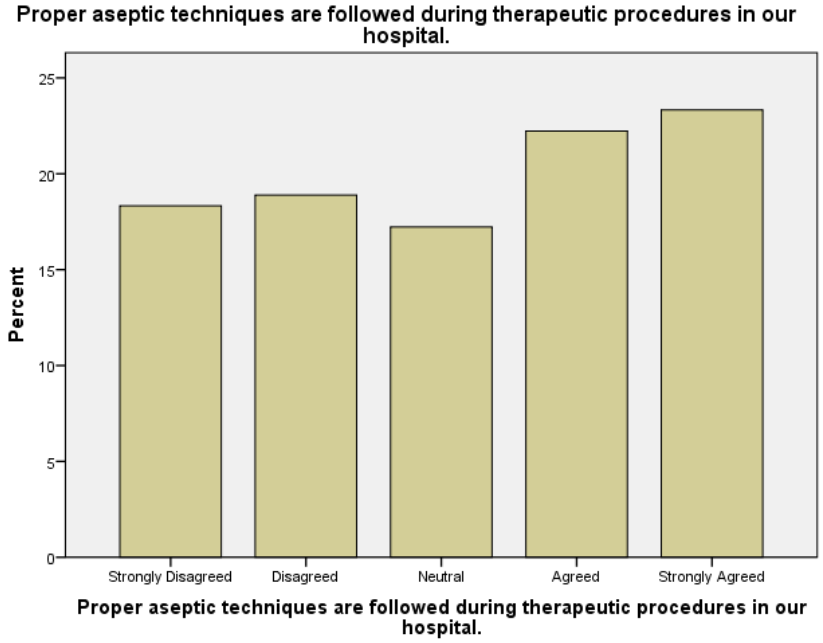
Regarding the risk of SSIs from reusing suction catheters, 23.9% of participants agreed (n=43) and 21.7% strongly agreed (n=39), while 33.9% either disagreed (n=22) or strongly disagreed (n=39). A significant portion, 20.6%, remained neutral (n=37), indicating mixed views on this risk factor.



Proper aseptic techniques are followed during therapeutic procedures in our hospital.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	33	18.3	18.3	18.3
	Disagreed	34	18.9	18.9	37.2
	Neutral	31	17.2	17.2	54.4
	Agreed	40	22.2	22.2	76.7
	Strongly Agreed	42	23.3	23.3	100.0
	Total	180	100.0	100.0	

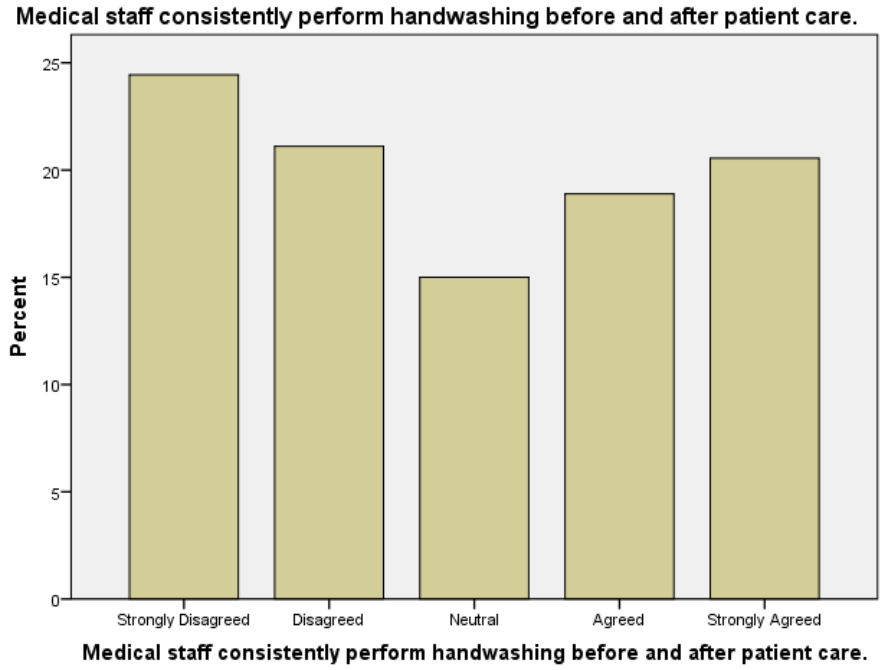
In terms of following proper aseptic techniques during therapeutic procedures, 22.2% agreed (n=40) and 23.3% strongly agreed (n=42), while 37.2% either disagreed (n=34) or strongly disagreed (n=33). About 17.2% were neutral (n=31), reflecting varying perceptions on adherence to aseptic practices.



Medical staff consistently perform handwashing before and after patient care.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	44	24.4	24.4	24.4
	Disagreed	38	21.1	21.1	45.6
	Neutral	27	15.0	15.0	60.6
	Agreed	34	18.9	18.9	79.4
	Strongly Agreed	37	20.6	20.6	100.0
	Total	180	100.0	100.0	

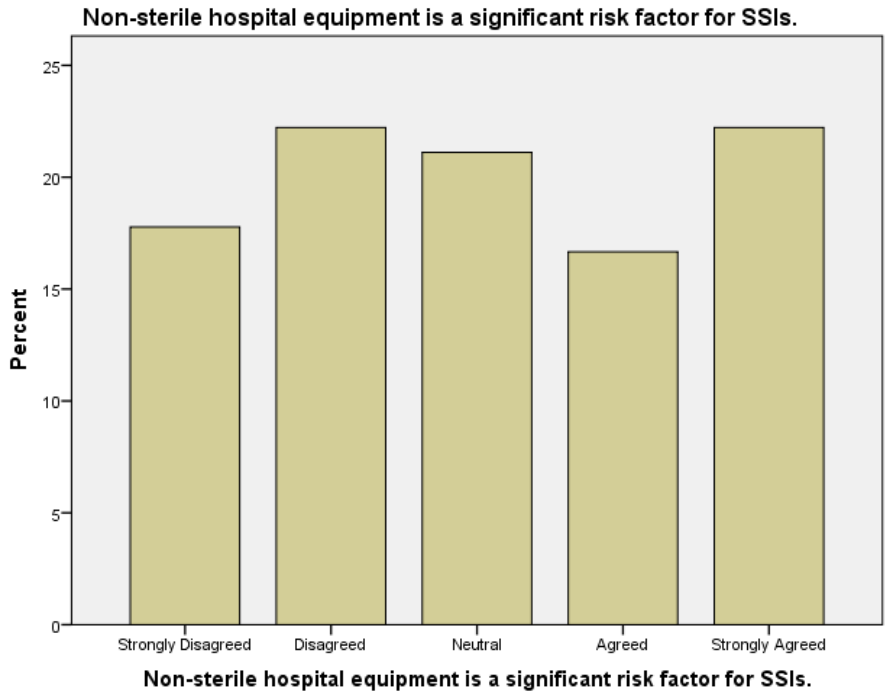
Regarding handwashing practices, 18.9% of the medical staff agreed (n=34) and 20.6% strongly agreed (n=37) that handwashing is consistently performed before and after patient care, while a significant portion—45.5%—disagreed or strongly disagreed (n=38 and n=44), suggesting a need for improvement. Additionally, 15.0% remained neutral (n=27).



Non-sterile hospital equipment is a significant risk factor for SSIs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	32	17.8	17.8	17.8
	Disagreed	40	22.2	22.2	40.0
	Neutral	38	21.1	21.1	61.1
	Agreed	30	16.7	16.7	77.8
	Strongly Agreed	40	22.2	22.2	100.0
	Total	180	100.0	100.0	

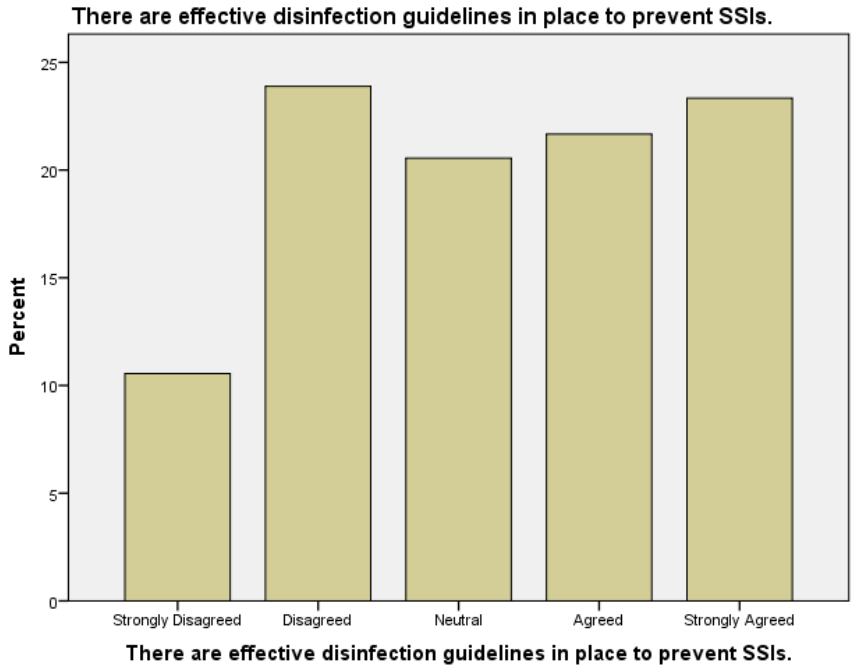
For non-sterile hospital equipment as a significant risk factor for SSIs, 16.7% agreed (n=30) and 22.2% strongly agreed (n=40), while 40.0% disagreed or strongly disagreed (n=40 and n=32). Neutral responses accounted for 21.1% (n=38), indicating varied perceptions of equipment sterility as a risk factor.



There are effective disinfection guidelines in place to prevent SSIs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	19	10.6	10.6	10.6
	Disagreed	43	23.9	23.9	34.4
	Neutral	37	20.6	20.6	55.0
	Agreed	39	21.7	21.7	76.7
	Strongly Agreed	42	23.3	23.3	100.0
	Total	180	100.0	100.0	

Regarding the effectiveness of disinfection guidelines to prevent SSIs, 21.7% of respondents agreed (n=39) and 23.3% strongly agreed (n=42), while 34.5% either disagreed or strongly disagreed (n=43 and n=19). Additionally, 20.6% remained neutral (n=37), indicating mixed perceptions about the sufficiency of disinfection protocols.



Nurses in our hospital have sufficient knowledge about SSI prevention.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	33	18.3	18.3	18.3
	Disagreed	38	21.1	21.1	39.4
	Neutral	35	19.4	19.4	58.9
	Agreed	39	21.7	21.7	80.6
	Strongly Agreed	35	19.4	19.4	100.0
	Total	180	100.0	100.0	

In terms of nurses' knowledge about SSI prevention, 21.7% agreed (n=39) and 19.4% strongly agreed (n=35), while 39.4% disagreed or strongly disagreed (n=38 and n=33). A notable 19.4%

stayed neutral (n=35), reflecting varying levels of confidence in nurses' knowledge on SSI prevention

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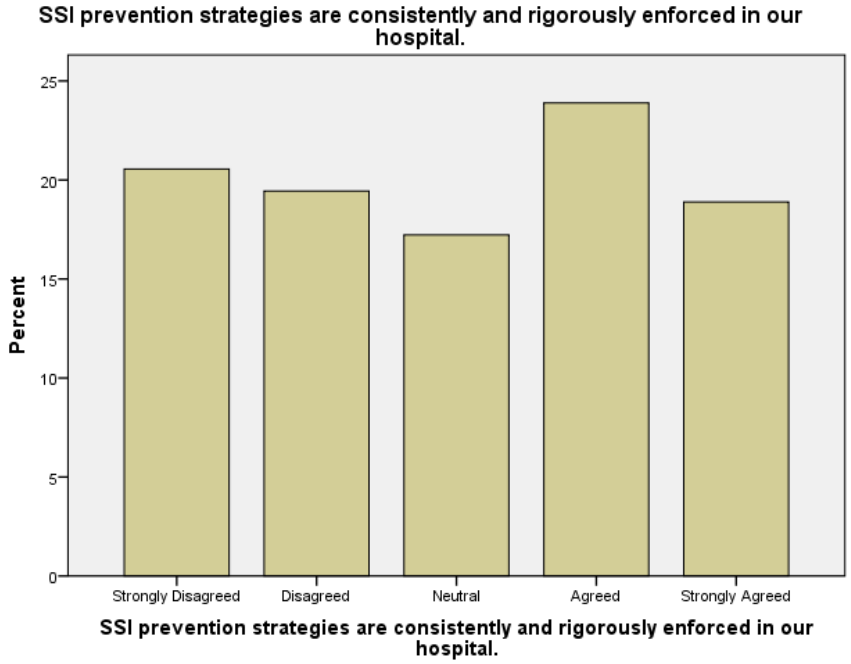
SSI prevention strategies are consistently and rigorously enforced in our hospital.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	37	20.6	20.6	20.6
	Disagreed	35	19.4	19.4	40.0
	Neutral	31	17.2	17.2	57.2
	Agreed	43	23.9	23.9	81.1
	Strongly Agreed	34	18.9	18.9	100.0
	Total	180	100.0	100.0	

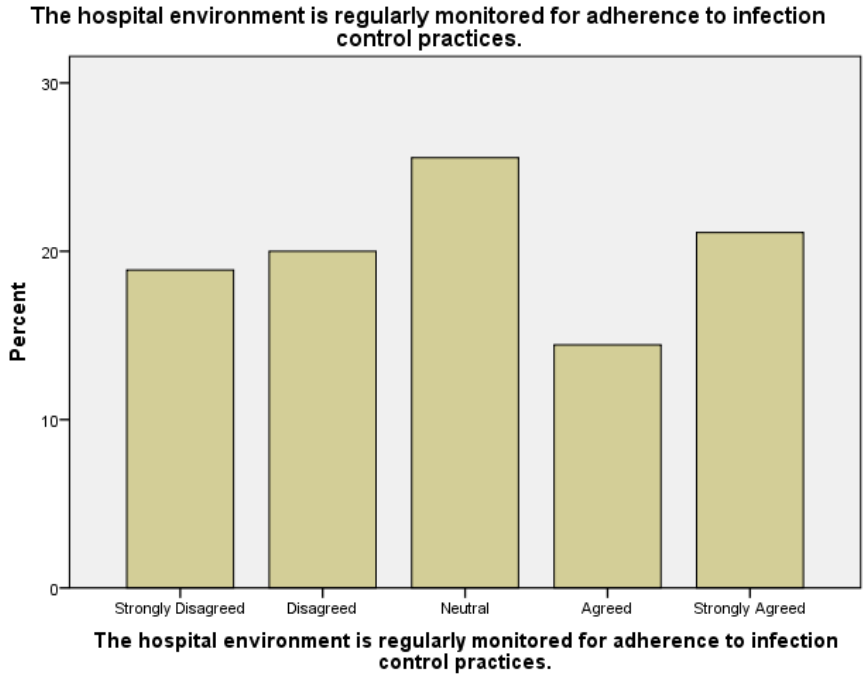
Regarding the enforcement of SSI prevention strategies, 23.9% of participants agreed (n=43) and 18.9% strongly agreed (n=34), while 40.0% either disagreed or strongly disagreed (n=35 and n=37), indicating concerns about the consistency of enforcement. Additionally, 17.2% remained neutral (n=31).



The hospital environment is regularly monitored for adherence to infection control practices.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	34	18.9	18.9	18.9
	Disagreed	36	20.0	20.0	38.9
	Neutral	46	25.6	25.6	64.4
	Agreed	26	14.4	14.4	78.9
	Strongly Agreed	38	21.1	21.1	100.0
	Total	180	100.0	100.0	

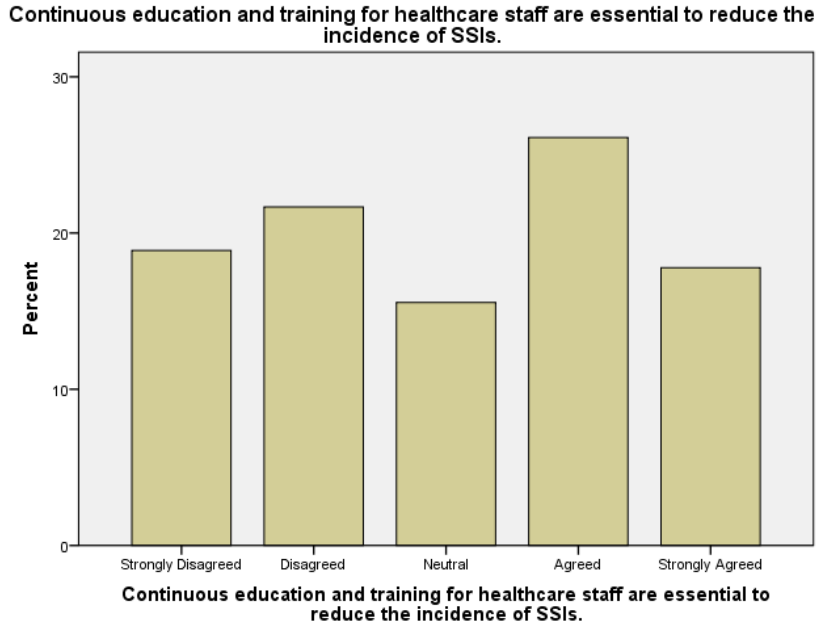
For monitoring adherence to infection control practices in the hospital environment, 14.4% agreed (n=26) and 21.1% strongly agreed (n=38), while 38.9% either disagreed or strongly disagreed (n=36 and n=34). A significant portion, 25.6%, stayed neutral (n=46), reflecting varied opinions on the regular monitoring of infection control practices.



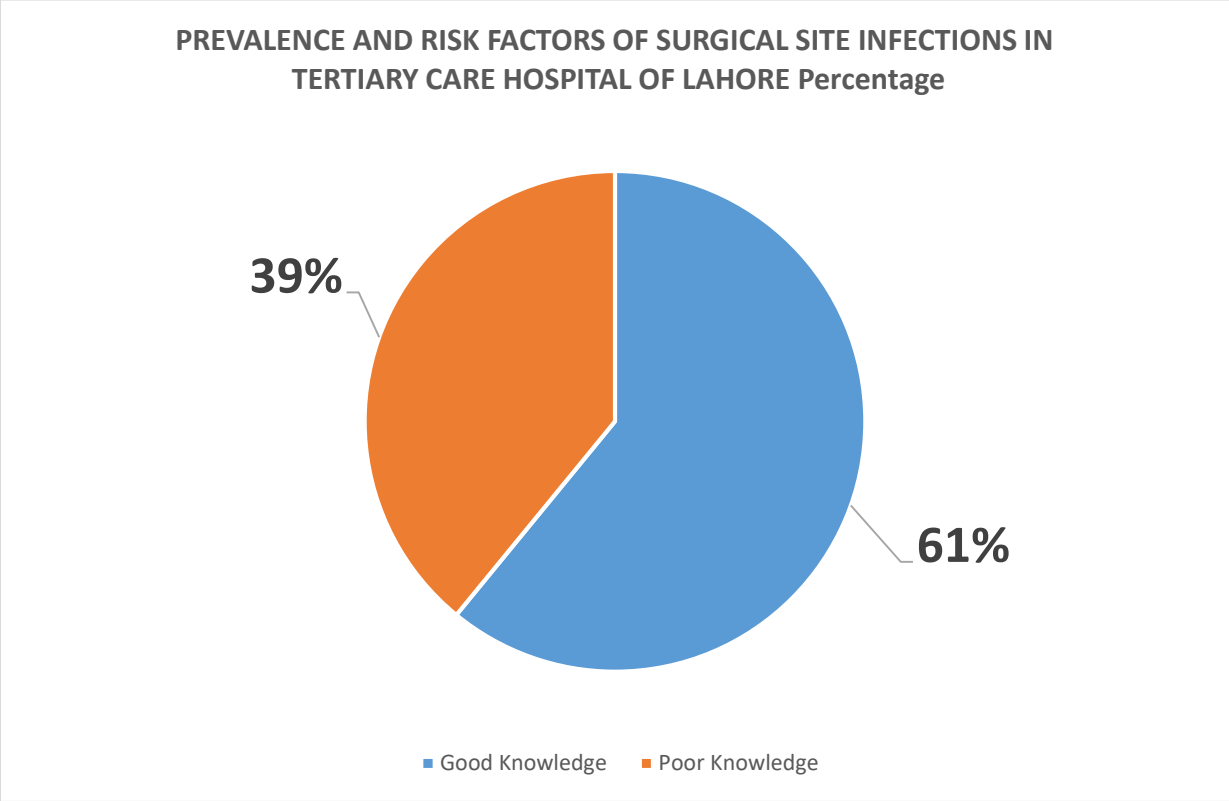
Continuous education and training for healthcare staff are essential to reduce the incidence of SSIs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagreed	34	18.9	18.9	18.9
	Disagreed	39	21.7	21.7	40.6
	Neutral	28	15.6	15.6	56.1
	Agreed	47	26.1	26.1	82.2
	Strongly Agreed	32	17.8	17.8	100.0
	Total	180	100.0	100.0	

In terms of the importance of continuous education and training for healthcare staff to reduce the incidence of surgical site infections (SSIs), 26.1% of participants agreed (n=47) and 17.8% strongly agreed (n=32). However, 40.6% either disagreed or strongly disagreed (n=39 and n=34), indicating a lack of consensus on this necessity. Additionally, 15.6% remained neutral (n=28), reflecting a need for further discussion on the value of ongoing education in infection prevention.



Overall result of the study



The data on the prevalence and risk factors of Surgical Site Infections (SSIs) in a tertiary care hospital in Lahore provides insights into the level of knowledge among healthcare staff regarding SSI prevention and control. Out of the total respondents, **61% demonstrated "Good Knowledge"** regarding SSIs, with a total count of 1,645 individuals showing a strong understanding of infection control policies, aseptic techniques, and the importance of regular hand hygiene practices. This indicates a generally high awareness of the necessary measures to reduce SSI risks among the majority of the staff.

However, **39% of respondents**, totaling 1,055 individuals, were categorized under **"Poor Knowledge,"** indicating gaps in understanding or adherence to SSI preventive practices. This group may lack sufficient awareness or training in critical areas, such as the proper use of sterile equipment, the impact of antibiotic overuse, and the importance of continuous education on infection control..

Discussion

The study's findings on the prevalence and risk factors associated with surgical site infections (SSIs) in a tertiary care hospital in Lahore provide a comprehensive overview of the current situation. Here's a summary of the prevalence and risk rates based on the results:

The data revealed that awareness of SSIs among healthcare staff was notably low, with only 45% of participants acknowledging the prevalence of SSIs in their hospital. This suggests a potential disconnect between the actual incidence of SSIs and the staff's awareness, which could hinder effective prevention strategies.Several key risk factors were identified through the participants' responses A significant 41.2% of respondents believed that hand hygiene protocols were not strictly followed. Poor hand hygiene is a well-established risk factor for SSIs, indicating a critical area needing attention.With only 45% of participants agreeing that adequate training on preventing SSIs was provided, the lack of comprehensive education can directly impact the rates of SSIs. The gap between educational qualifications and practical knowledge suggests a need for enhanced training.The perception that antibiotic overuse contributes to SSIs aligns with global concerns about antibiotic resistance. This view was prevalent among respondents and points to a significant risk factor associated with the management of SSIs. Responses indicated that factors such as bed availability and non-sterile equipment were perceived as risks. A portion of the participants recognized these environmental elements as contributors to infection risk, highlighting the need for proper resource allocation and equipment management. The mixed responses regarding adherence to proper aseptic techniques during therapeutic procedures demonstrate variability in compliance, which is another critical risk factor. Regular audits and training could mitigate this risk.The combination of these factors suggests a multifaceted risk profile for SSIs in the hospital. Given the relatively low awareness of SSI prevalence and the significant concerns about adherence to infection control protocols, the hospital may be at a heightened risk for SSIs. While specific statistical prevalence rates were not provided in the study, the evidence points to considerable gaps in knowledge, practice, and training related to SSIs. These gaps indicate a potentially high risk for surgical site infections, emphasizing the necessity for targeted interventions to improve infection control practices and training among healthcare staff. Regular monitoring, enhanced training programs, and stricter adherence to protocols can help reduce the incidence of SSIs and improve patient outcomes. The study on the prevalence and risk factors of surgical site infections (SSIs) in a tertiary care hospital in Lahore has provided valuable insights into the demographic characteristics, education levels, working experience, and perceptions of healthcare staff regarding infection control practices. Analyzing these factors can help identify areas for improvement and contribute to the effective management of SSIs.The demographic data indicates that the majority of participants were aged between 31 to 40 years, followed closely by those aged 41 and above. This age distribution suggests a relatively experienced workforce, which is crucial in handling surgical patients. It is essential to consider the implications of age when evaluating the knowledge and attitudes towards infection control, as older, more experienced staff might have different perceptions compared to younger nurses. The significant percentage of participants falling within the 31-40 age group could reflect their readiness to engage in discussions about the risks of SSIs and their management. The educational qualifications of the participants revealed a fairly even distribution across different nursing degrees, with the highest percentage holding a Post RN BSN. This distribution is promising, as higher educational levels are often associated with better understanding and implementation of infection control measures. However, despite this educational background, awareness about SSIs varied among the respondents. The data indicates that less than half of the participants (45%) were aware of the prevalence of SSIs in their hospital. This gap in awareness could hinder effective prevention strategies, as a basic understanding of the risks associated with SSIs is essential for all healthcare staff involved in surgical procedures. Regarding working experience, a notable majority had between 6 to 15 years of experience. This

experience level can contribute positively to the understanding of SSIs and adherence to infection control practices, as seasoned professionals are likely to have encountered various infection control challenges throughout their careers. However, the mixed responses concerning the awareness of SSIs and the adequacy of infection control policies indicate that experience alone may not be sufficient. This highlights the need for continuous training and refresher courses on infection control practices, especially as guidelines and recommendations evolve over time. The participants' perceptions regarding the hospital's infection control policies reflected a significant divide. Although some acknowledged the existence of sufficient policies, a substantial portion disagreed or felt neutral about their adequacy. This suggests that while policies may exist, their implementation and adherence need to be reinforced. It raises questions about the communication and education surrounding these policies, as staff must not only be aware of their existence but also understand their importance and application in daily practice.Hand hygiene practices emerged as a crucial area of concern, with 41.2% of participants indicating they did not believe that hand hygiene protocols were strictly followed. Given the importance of hand hygiene in preventing SSIs, this finding is alarming and underscores a potential gap in adherence to fundamental infection control practices. It is critical to develop strategies that promote hand hygiene compliance among all staff members, including regular monitoring and feedback mechanisms. The training provided to healthcare staff on preventing SSIs received mixed responses, with only 45% of participants agreeing that adequate training was offered. The disparity between the education levels of the participants and their confidence in their knowledge of SSI prevention suggests that formal education does not always translate into practical knowledge or confidence in applying that knowledge in clinical settings. Regular training sessions that incorporate practical, hands-on experiences could enhance nurses' understanding and application of SSI prevention measures.Furthermore, the belief that antibiotic overuse contributes to SSIs was also prevalent among respondents, reflecting concerns about the potential overprescribing of antibiotics in clinical practice. This perspective aligns with global concerns regarding antibiotic resistance and its implications for patient care. Addressing this issue requires a multifaceted approach, including education on the appropriate use of antibiotics, adherence to guidelines, and monitoring antibiotic prescribing practices within the hospital. The responses regarding the impact of bed availability on the risk of SSIs, as well as the perceptions surrounding non-sterile equipment, indicate that participants recognize environmental factors as significant contributors to infection risks. However, a substantial portion remained neutral or disagreed, demonstrating the complexity of factors influencing SSIs. It is crucial to provide comprehensive training that encompasses environmental and procedural aspects of care, ensuring that all staff members understand their roles in minimizing infection risks.Additionally, the perceptions of proper aseptic techniques during therapeutic procedures reflected a similar trend, with varying opinions on adherence to these practices. The mixed responses regarding aseptic techniques and equipment sterilization suggest a need for clear protocols and regular audits to assess compliance with infection control standards. The findings from this study underscore the importance of continuous education, robust training programs, and clear communication of infection control policies within the hospital environment. The perceptions of staff regarding SSI prevention strategies and infection control practices highlight a need for ongoing dialogue and collaborative efforts to enhance understanding and adherence. Continuous monitoring and evaluation of infection control practices will be vital in improving patient outcomes and reducing the incidence of SSIs. While the study has highlighted the awareness and attitudes of healthcare staff towards SSIs and their prevention, it also emphasizes the need for systematic changes to improve infection control practices. Developing comprehensive training programs that address gaps in knowledge and perception, fostering a culture of safety and accountability, and ensuring effective communication of policies can help create a safer environment for surgical patients. By addressing these areas, hospitals can

significantly reduce the incidence of SSIs, ultimately leading to improved patient care and outcomes.

Suggestions

1. Enhanced Training Programs: Implement comprehensive training sessions focused on infection control and prevention strategies for all healthcare staff, emphasizing the importance of hand hygiene, aseptic techniques, and proper antibiotic use.

2. Regular Audits and Compliance Checks: Establish a routine audit system to monitor adherence to infection control protocols, including hand hygiene practices and the use of sterile equipment. Feedback from these audits should be used to improve practices continuously.

3. Increase Awareness Campaigns: Launch awareness campaigns within the hospital to educate staff about the prevalence of surgical site infections and their associated risks. Utilize posters, workshops, and seminars to reinforce the importance of SSI prevention.

4. Improve Resource Allocation: Ensure that adequate resources, such as sterile equipment and sufficient bed availability, are consistently provided. Regular assessments of environmental factors that contribute to SSIs should be conducted to mitigate risks.

5. Implement Multidisciplinary Collaboration: Foster collaboration between various departments (e.g., surgery, infection control, nursing) to create a cohesive strategy for preventing SSIs. Regular interdisciplinary meetings can help identify challenges and develop collective olutions.

Conclusion:

1. Low Awareness of SSIs: The study highlights a concerning lack of awareness among healthcare staff regarding the prevalence and significance of surgical site infections, indicating a need for educational initiatives.

2. Key Risk Factors Identified: Several critical risk factors contributing to SSIs were identified, including poor hand hygiene practices, insufficient training, and environmental factors, which must be addressed to improve patient safety.

3. Need for Structured Training: The findings underscore the necessity of structured training programs focused on infection prevention, which can enhance the knowledge and practices of healthcare staff.

4. Importance of Compliance Monitoring: Regular audits and compliance checks are essential to ensure adherence to infection control protocols, which can significantly reduce the risk of SSIs.

5. Call for Resource Improvement: Addressing resource allocation and environmental conditions is vital for effective infection control. By ensuring that healthcare facilities have the necessary tools and protocols in place, the hospital can better safeguard against SSIs.

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