

The Hidden Costs of Healing:Clinical and Economic Challenges of Suture Site Infections in Low Resource countries

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Introduction

Surgical Site Infection (SSI) is used to encompass the surgical wound and infections involving the body cavity, organs, which may or may not be associated with implants or prosthetic devices .

SSI is the most frequent type of hospital-acquired infection (HAI) in low-middle income countries (LMICs) and affects up to one-third of patients who have undergone a surgical procedure. While SSI incidence is much lower in high-income countries (HIC), however, it remains to be the second most frequent type of HAI .

SSIs can have major implications for patients, hospitals, and society; they increase morbidity as well as mortality , and as such may contribute to the burden on society in terms of healthcare costs (economic burden) and loss of years experienced in full health. SSIs may also result in excess healthcare utilization and costs. Previous studies have shown that costs can double, triple, or even increase six-fold for patients with an SSI compared with patients without an SSI , depending on the type of surgery, health care setting, and type of infection.

Global SSI rate after LSCS: 3–15%
Indian context: Estimated 10–25% depending on hospital setup and population.

Objectives-

- 1)To assess the prevalence and incidence of suture site infections (SSIs) in healthcare facilities across India.
- 3)To estimate the direct and indirect economic costs of managing SSIs including medical expenses, lost productivity, and patient out-of- pocket expenditures.
- 3)To provide recommendations for cost-effective interventions and policies to minimise the clinical and economic burden of SSIs in India.

Material and methods

This prospective observational study was performed at a tertiary care teaching hospital in Maharashtra state, India in the inpatient department of Obstetrics & Gynaecology at GGMC &Sir JJ group of Hospital, Mumbai. It is a state government-funded hospital, so the cost of treatment is borne by the state government.

All patients operated for cesarean section at the study institute were screened and data was collected of patients who developed incisional surgical site infection(ISSI) and their matching controls. Demographic and clinical details of such patients were obtained from the case records of the patient. The laboratory reports, as well as microbiology report of specimen (e.g. wound swab, pus or tissue) obtained from patients, were screened on daily basis. All such patients were followed up on daily basis until they were discharged from the hospital and the duration of hospital stay was noted.

Various cost included in the study

The costs of illness considered in the study included direct as well as indirect costs. The intangible cost has not been taken into consideration in the study.

The direct cost of treatment included the cost of antimicrobial agents which are not available in Govt setup and cost of diagnostics procedure during hospitalization.

The indirect cost of treatment included travel cost to the hospital, boarding, and lodging as well as loss of productivity.

Conclusion

Incisional SSIs post-cesarean delivery result in extended hospital stays, increased caregiver burden, and a tripling of indirect economic costs—even in publicly funded hospitals.

While treatment is free, the social and economic implications for patients and their families are profound. Implementing low-cost, evidence-based infection control measures can significantly reduce SSI incidence and associated burdens.

This study highlights the urgent need for systemic reforms, improved infection control practices, and enhanced post-discharge follow-up strategies in low-resource settings.

Results

Out of 2024 patients who underwent cesarean section during the period of Jan 2024 to Jan 2025 , at the department obstetrics & gynecology, at our tertiary care teaching hospital, 114 patients developed incisional surgical site infection secondary to cesarean section. Incidence rate of this study is 5.63% .Mean no. of days(±SD) from date of surgery to diagnosis of wound infection (ISSI) was 6.97 ± 2.7 days with a range of 4 to 14 Days. (Day of surgery is considered as day 1). Out of which 71% patients were diagnosed to have ISSI during their hospital stay, while 28.95% patients were readmitted for ISSI later. In case of readmission, length of stay (LOS) was aggregated with those of the original admission to form a single patient episode. There was no significant age difference between the control and ISSI patients. The mean preoperative LOS, as well as number of surgical antimicrobial prophylaxis prescribed in patients with ISSI, was comparable to the control group.

Table 1. Comparative characteristics of patients with post caesarian ISSI and control group.

Characteristic	SSI Group (n = 57)	Control Group (n = 57)	p-value
Mean Age (years ± SD)	26.7 ± 5.1	27 ± 4.8	0.47
Parity			
– Primipara	30 (52.6%)	28 (49.1%)	0.71
– Multipara	27 (47.4%)	29 (50.9%)	0.71
BMI (kg/m²)	27.5 ± 2.8	26.9 ± 2.4	0.22
Gestational Age at Delivery (weeks)	38.1 ± 1.2	38.4 ± 1.3	0.18
Comorbidities Present			
– Diabetes Mellitus	10 (17.5%)	3 (5.3%)	0.04*
– Anemia (Hb < 10 g/dL)	22 (38.6%)	9 (15.8%)	0.006*
– Hypertensive Disorders in Pregnancy (HDP)	12 (21.1%)	6 (10.5%)	0.12

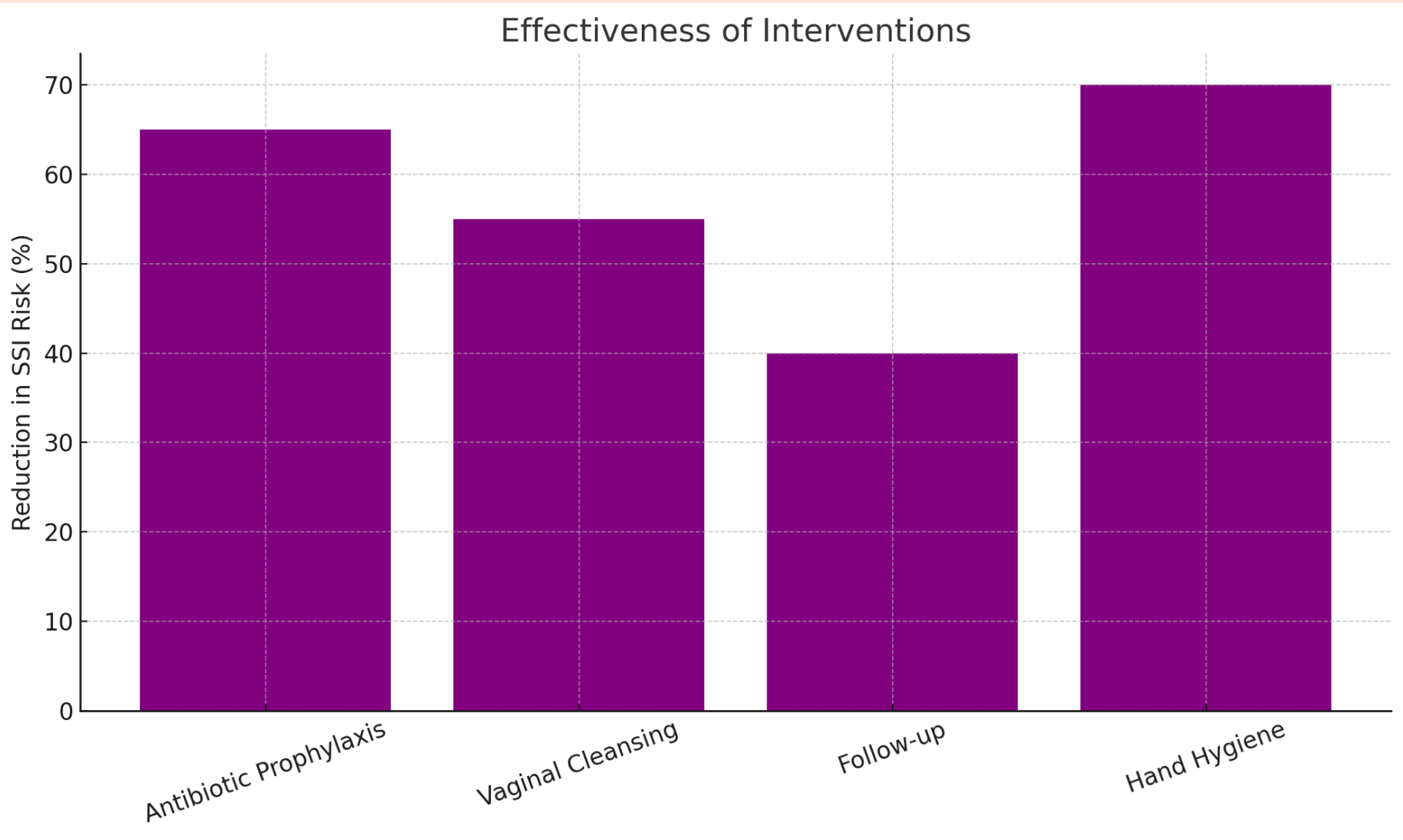
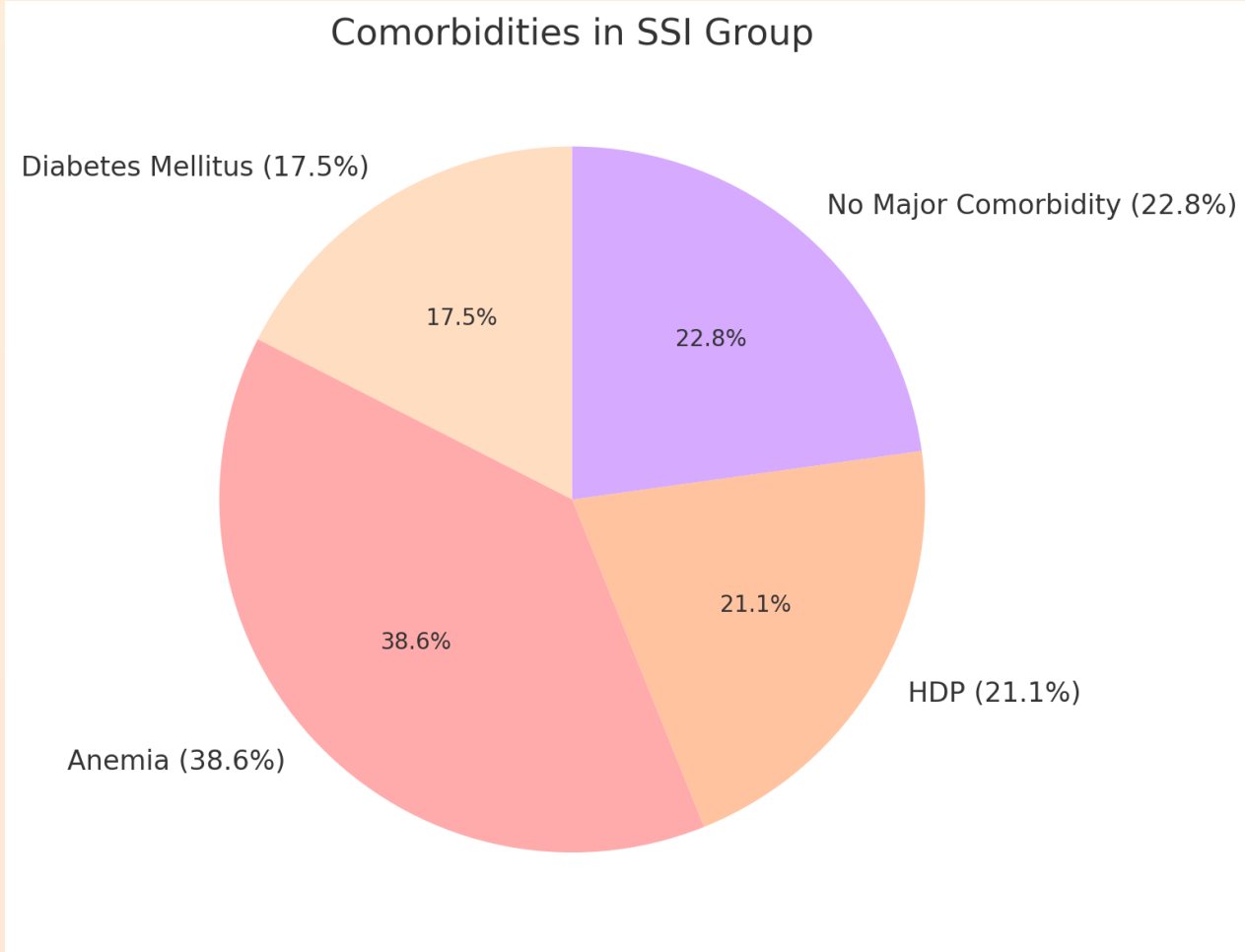
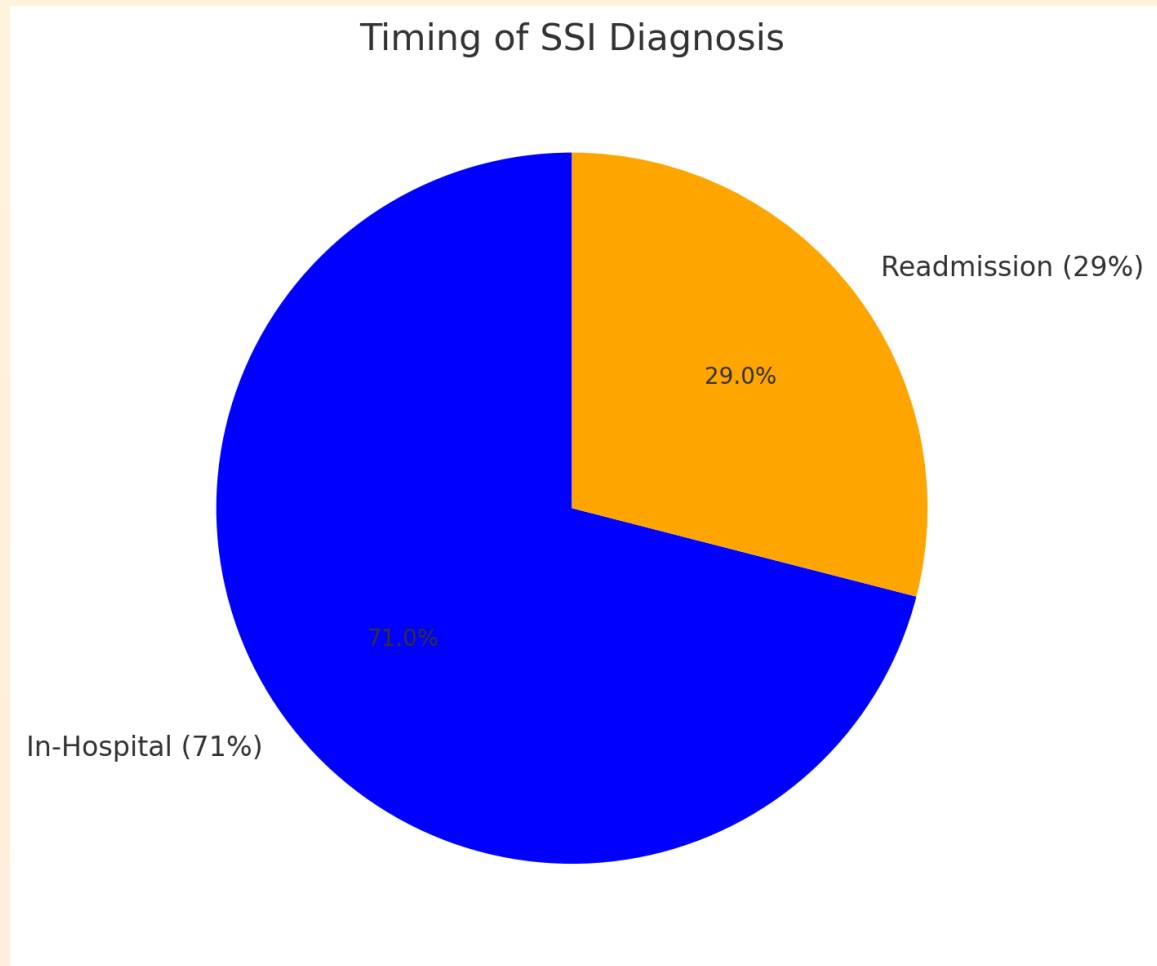
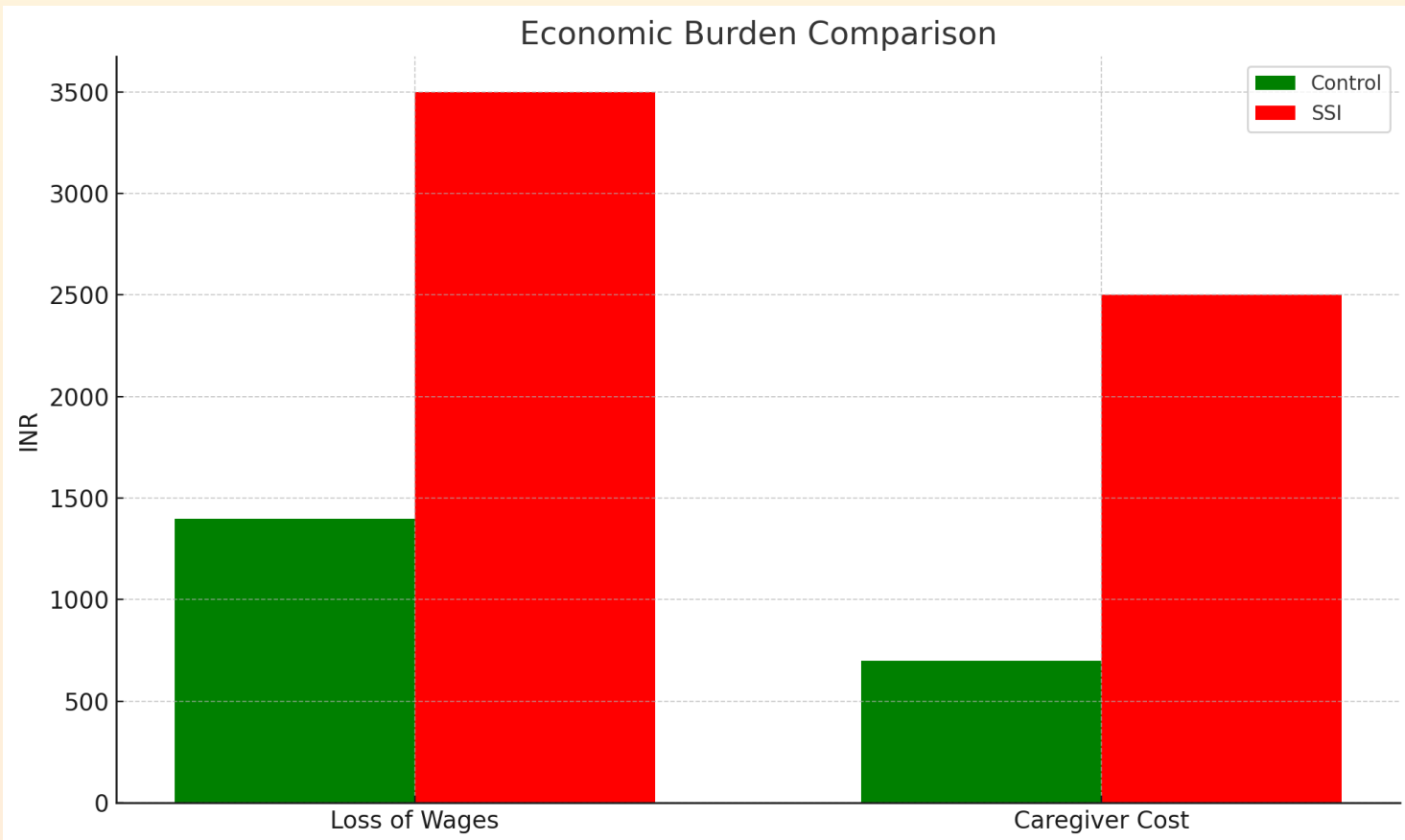
Table 2. Comparative Table: Economic burden of SSI post LSCS in Govt tertiary care hospital

Parameter	Control Group (No SSI, n = 100)	Case Group (SSI Present, n = 50)	P-value / Remarks
Average Postoperative Hospital Stay (days)	4.2 ± 1.1	10.6 ± 3.4	< 0.001 (Significant)
Readmission Rate (%)	2%	28%	< 0.001
Cost of Antibiotics (Free Supply)	₹0	₹0	Provided free in government setup
Wound Care & Dressing (Free Supply)	₹0	₹0	Provided free in government setup
Additional Lab/Imaging Costs (INR)	₹300	₹1,200	Often subsidised
Total Direct Hospital Costs (INR)	₹ 0	₹ 0	Provided free in government setup
Loss of Wages for Patient	4 days × ₹500 = ₹2000	10 days × ₹500 = ₹5000	
Caregiver’s Indirect Cost	₹700	₹ 3,000	
Total Economic Burden (INR)	₹ 3,000	₹ 9,200	> 3× higher in SSI

- **Average wage** assumed at ₹500/day (casual labor or house help equivalent).
- Costs based on **public sector procurement**; private sector figures would be 2–3× higher.
- Statistical significance calculated using **independent t-test** / **chi-square** where applicable.

Table 3. Summary of Cost-Effective Interventions to Reduce SSI Burden Post-LSCS

Intervention	Cost (Approx.)	Expected Benefit
Single-dose antibiotic prophylaxis	₹30–₹50/patient(provided free under Govt hospital)	↓ SSI risk by 60–70%
Antiseptic vaginal cleansing (povidone)	₹10–₹15 per use	↓ Endometritis & wound infection
Telephonic follow-up post-discharge	Negligible	↓ Readmission, ↑ Early detection
Staff hand hygiene (alcohol rubs)	₹1–₹2 per use (provided free in Govt setup)	Major drop in cross-infection



References:

- WHO Global Guidelines for SSI prevention
- Indian Council of Medical Research (ICMR) antimicrobial resistance surveillance reports
- Recent studies from Indian Journal of Obstetrics and Gynecology