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FREQUENCY OF WOUND INFECTIONS IN HIGH-RISK PATIENTS UNDERGOING OBSTETRIC AND GYNECOLOGY SURGERIES COMBINED MILITARY HOSPITAL, PESHAWAR

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ABSTRACT

Surgical site infection (SSI) is among the most frequent and consequential postoperative gynecological complications to date and is still a major public health concern. It remains a significant cause of morbidity; it complicates 2–5% of open gynecological operations. Objective: Thus, the objective of this study was to establish the prevalence of SSIs in high risk obstetric and gynecological patients who underwent surgery.

Study Design: *Descriptive case series Study Settings and Duration: The study was performed at the Department of Obstetrics & Gynecology, Combined Military Hospital, Peshawar from 7 November 2021 to 7 May 2022. Materials and Methods: Participants were mainly women who had been operated via obstetric or gynecologic surgeries, and their SSIs were observed for 15 postoperative days. The symptoms/clinical presentation of SSI, including erythema, induration and slight discharge at the site of the incision were also assessed. Data was analyzed using SPSS. Results: The analysis included 157 patients who met the inclusion criteria before undergoing the interventions. There were 83 participants, the age was distributed between 30 and 70 years and the mean age was 40.11 years old (SD ± 13.37). They noted surgical site infection in 52 patients giving a rate of 33. 1%.*

Conclusion: *The findings of the study also identified that the overall SSIs were high (33.1%). This higher rate may be explained by poor socio-economic status, poor Nutritional health and other related co morbidities.*

Keywords: *OB/GYN Procedures; surgical complications; wound infection; postoperative complication; high risk patients.*

INTRODUCTION

A wound infection after surgery is called a postoperative wound infection. The rate of this infection varies from hospital to hospital, and the site of infection may be confined to the suture line or may extend to the surgical site. Surgical site infection is a type of nosocomial infection[1]. Surgical site infections are the most frequent nosocomial infections following urinary tract infection, they represent 20 to 39% of all nosocomial infections[2]. This classification is based on the estimated degree of bacterial contamination of the wound edge before closure

during surgery; therefore, the presence of microorganisms in the surgical wound during surgery can increase the risk of infection at the surgical site. Studies have linked the microbial colonization of the skin of patients before surgery with the risk of infection[3].

Surgery site infection is one of the most common gynecological complications[4].

Surgical site infection (SSI) is a major health problem worldwide. It is one of the most common causes of morbidity in open gynecological patients, occurring in about 2 to 5% of cases[5]. A study conducted in Sylvia 7% of the patients develop surgical site infection 55% superficial and 45% organs space undergoing laparotomy for gynecological surgery[6]. Surgical incisional infection rates according to traditional classifications were 2.1% for clean surgery, 3.3% for clean surgery, 6.4% for infection, and 7.1% for surgery for dirty cases or infected[7]. We treat several surgical infections in each OPD. The goal of obstetricians and gynecological surgeons is to prevent infection of the surgical site. After elective and emergent procedures, these infections are the main cause of morbidity. Severesequelae such as sepsis, septic shock, embolism, pelvic abscess, thrombophlebitis, wound abscess, and omental growth may exacerbate the underlying acute and severe infection. Many risk factors including advanced age, multiple births, obesity related to diabetes, hypertension and many more have been reported[8]. Any surgery has the risk of complications. The risk of postoperative complications depends on age, comorbidities, and functional characteristics[9]. Known potential risk factors during the surgical examination of the patient, and this should be part of good clinical practice. Any complications, such as abdominal adhesions, visceral injuries and postoperative infections, should be discussed with previous abdominal surgery, including indications and approaches. Diseases that complicate surgery should also be considered, such as endometriosis, cancer, coagulopathy, and obesity, because they increase the chance of injury[10]. Local intrinsic factors include tissue damage that occurred during surgery, the presence of non-viable or necrotic tissue, the presence of foreign bodies, and the establishment of skin microbes. Systemic intrinsic factors include tissue hypoxia, advanced age, blood transfusions, malnutrition, obesity, diabetes and other chronic diseases, smoking, and situations where immune suppressants such as steroids are involved[11]. Exogenous factors include surgery lasting more than 2 hours, lack of antibiotic prophylaxis, and intraoperative contamination (cleanliness, clean contamination, stains and stains) that depend on the type of surgery[12].

This study aims to determine the frequency of the surgical site wound infection of patients undergoing obstetrics and gynecological elective and emergency surgeries in a tertiary care hospital. The patient comorbidities, hygiene and types of wound infection also determined.

METHODE AND MATERIALS

Study Setting and Duration

The study was conducted at the Department of Obstetrics & Gynecology, Combined Military Hospital (CMH), Peshawar, a renowned institution providing specialized medical care. The research spanned a duration of six months, from November 7, 2021, to May 7, 2022. This timeframe allowed for the collection of comprehensive data regarding the frequency of surgical site infections (SSI) in high-risk patients undergoing obstetric and gynecological surgeries, ensuring a robust sample for analysis.

Power Calculation & Sample size estimation and Study design

The sample size for this study was estimated by using the WHO software for sample size estimation for sample surveys norms. At 95% confidence interval, 7% proportion of SSI, and 4% margin of error, the sample size calculated was 157 patients. This study was planned as the descriptive case series to evaluate the rate of SSIs in patients with the comorbid diseases or the factors predisposing them to the infection.

Sampling Technique and Sampling Criteria of Inclusion and Exclusion

In this study, consecutive non probability sampling technique was used to enroll participants who fulfilled the inclusion criteria. The study therefore targeted female patients aged 30-70 years who had undergone obstetric or gynecological surgery and irrespective of parity, nulliparous or multiparous. The researcher excluded patients having neurological diseases or those who were unconscious because such conditions may have distorted the results or hindered post-operative management of the patients.

Data Collection and Procedure

It was conducted in the department of Gynecology of CMH Peshawar and was approved by College of Physicians and Surgeons Pakistan (CPSP). Having assured the subjects' informed consent we took their medical, surgical, personal and family history. Operative aspect including the type of surgery, duration, blood loss and if there was any complication like adhesion during surgery was also well recorded. Subsequently, the patient required wound cleaning and minor debridement before application of sterile dressing and then transfer of the patient to the ward. Recordation was made through a structured format- a proforma so as to ensure that all the major aspects of the disease had been recorded as much as possible.

Statistics Concepts and Analysis Techniques

The collected data was analyzed using SPSS Version 20. Age duration of hospital stay, and BMI were recorded as numerical variables where the measures of central tendency were mean and measures of dispersion as standard deviation. In case of categorical variables, such as anemia, obesity, hypertension, diabetes, cardiac diseases, previous operations and wound infections, the frequencies and percentages were determined. The patients were divided into different groups according to the different risk factors and to analyze the significance of connection between the wound infection and these factors a chi square test was used and the prevalence level used was 5%.

The Analysis and Presentation of Data

The results obtained from the study were presented in tables and graphs which provided a logical presentation of the data. It provided the basis for an easier interpretation of the results that revealed the trends and dependencies that might explain the frequency of SSIs for patients with obesity in the obstetric and gynecological surgery field. The lack of ambiguity in the outcome can also be attributed to the fact that the results obtained were un-complicated and while can be easily used in future research or in practice.

RESULTS

Demographics and Health Measures

Table 1 presents the demographics and basic health measures of the patients enrolled in the study. The mean age of the patients was 40.11 years, with a range from 21 to 67 years, suggesting that most patients were middle-aged. The hospital stay ranged from 2 to 13 days, with a mean of 6.13 days, indicating moderate postoperative recovery times. The weight of patients varied between 48 kg and 77 kg, with a mean weight of 58.99 kg. The height ranged from 153 cm to 165 cm, with a mean of 159.17 cm. Regarding BMI, the mean value was 22.96 kg/m^2, which falls within the normal weight range, but with a noticeable variance, indicating that some patients were overweight or obese.

Frequencies and Percentages for Key Health Variables

Table 2 breaks down the frequencies and percentages for various health categories. In terms of age, most patients (73.9%) were between the ages of 30-50 years, which is typical for patients undergoing gynecological and obstetric procedures. The prevalence of obesity was significant, with 42.7% of patients categorized as obese, highlighting a potential risk factor for complications like surgical site infections (SSI). Anemia was present in 33.8% of patients, which may contribute to poor wound healing and increased infection risk. Finally, the SSI rate was 33.1%, with 52 out of 157 patients developing infections, indicating a notable incidence of post-operative complications.

Stratification of SSI with Demographics

Table 3 presents the stratification of SSI according to age, obesity, and anemia. In terms of age, there was a slight trend indicating that younger patients (30-50 years) were more likely to develop SSI (34.5%) compared to older patients (29.3% in the 51-70 years group), but the difference was not statistically significant (P-value = 0.542).Obesity also showed no significant association with SSI, with 38.8% of obese patients developing SSI compared to 28.9% of non-obese patients (P-value = 0.192). Anemia was also not significantly associated with SSI, with a slight increase in the SSI rate among anemic patients (37.7%) compared to non-anemic patients (30.8%) (P-value = 0.380).

SSI Stratified by Hospital Stay, Hypertension, and Diabetes Mellitus

Table 4, we examine how **hospital stay**, **hypertension**, and **diabetes mellitus** influence the incidence of SSI. Hospital stay duration did not significantly affect the likelihood of SSI. Patients with shorter hospital stays (5 days or fewer) had a similar SSI rate (32.9%) to those with longer stays (33.3%), with a P-value = 0.953, indicating no statistically significant difference. The presence of hypertension also showed no significant correlation with SSI (P-value = 0.936), as both hypertensive (32.7%) and non-hypertensive patients (33.3%) had similar infection rates. Diabetes mellitus was slightly more prevalent in patients with SSI (37.8%) compared to those without (31.3%), but this was not statistically significant (P-value = 0.432).

Hospital Stay: SSI rates were similar across

SSI with Cardiac Issues, Previous Surgery, and Stratified Obesity

Table 5 investigates whether cardiac issues, previous surgery, and obesity influence SSI development. Cardiac issues did not show a significant relationship with SSI, with similar infection rates observed in patients with (31.6%) and without (33.6%) cardiac issues (P-value = 0.817).Previous surgery was also not significantly associated with SSI, as 40.5% of patients with a history of surgery developed SSI, compared to 30.8% in those without a previous surgical history (P-value = 0.273).again, obesity did not show any significant difference, with similar infection rates in both obese and non-obese patients (P-value = 0.192).

Final Stratification of SSI with Age, Hospital Stay, and Other Conditions

Finally, Table 6 combines various stratifications to assess potential factors influencing SSI. The results show that none of the factors—age, hospital stay duration, obesity, or anemia—demonstrated a statistically significant relationship with the development of SSI.

Age: No significant difference in SSI between younger (30-50 years) and older (51-70 years) patients (P-value = 0.542).

both short (5 days or fewer) and longer stays (Pvalue = 0.953).

Obesity: The prevalence of SSI remained similar in both obese and non-obese groups (P-value = 0.192).

Anemia: The infection rates were slightly higher among anemic patients, but this difference was not statistically significant (P-value = 0.380).

Conclusion and Implications

Therefore, it was revealed in this study that the SSI incidence in high-risk obstetrics and gynecology patients was 33.1%. Conversely, after defragmenting SSI according to such subgroups as age, obesity, hypertension, and

diabetes, no relevant correlations were established. This indicates that other factors, which might not have been captured in this study or are more subtle in form could play a role in development of SSI in these patients. Social inequalities, inadequate nutrition, and the coexistence of various chronic diseases might be almost more influential for infection development. These results signify the importance of continued research and more effective prevention tools, continuous patient surveillance as well as effective wound and operative follow-up among high risk patients.

TABLE 1. DEMOGRAPHICS AND BASIC HEALTH MEASURES (Age, Hospital Stay, Weight, Height, BMI) Combined Military Hospital, Peshawar.

Measure	Minimum	Maximum	Mean	Std. Deviation
Age (years)	21	67	40.11	13.373
Hospital Stay (days)	2	13	6.13	2.980
Weight (kg)	48	77	58.99	6.068
Height (cm)	153	165	159.17	2.906
BMI (kg/m²)	19.0	30.1	22.96	2.5806

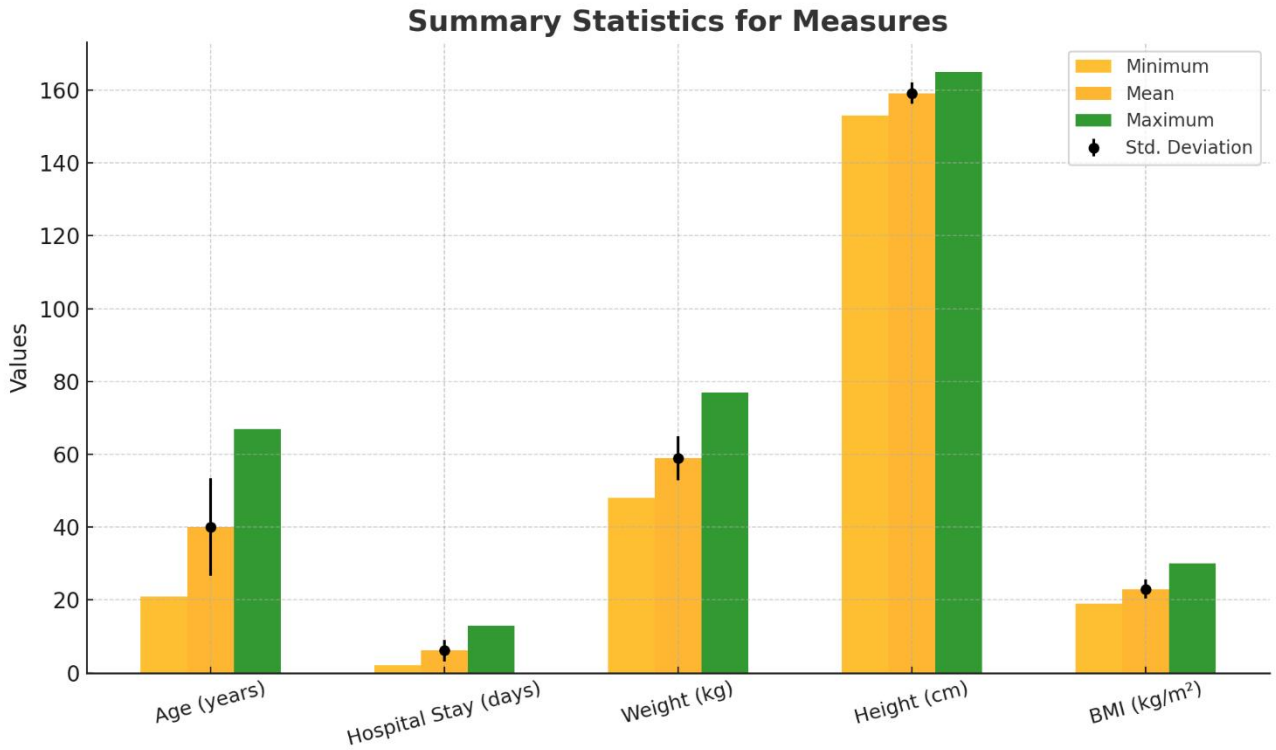


TABLE 2. FREQUENCIES AND PERCENTAGES FOR PATIENTS BY AGE, OBESITY, ANEMIA, AND SURGICAL SITE INFECTION Combined Military Hospital, Peshawar.

Category	Subcategory	Frequency	Percent
Age (years)	30-50	116	73.9%
	51-70	41	26.1%
Obesity	Yes	67	42.7%
	No	90	57.3%
Anemia	Yes	53	33.8%
	No	104	66.2%
Surgical Site Infection	Yes	52	33.1%
	No	105	66.9%

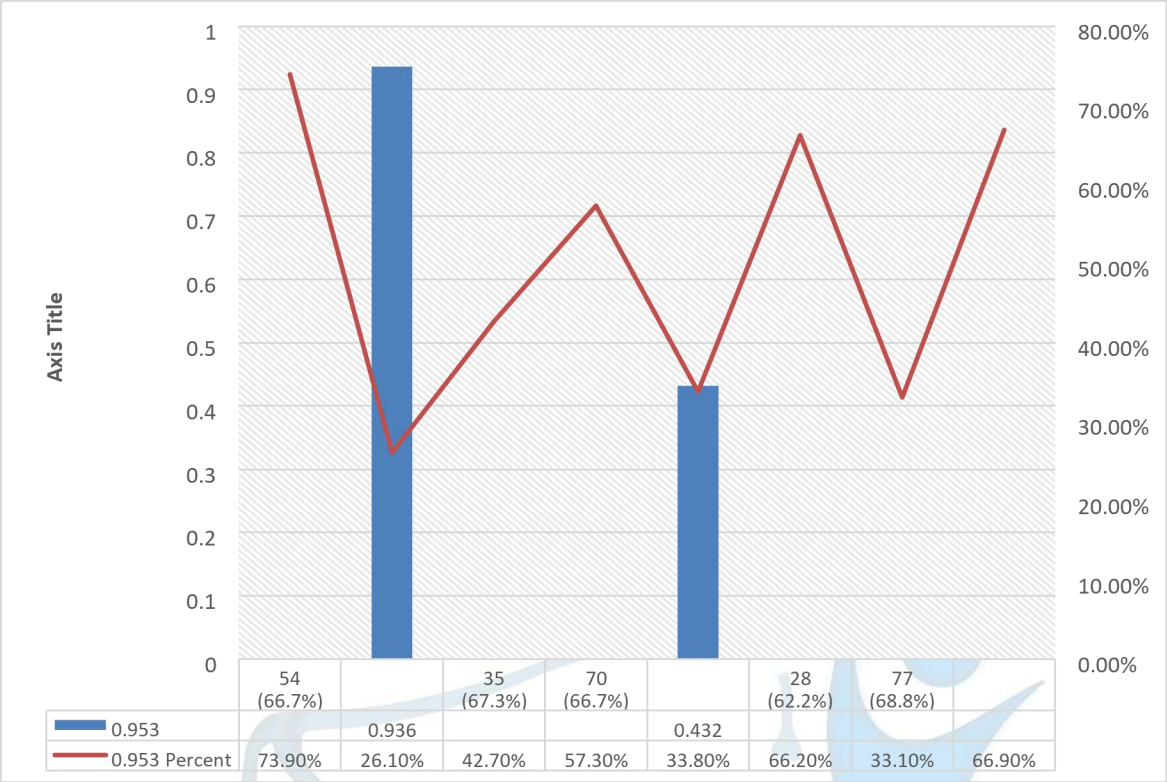


TABLE 3. STRATIFICATION OF SURGICAL SITE INFECTION (SSI) WITH DEMOGRAPHICS (Age, Obesity, Anemia) Combined Military Hospital, Peshawar.

Category	SSI Yes	SSI No	Total	P-value
Age (years)				0.542
30-50	40 (34.5%)	76 (65.5%)	116	
51-70	12 (29.3%)	29 (70.7%)	41	
Obesity				0.192
Yes	26 (38.8%)	41 (61.2%)	67	
No	26 (28.9%)	64 (71.1%)	90	
Anemia				0.380
Yes	20 (37.7%)	33 (62.3%)	53	
No	32 (30.8%)	72 (69.2%)	104	

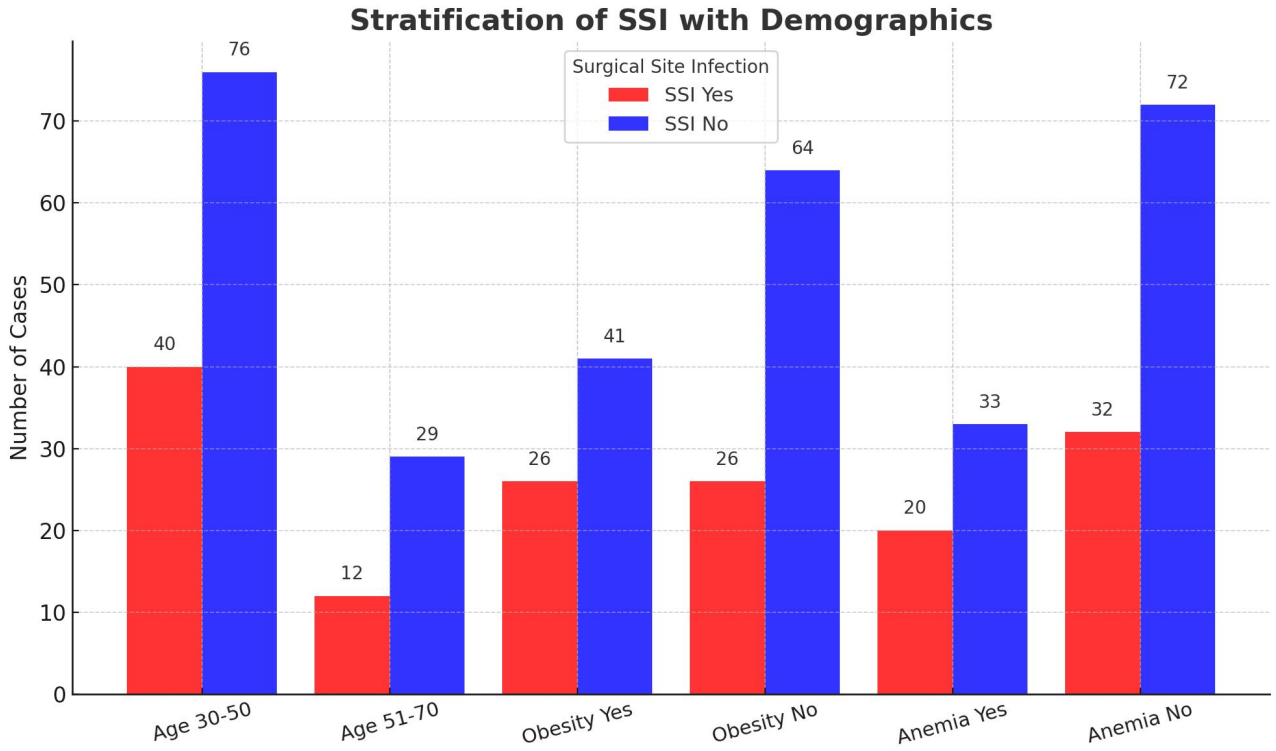


TABLE 4. STRATIFICATION OF SURGICAL SITE INFECTION (SSI) WITH HOSPITAL STAY, HYPERTENSION, AND DIABETES MELLITUS Combined Military Hospital, Peshawar.

Category	SSI Yes	SSI No	Total	P-value
Hospital Stay				0.953
5 or below	25 (32.9%)	51 (67.1%)	76	
More than 5	27 (33.3%)	54 (66.7%)	81	
Hypertension				0.936
Yes	17 (32.7%)	35 (67.3%)	52	
No	35 (33.3%)	70 (66.7%)	105	
Diabetes Mellitus				0.432
Yes	17 (37.8%)	28 (62.2%)	45	
No	35 (31.3%)	77 (68.8%)	112	

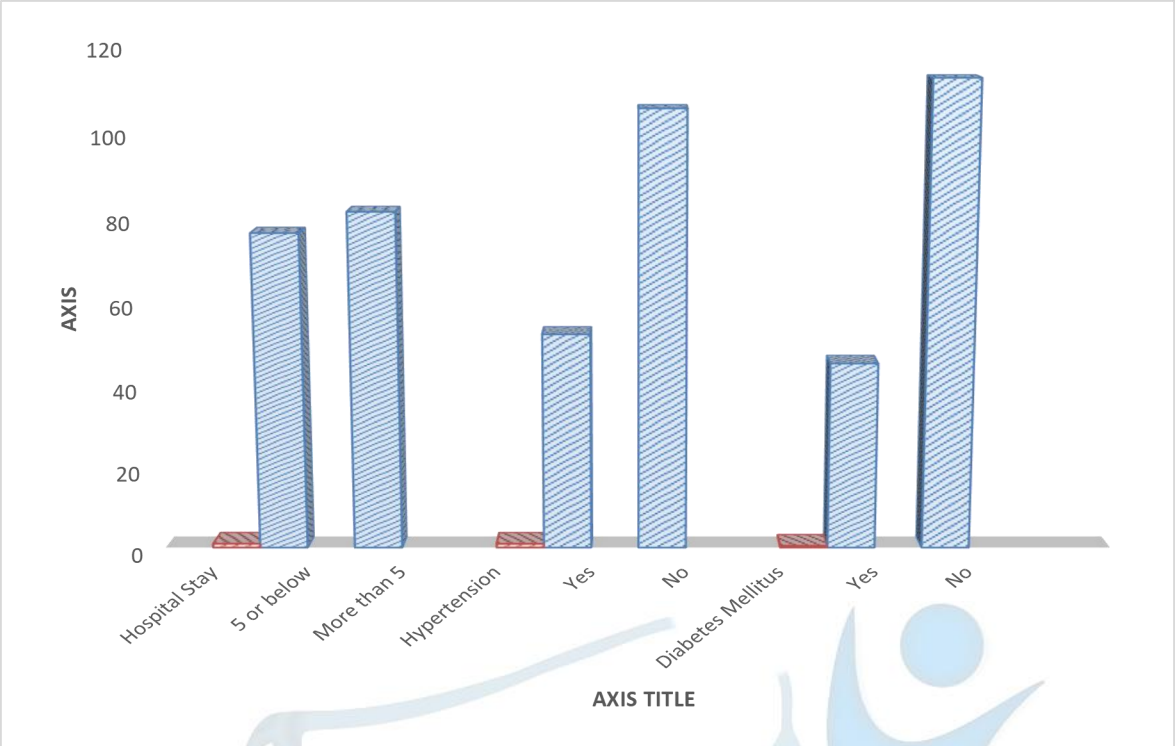


TABLE 5. STRATIFICATION OF SURGICAL SITE INFECTION (SSI) WITH CARDIAC ISSUE, PREVIOUS SURGERY, AND STRATIFIED OBESITY Combined Military Hospital, Peshawar.

Category	SSI Yes	SSI No	Total	P-value
Cardiac Issue				0.817
Yes	12 (31.6%)	26 (68.4%)	38	
No	40 (33.6%)	79 (66.4%)	119	
Previous Surgery				0.273
Yes	15 (40.5%)	22 (59.5%)	37	
No	37 (30.8%)	83 (69.2%)	120	
Obesity				0.192
Yes	26 (38.8%)	41 (61.2%)	67	
No	26 (28.9%)	64 (71.1%)	90	

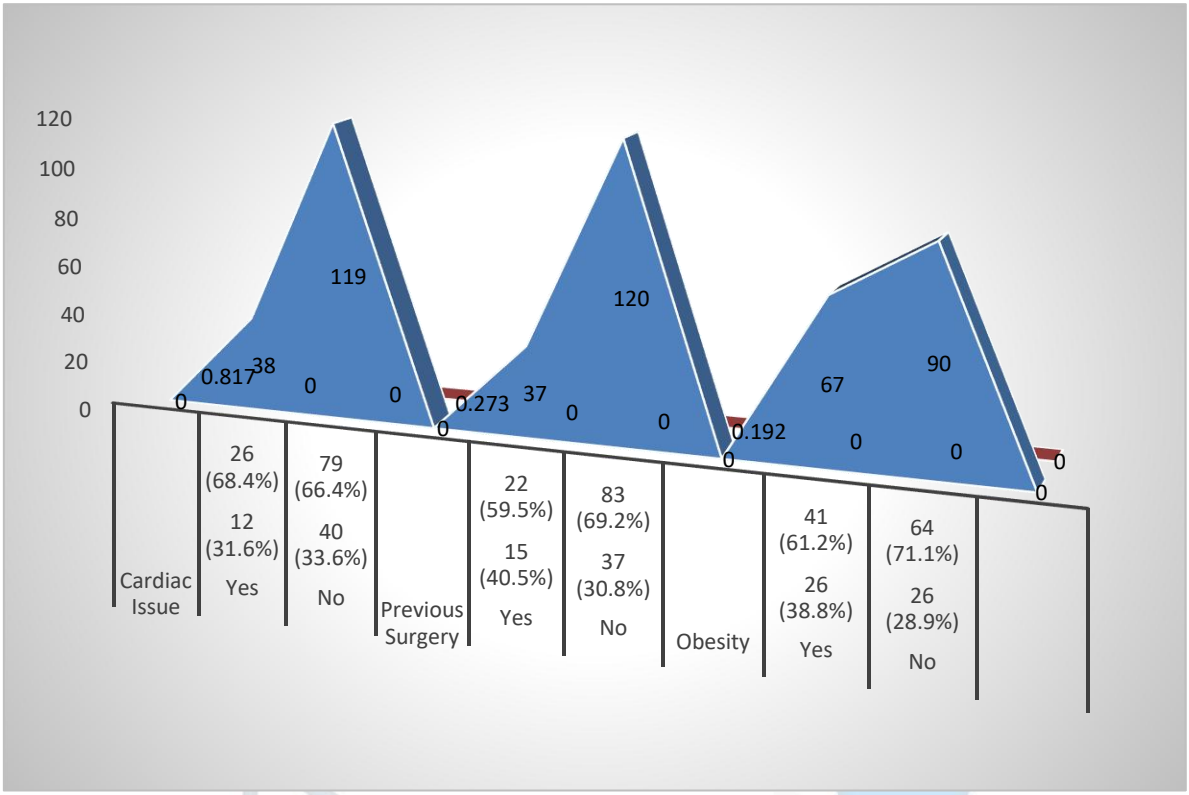
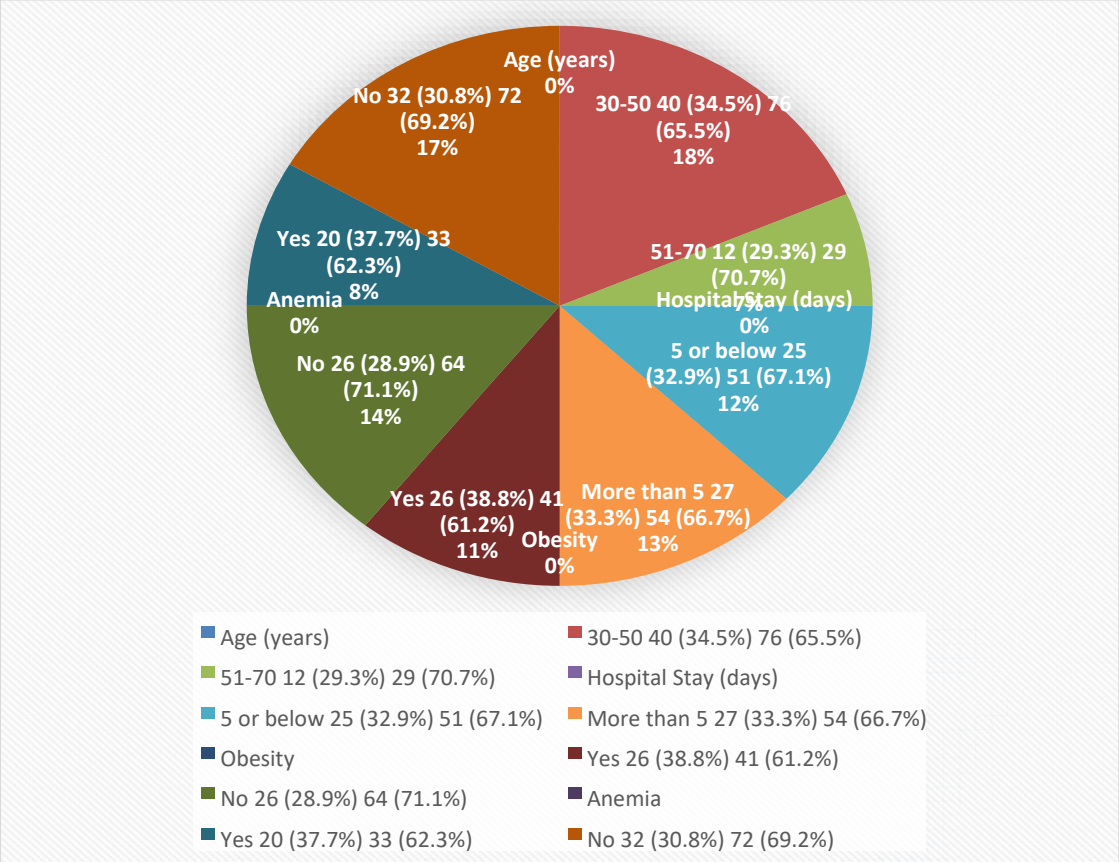


TABLE 6. FINAL STRATIFICATION OF SURGICAL SITE INFECTION (SSI) WITH AGE, HOSPITAL STAY, AND OTHER CONDITIONS Combined Military Hospital, Peshawar**.**

Category	SSI Yes	SSI No	Total	P-value
Age (years)				0.542
30-50	40 (34.5%)	76 (65.5%)	116	
51-70	12 (29.3%)	29 (70.7%)	41	
Hospital Stay (days)				0.953
5 or below	25 (32.9%)	51 (67.1%)	76	
More than 5	27 (33.3%)	54 (66.7%)	81	
Obesity				0.192
Yes	26 (38.8%)	41 (61.2%)	67	
No	26 (28.9%)	64 (71.1%)	90	
Anemia				0.380
Yes	20 (37.7%)	33 (62.3%)	53	
No	32 (30.8%)	72 (69.2%)	104	



DISCUSSION

The overall SSI rate in this study was 33.1%, reflecting the impact of key risk factors such as BMI, hemoglobin levels, and blood sugar. Patients with BMI >25 kg/m², hemoglobin <11 g/dL, and blood sugar >140 mg/dL were at significantly higher risk of developing SSI, consistent with findings in prior studies [13,15,18-21]. While no significant difference was observed between elective and emergency surgeries, the study highlights the need for tailored pre-operative and post-operative measures to mitigate risks, particularly in cases involving comorbidities like diabetes, anemia, and obesity. Additionally, the type of surgery also influenced SSI rates, with total abdominal hysterectomies showing the highest incidence.

These findings emphasize the importance of addressing modifiable risk factors, improving surgical infrastructure, and adhering to uniform antibiotic and infection control protocols. Inadequate resources and varying practices contribute to the higher SSI rates seen in this region compared to developed countries. With proper knowledge dissemination, standardized techniques, and localized studies to address specific challenges, the SSI incidence can be substantially reduced. This study underscores the critical role of healthcare providers in recognizing and rectifying local factors to decrease morbidity associated with SSIs.

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PRO-FORMA

Case No.: _____ **Dated**: _____
Name of Patient: _____ **Registration No.**: _____ **Age of Patient (in years)**: _____
Address: _____ **Duration of Hospital Stay (in days)**: _____
Contact No.: _____ **BMI**: _____
Hygiene of Patient
• Good: ☐
• Poor: ☐

Comorbidities
• Anemia: Yes ☐ / No ☐
• Obesity: Yes ☐ / No ☐
• Hypertension: Yes ☐ / No ☐
• Diabetes: Yes ☐ / No ☐
• Previous Surgeries: Yes ☐ / No ☐
• Cardiac Disease: Yes ☐ / No ☐
• Renal Disorder: Yes ☐ / No ☐
• Previous Chronic Antibiotic Use: Yes ☐ / No ☐

Type of Wound Infection
• Pus Discharge: ☐
• Blood-Stained Discharge: ☐
• Other (Please specify): _____