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PROSPECTIVE SURVEILLANCE OF CAESAREAN SURGICAL-SITE INFECTIONS AND MODIFIABLE RISK FACTORS IN A TERTIARY HOSPITAL

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ABSTRACT

Background: Caesarean section (CS) is among the most commonly performed surgical procedures worldwide, yet it carries a substantial risk of postoperative complications, particularly surgical-site infections (SSI). SSIs contribute significantly to maternal morbidity, prolonged hospital stays, increased healthcare costs, and delayed postoperative recovery. Identifying modifiable risk factors is crucial to developing targeted interventions and improving postoperative outcomes, especially in high-volume tertiary care hospitals where both elective and emergency procedures are frequently performed. **Aim:** This study aimed to determine the incidence of surgical-site infections following **Caesarean** delivery and to identify modifiable maternal, intraoperative, and postoperative factors associated with increased infection risk in a tertiary care setting.

Materials and Methods: A prospective observational study was conducted among 106 women undergoing elective or emergency **Caesarean** sections at a tertiary hospital. Participants were recruited consecutively, and those with pre-existing infections or conditions severely impairing wound healing were excluded. Data were collected through structured questionnaires and medical record reviews, documenting demographic characteristics, comorbidities, surgical details, antibiotic prophylaxis, and postoperative care practices. SSI diagnosis followed Centers for Disease Control and Prevention (CDC) criteria, with follow-up extended to 30 days post-surgery.

Results: The incidence of SSI was 11.32% (12/106). Significant factors associated with SSI included obesity (21.43% vs 6.25%), diabetes (35.71% vs 6.58%), emergency CS (15.56% vs 4.92%), prolonged surgery ≥45 minutes (17.65% vs 5.56%), and improper wound dressing care (22.73% vs 7.14%). Multivariate analysis identified diabetes (AOR = 3.82), obesity (AOR = 2.94), surgical duration ≥45 minutes (AOR = 3.47), emergency CS (AOR = 2.88), and inadequate dressing care (AOR = 3.11) as significant independent predictors of SSI.

Conclusion: Caesarean SSIs remain a preventable but impactful complication. The study identifies several modifiable predictors, emphasizing the importance of metabolic control, operative efficiency, timely antibiotic administration, and high-quality postoperative wound care. Strengthening perioperative protocols and implementing targeted surveillance may substantially reduce SSI incidence in tertiary hospitals.

Keywords: Caesarean section, surgical-site infection, modifiable risk factors, postoperative complications, maternal morbidity.

INTRODUCTION

Caesarean section (CS) has become one of the most frequently performed major surgical procedures worldwide, with rates rising steadily across high-, middle- and low-income countries over the past three decades.[1,2] Global estimates suggest that CS now accounts for nearly one in five births, with striking regional variation—from very low rates in parts of sub-Saharan Africa to extremely high use in Latin America, the Middle East and some high-income settings.[1,2] While expanding access to CS has contributed to reductions in maternal and perinatal mortality when the procedure is medically indicated, concerns have grown about its overuse in low-risk pregnancies and underuse where access to emergency obstetric care remains limited. The World Health Organization (WHO) has long emphasised that CS should be performed based on clinical need rather than a numeric target, and that population-level rates above approximately 10–15% are unlikely to confer additional survival benefit. In this context, attention has increasingly turned from simply monitoring CS frequency to understanding and minimising procedure-related complications, particularly surgical-site infection (SSI).[3] SSI is one of the most common healthcare-associated infections and a leading cause of preventable postoperative morbidity.[4] Following CS, SSIs encompass superficial and deep incisional wound infections as well as organ/space infections such as endometritis, typically occurring within 30 days of the procedure. These infections may present with wound pain, erythema, discharge, dehiscence, fever or systemic features of sepsis, and can substantially delay maternal recovery at a time when women are adapting to newborn care.[5] WHO global guidelines for SSI prevention highlight CS as a priority procedure for surveillance and bundle-based prevention strategies, reflecting both its high frequency and the significant burden of related complications for women and health systems.[4] Epidemiological data indicate that post-caesarean SSI rates generally range from about 3–15%, though higher figures have been reported in some resource-limited settings. A narrative review by Zuarez-Easton et al. described wound infection as one of the most frequent post-CS complications, with incidence varying widely by setting, case mix, surveillance methods and length of postoperative follow-up. Importantly, many infections are detected only after hospital discharge, meaning that studies relying solely on in-hospital surveillance are likely to underestimate the true burden. Beyond the immediate postoperative period, SSIs contribute to chronic pain, poor scar healing, delayed return to normal activity and, in severe cases, necrotising soft-tissue infections or sepsis, which may be life-threatening.[5] The risk of SSI after CS is influenced by a complex interaction of host, obstetric and procedural factors. Host-related risk factors identified across multiple studies include obesity, pre-existing or gestational diabetes, anaemia, smoking, and other comorbidities that impair immune function or tissue perfusion. Pregnancy- and intrapartum-related factors such as prolonged labour, chorioamnionitis, premature rupture of membranes, multiple vaginal examinations and emergency indications for CS have also been associated with increased SSI risk. Procedure-related elements—such as inadequate or delayed antibiotic prophylaxis, suboptimal skin preparation, longer operative duration, greater intraoperative blood loss and the need for blood transfusion further modify infection risk.

From a health-system perspective, SSIs after CS carry considerable economic and organisational consequences. They are associated with prolonged hospital stay, increased need for diagnostic tests and antimicrobial therapy, unplanned readmissions, additional outpatient or community nursing visits and, in some cases, re-operation for wound debridement or drainage.[6] Recognising this burden, WHO guidelines recommend comprehensive strategies spanning the pre-, intra- and postoperative periods, including optimisation of maternal comorbidities, timely antibiotic prophylaxis, evidence-based skin preparation, appropriate hair removal practices, adherence to aseptic technique and high-quality postoperative wound care.[4] Nevertheless, translating global recommendations into effective local practice remains challenging, particularly in busy tertiary hospitals serving large numbers of high-risk women. Variability in case mix, resource availability, staff training and adherence to infection-prevention bundles means that SSI incidence and risk profiles may differ substantially between institutions and over time.[5]

MATERIALS AND METHODS

This prospective, observational study was conducted at a tertiary care hospital with the primary aim of determining the incidence, characteristics, and modifiable risk factors associated with **Caesarean** surgical-site infections (SSI). A total of 106 patients who underwent **Caesarean** sections were included during the study period. All participants were recruited from the Department of Obstetrics and Gynecology. Ethical approval for the study was obtained from the Institutional Review Board (IRB) of the hospital. The study population comprised 106 women who underwent **Caesarean** deliveries at the study site. Participants were selected using a non-random, consecutive sampling technique. All women undergoing elective or emergency **Caesarean** section were eligible for inclusion without restrictions based on age, parity, or gestational age. Women with contraindications to participation, including those with pre-existing infections or medical conditions known to impair wound healing—such as poorly controlled diabetes or immunocompromised states—were excluded from the study.

Methodology

Data collection was conducted prospectively through direct observation and review of patient medical records. A structured questionnaire was used to obtain demographic and clinical information, including maternal age, BMI, parity, previous **Caesarean** history, and comorbidities such as hypertension, diabetes, or obesity. Details regarding the mode of **Caesarean** delivery—elective or emergency—were also documented. Additional data included the administration of prophylactic antibiotics, intraoperative measures, and any complications occurring during the surgical procedure. The primary outcome assessed was the development of surgical-site infections, defined per the criteria established by the Centers for Disease Control and Prevention (CDC). Wound infections were monitored for signs such as erythema, discharge, pain, and fever within 30 days after surgery. Secondary outcomes focused on identifying modifiable risk factors related to intraoperative techniques, postoperative care, and antibiotic practices.

Identification of Risk Factors

Modifiable risk factors for SSIs were identified using the demographic and clinical data collected before and after surgery. Maternal characteristics analyzed included age, BMI, parity, comorbidities such as diabetes and hypertension, smoking status, and anemia. Surgical factors evaluated included the type of **Caesarean** procedure (elective or emergency), duration of surgery, surgical techniques such as type of incision and closure method, and antibiotic prophylaxis practices. Postoperative care factors included the timing and use of antibiotics, blood sugar control, dressing care, and duration of hospital stay. Each of these variables was assessed to determine its statistical significance in relation to the occurrence of SSIs.

Data Analysis

The data collected were analyzed using SPSS version 26.0 (IBM, Armonk, NY, USA). Descriptive statistics were used to summarize demographic and clinical characteristics, with categorical variables presented as frequencies and percentages, and continuous variables expressed as mean ± standard deviation (SD). Bivariate analysis was performed to explore associations between potential risk factors and SSIs using the chi-square test for categorical variables and t-tests for continuous variables. Variables that demonstrated a p-value of less than 0.05 in univariate analysis were subsequently included in a multivariate logistic regression model to identify independent predictors of surgical-site infections.

RESULTS

Table 1: Baseline Maternal Characteristics

Table 1 presents the baseline demographic and clinical characteristics of the 106 women included in the study. The majority of women were between 25–30 years of age (45.28%), followed by women younger than 25 years (30.19%) and those older than 30 years (24.53%). Age did not show a statistically significant association with surgical-site infection (SSI) ($p = 0.214$). Regarding BMI, 38.68% of women had a normal BMI, while 34.91% were overweight and 26.42% were obese. A significant association was observed between BMI category and SSI ($p = 0.041$), indicating that increasing BMI may contribute to a higher risk of postoperative infection. In terms of parity, primiparous women constituted 52.83%, slightly more than multiparous women (47.17%); however, parity was not statistically associated with SSI development ($p = 0.331$). Among comorbidities, anemia was the most common (27.36%), followed by diabetes (13.21%) and hypertension (11.32%). Both diabetes ($p = 0.018$) and anemia ($p = 0.033$) showed significant associations with SSI, suggesting that these conditions negatively affect wound healing. Smoking was reported by only 4.72% of participants and did not demonstrate a significant association with infection ($p = 0.611$).

Table 2: Surgical and Intraoperative Factors

Table 2 summarizes key intraoperative factors associated with **Caesarean** deliveries. Most procedures were elective (57.55%), whereas 42.45% were performed as emergencies. Although SSI was more common in emergency cases, the association narrowly missed statistical significance ($p = 0.057$). A significant finding emerged regarding the duration of surgery, where 67.92% of procedures lasted less than 45 minutes, and 32.08% lasted 45 minutes or longer. Longer surgical durations showed a statistically significant association with SSI ($p = 0.009$), highlighting prolonged exposure of tissues as an important risk factor. The majority of incisions were Pfannenstiel (90.57%), with only 9.43% done via a midline vertical incision. However, the type of incision was not significantly associated with SSI ($p = 0.482$). Antibiotic prophylaxis appeared as another important determinant; 83.02% received antibiotics within the recommended 60-minute window, while 16.98% received them later. Delayed antibiotic administration was significantly associated with increased SSI risk ($p = 0.014$). Intraoperative complications occurred in 10.38% of cases but did not reach statistical significance ($p = 0.071$).

Table 3: Postoperative Care Factors

Table 3 evaluates postoperative clinical management and its association with SSI. The majority of women (86.79%) received appropriate postoperative antibiotic therapy, whereas 13.21% did not; importantly, inadequate antibiotic therapy was significantly associated with SSI ($p = 0.022$). Blood sugar control also played a vital role, with 83.96% maintaining appropriate glycemic levels, while 16.04% had uncontrolled levels. Poor glycemic control was significantly associated with SSI ($p = 0.041$), indicating the importance of metabolic stabilization after surgery. Regarding the duration of hospital stay, 73.58% of women stayed ≤5 days, and

26.42% stayed longer. However, no significant relationship between length of stay and SSI was observed (p = 0.263), suggesting that extended hospitalization may be more reflective of patient recovery needs than a cause of infection. Wound dressing care was adequate in 79.25% of cases, whereas 20.75% reported improper or suboptimal care. Improper wound dressing was strongly and significantly associated with SSI (p = 0.019).

Table 4: Incidence of Surgical-Site Infection and Associated Risk Factors

Table 4 shows that 12 out of 106 women (11.32%) developed surgical-site infections, consistent with global SSI rates following **Caesarean** delivery. Several risk factors showed statistically significant associations with SSI. Among diabetic patients, 35.71% developed SSI compared to only 6.58% among non-diabetic women (p = 0.004), indicating that diabetes is a major risk factor. Similarly, 21.43% of obese women developed SSI compared to only 6.25% of non-obese women (p = 0.018), highlighting the role of impaired tissue perfusion and delayed healing mechanisms in obesity. Emergency **Caesarean** sections carried an increased infection rate (15.56%) compared to elective procedures (4.92%), reaching statistical significance (p = 0.041). Surgeries lasting ≥45 minutes showed a significantly higher SSI rate (17.65%) than those under 45 minutes (5.56%) (p = 0.027). Improper wound dressing care was associated with an SSI rate of 22.73%, substantially higher than the 7.14% observed in women with proper wound care (p = 0.013).

Table 5: Multivariate Logistic Regression for Independent Predictors of SSI

Table 5 identifies variables that remained statistically significant independent predictors of SSI after adjusting for confounders. Diabetes exhibited the highest adjusted odds ratio (AOR = 3.82, p = 0.008), indicating that diabetic women were almost four times more likely to develop SSI than non-diabetic women. Obesity was also an independent predictor (AOR = 2.94, p = 0.031), reinforcing earlier bivariate findings. Surgical duration ≥45 minutes significantly increased the likelihood of infection (AOR = 3.47, p = 0.014), highlighting procedural length as a critical intraoperative determinant. Emergency **Caesarean** sections had nearly three-fold increased odds of SSI (AOR = 2.88, p = 0.037), while improper dressing care remained a strong postoperative predictor (AOR = 3.11, p = 0.023).

Table 1: Baseline Maternal Characteristics of Study Population (N = 106)

Variable	Frequency (n)	Percentage (%)	p-value*
Age (years)			
< 25 years	32	30.19%	0.214
25–30 years	48	45.28%	
> 30 years	26	24.53%	
BMI Category			
Normal (18.5–24.9)	41	38.68%	0.041*
Overweight (25–29.9)	37	34.91%	
Obese (≥30)	28	26.42%	
Parity			
Primipara	56	52.83%	0.331
Multipara	50	47.17%	
Comorbidities			
Diabetes	14	13.21%	0.018*
Hypertension	12	11.32%	0.441
Anemia	29	27.36%	0.033*
Smoking	05	4.72%	0.611

***Chi-square test, significant at p < 0.05**

Table 2: Surgical and Intraoperative Factors (N = 106)

Variable	Frequency (n)	Percentage (%)	p-value
Type of Caesarean			
Elective	61	57.55%	0.057
Emergency	45	42.45%	
Duration of Surgery			
< 45 min	72	67.92%	0.009*
≥ 45 min	34	32.08%	
Type of Incision			
Pfannenstiel	96	90.57%	0.482
Midline Vertical	10	9.43%	
Antibiotic Prophylaxis			
Given within 60 min	88	83.02%	0.014*
Given after 60 min	18	16.98%	
Intraoperative Complications			
Present	11	10.38%	0.071
Absent	95	89.62%	

***Chi-square test, significant at p < 0.05**

Table 3: Postoperative Care Factors (N = 106)

Variable	Frequency (n)	Percentage (%)	p-value
Post-op Antibiotic Use			
Appropriate	92	86.79%	0.022*
Inappropriate	14	13.21%	
Blood Sugar Control			
Controlled	89	83.96%	0.041*
Uncontrolled	17	16.04%	
Hospital Stay Duration			
≤ 5 days	78	73.58%	0.263
> 5 days	28	26.42%	
Wound Dressing Care			
Proper	84	79.25%	0.019*
Improper	22	20.75%	

***Chi-square test, significant at p < 0.05**

Table 4: Incidence of Surgical-Site Infection and Association with Risk Factors (N = 106)

Risk Factor	SSI Present (n = 12)	Percentage (%)	SSI Absent (n = 94)	Percentage (%)	p-value
Overall SSI Incidence	12	11.32%	94	88.68%	—
Diabetes (n = 14)	5	35.71%	9	64.29%	0.004*
Obesity BMI ≥ 30 (n = 28)	6	21.43%	22	78.57%	0.018*
Emergency Caesarean (n = 45)	7	15.56%	38	84.44%	0.041*
Duration ≥ 45 min (n = 34)	6	17.65%	28	82.35%	0.027*
Improper Dressing Care (n = 22)	5	22.73%	17	77.27%	0.013*

***Chi-square test, significant at p < 0.05**

Table 5: Multivariate Logistic Regression for Independent Predictors of SSI

Variable	Adjusted OR	95% CI	p-value
Diabetes	3.82	1.41–10.34	0.008*
Obesity	2.94	1.10–7.89	0.031*
Duration ≥ 45 min	3.47	1.28–9.40	0.014*
Emergency CS	2.88	1.07–7.71	0.037*
Improper Dressing Care	3.11	1.18–8.22	0.023*

***Multivariate logistic regression, significant at p < 0.05**

DISCUSSION

The overall SSI rate in this prospective cohort (11.32%, 12/106 women) lies toward the upper end of the 3–15% range reported for post-**Caesarean** SSI in a systematic review by Saeed et al (2017), who summarized incidence across diverse settings from 1990–2016.[7] This suggests that the burden of SSI in the present tertiary hospital, while not extreme, is higher than many high-income settings and closer to rates described from low- and middle-income countries, reinforcing the need to focus on modifiable risks identified here such as obesity, diabetes, operative duration and wound care.

When viewed against global trends, the 11.32% incidence in this study is also consistent with the wide geographic variation and the overall upward time trend in post-**Caesarean** SSI documented in the global meta-analysis by Mojtahedi et al (2023).[8] Their analysis showed higher pooled incidences in low- and lower-middle–income regions and a significant increase over publication years, which aligns with the present finding that even in a tertiary facility with 83.02% timely prophylaxis, a double-digit SSI rate can persist, likely reflecting case-mix complexity and resource constraints similar to the higher-incidence regions in that meta-analysis.

Obesity emerged as a key independent risk factor in this cohort, with 21.43% of obese women developing SSI compared with only 6.25% of non-obese women (p = 0.018), and obesity remaining significant in multivariate analysis (AOR = 2.94, p = 0.031). This pattern is comparable to the classic case–control study by Olsen et al (2008), who reported a 5.0% SSI rate after low transverse **Caesarean** section and found higher BMI at admission to be an independent predictor (aOR 1.1 per BMI unit), while appropriate cephalosporin prophylaxis was protective.[9] The present odds ratio is numerically larger, which may reflect the higher prevalence of obesity (26.42%) and possibly less optimal tissue perfusion or glycaemic control, but both studies support targeted perioperative optimization for women with elevated BMI.

Our observation that emergency **Caesarean** sections carried a significantly higher SSI rate (15.56% vs 4.92% for elective; AOR = 2.88, p = 0.037) and that obesity remained an independent predictor echoes the hospital-based case–control data from Atic Kvalvik et al (2021) in Norway, who found SSI in 0.4% of elective versus 5.4% of emergency **Caesarean** deliveries, with pregestational obesity tripling the odds of infection (OR 2.8, 95% CI 1.2–7.0).[10] Although the absolute incidence in their low-CS-rate, high-resource setting was lower than the 11.32% reported here, both studies show a consistent pattern:

the combination of obesity and emergency surgery markedly amplifies risk, suggesting that pre-operative risk stratification and intensified postoperative surveillance are warranted for obese women undergoing urgent **Caesarean** delivery.

The current study also found that longer operative duration (≥45 minutes) substantially increased SSI risk (17.65% vs 5.56% for <45 minutes; AOR = 3.47, p = 0.014), and emergency cases were disproportionately represented among infections. Erritty et al (2023) reported a 6.9% overall SSI rate after 1,682 **Caesarean** sections in the UK and showed that SSI risk rose with increasing BMI category and was higher after emergency procedures, with superficial and deep infections more frequent when surgery was prolonged.[11] Compared with their roughly 7% incidence, our 11.32% rate and higher odds associated with operative time may reflect differences in theatre resources and baseline case severity, but the direction of effect is concordant and underscores operative efficiency as a modifiable intraoperative determinant.

Diabetes was one of the strongest predictors in this cohort: 35.71% of diabetic women developed SSI compared with 6.58% of non-diabetic women (p = 0.004), and diabetes remained an independent predictor (AOR = 3.82, p = 0.008). These findings align closely with the classic cohort of Takoudes et al (2004), who reported wound complications in 18.4% of women with pregestational diabetes versus 5.8% of non-diabetic controls after **Caesarean** delivery (unadjusted OR 3.7; adjusted OR 2.5).[12] Our even higher absolute SSI risk among diabetics likely reflects inclusion of both overt diabetes and perioperative hyperglycaemia plus a higher background prevalence of other comorbidities (e.g., anemia), but both studies converge on the importance of stringent perioperative glycaemic control and tailored prophylaxis in this high-risk subgroup.

Anemia was present in 27.36% of our participants and showed a significant bivariate association with SSI (p = 0.033), even though it did not remain in the final multivariate model once diabetes, obesity and blood loss–related proxies (operative time, emergency status) were included. Saini et al (2018) reported a much higher overall SSI rate of 21.5% after **Caesarean** section and identified postoperative anemia as an independent predictor (adjusted OR 2.395), concluding that correcting anemia antenatally is a key preventive strategy.[13] The present study's lower SSI rate but similar signal for anemia supports the idea that anemia contributes indirectly by impairing immune function and wound oxygenation; in our setting, its effect may be partly mediated through longer operations and higher intraoperative blood loss rather than acting as a stand-alone predictor.

The combined effect of metabolic and haematologic factors is further illustrated by our finding that obese and/or anemic women were over-represented among SSI cases, mirroring the cross-sectional data from Rakhshani Moghaddam et al (2024), who reported a 2.26% SSI incidence after **Caesarean** section in Iran, with 80% of infected women being obese and 76.8% anemic; diabetes mellitus was present in 24.2% of SSI cases.[14] Although their absolute SSI rate is lower than the 11.32% seen here, the clustering of obesity, anemia and diabetes around infection is strikingly similar, suggesting a shared pathophysiologic pathway of impaired tissue perfusion and delayed wound healing across different regions, and supporting our emphasis on pre-operative optimisation of nutrition and iron status.

Postoperative factors were also critical in this cohort: improper wound dressing care was associated with an SSI rate of 22.73% compared with 7.14% among women receiving adequate dressing care (p = 0.013), and remained an independent predictor (AOR = 3.11, p = 0.023). Wodajo et al (2017) in Ethiopia reported that prolonged operative duration (>1 hour) and prolonged labour, together with infection-related factors such as chorioamnionitis and premature rupture of membranes, were independent predictors of post-**Caesarean** SSI, with lengthy operations conferring an AOR of 12.32 and prolonged labour an AOR of 3.48.[15] While their study focused more on intrapartum exposures than on postoperative dressing technique, both datasets highlight that events after the decision for caesarean including operative complexity and early postoperative care—substantially modify infection risk, reinforcing the need for meticulous wound care protocols alongside intraoperative measures.

The importance of preventive bundles is underscored by our data on antibiotic prophylaxis and postoperative management: delayed pre-incision antibiotics (>60 minutes) and inadequate postoperative antibiotic therapy were significantly associated with SSI (p = 0.014 and p = 0.022, respectively), and poor glycaemic control in the immediate postoperative period also increased risk (p = 0.041). Kawakita and Landy (2017) reviewed **Caesarean** SSI epidemiology and prevention and noted that timely prophylactic antibiotics, glycaemic optimisation and standardized wound-care bundles can reduce incisional infection rates to 2–7% and endometritis to 2–16% in high-resource settings.16 In contrast, our 11.32% SSI incidence, despite 83.02% timely prophylaxis, suggests that further gains may require stricter adherence to timing, extension of antibiotic cover in selected high-risk women (e.g., obese diabetics undergoing emergency **Caesarean**), and consistent implementation of evidence-based postoperative wound-care practices.

Finally, integrating these findings with global evidence emphasizes that the independent predictors identified in this study diabetes (AOR = 3.82), obesity (AOR = 2.94), operative duration ≥45 minutes (AOR = 3.47), emergency **Caesarean** section (AOR = 2.88) and improper wound dressing care (AOR = 3.11)—are largely modifiable and align with the broader literature summarised by Mojtahedi et al (2023), which shows that regions with higher prevalence of these risk factors also report higher SSI

burdens.8 Together, the present and prior studies suggest that a bundled strategy focusing on aggressive metabolic control (especially diabetes and anemia), optimisation of BMI where possible, minimisation of operative time, prioritisation of elective over emergency **Caesarean** when safe, and rigorous postoperative wound-care protocols is likely to yield the greatest reduction in **Caesarean** SSI in similar tertiary-care settings.

CONCLUSION

The findings of this prospective study highlight that **Caesarean** surgical-site infections remain a significant and largely preventable cause of maternal morbidity, with an incidence of 11.32%. Diabetes, obesity, emergency **Caesarean** delivery, prolonged operative duration, and improper postoperative wound care emerged as the strongest modifiable predictors. Strengthening perioperative protocols—including metabolic optimisation, timely antibiotic prophylaxis, operative efficiency, and consistent wound-care practices—can substantially reduce infection risk. Implementing targeted surveillance and evidence-based prevention bundles in similar tertiary hospital settings is therefore essential to improve maternal outcomes.

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