

Original Article**Post Cesarean Wound Infection: Incidence and Risk Factors- An Observational Study**Iffana Azam¹, Fahima Ara Khanam², Mohshsina Khatoon³, Ehsan Ali⁴, Shahana Fedous Choudhury⁵, Lubna Yeasmin⁶**Abstract**

Background: Caesarean section (CS) is a common operation in obstetric practice. In CS, wound infections constitute a significant problem in surgical procedures.

Methods: This is an observational type of cross sectional study was carried out to evaluate the incidence and risk factors of post cesarean wound infection at the Department of Gynecology and Obstetrics, Sylhet Women's Medical College Hospital. Total 80 pregnant women who developed wound infection following lower segment caesarian section considered for the study population.

Results: During the study, 36.7% patients were nulliparas followed by 54.2% patients were overweight, 84.6% were housewife. Total 2200 LUCS in last 12 months and total CSI incident was 80. Incident rate were 4%. According to clinical risk factor of Post cesarean wound infection 43.9% cases types of all incision were horizontal/transverse no vertical incision, 65% had anemia, 35% had DM, 76.3% subcuticular types were seen in Skin Suturing case and PROM were seen 29% cases. According to operative risk factor of post cesarean wound infection where 100% cases antibiotic was used preoperative and post operatively followed, 80% patients stayed in hospital for 4 to 5 days, 52.6% cases operative time was >1hour and 20% patients stayed in hospital for 6 to 7 days. Also, emergency of CS, DM, PROM, preoperative anemia, rupture of membrane, microbial infection, obesity found as a significant risk factor for SSI occurrence.

Conclusion: It is high time to pay more attention during daily practice, and paving a roadmap to prevent or decrease the rate of post CS infections. In addition, identifying risk factors, particularly modifiable ones that may be related to the woman, pregnancy, or to the procedure itself and implementing approaches to prevent, diagnose, and treat infection in time are all vital steps for reducing the occurrence of SSI and its consequences.

Keywords: Post cesarean section, surgical site infection (SSI), risk factors.

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Introduction

1. Assistant Professor, Department of Gynecology and Obstetrics, Sylhet Women's Medical College Hospital.
2. Assistant Professor, Department of Gynecology and Obstetrics, Sylhet Women's Medical College Hospital.
3. Professor, Department of Microbiology, Sylhet Women's Medical College.
4. Assistant Professor, Department of Anesthesia, Sylhet Women's Medical College Hospital.
5. Professor, Department of Gynecology and Obstetrics, Sylhet Women's Medical College Hospital.
6. Assistant Professor, Department of Gynecology and Obstetrics, Sylhet Women's Medical College Hospital.

The surgical site infection (SSI) is considered as quite possibly the most well-known medical care related contaminations, particularly in low and center pay nations.¹ However; Surgical site infection (SSI) after cesarean area is one of the significant contaminations that can influence

Corresponding author: Dr.Iffana Azam

Assistant Professor, Department of Gynecology and Obstetrics, Sylhet Women's Medical College Hospital.
Email: iffana83@gmail.com

patients with a cesarean segment (C-segment) procedure.² Cesarean segment (CS) is among the most successive careful intercessions in ladies everywhere on the world.³ Despite ongoing careful boundaries and anti-microbial prophylaxis, SSI is as yet standing fundamentally behind horribleness, mortality, and medical care related expenses, particularly in the event that we realize that CS builds the danger of post-injury contamination by five to even twenty-crease contrasted with common or vaginal delivery.⁴⁻⁵ Due to the worldwide ongoing rise in the incidence of cesarean deliveries, the number of women with postpartum wound infection is expected to increase.⁶ In this study our main goal is to evaluate the incidence and risk factor of post cesarean section surgical site infection.

Methods

This is an observational type of cross sectional study was carried out to evaluate the incidence and risk factors of post cesarean wound infection at the Department of Gynecology and Obstetrics, Sylhet Women's Medical College Hospital. Where data were collected from July 2019 to June 2020. 80 pregnant women who developed wound infection following lower segment caesarian section considered for the study population. Sample were collected through purposive sampling as per inclusion criteria. All women who developed surgical site infection after LSCS conducted at SWMCH were included and Patients referred to SWMCH from outside hospital postoperatively after LSCS, patients who have preexisting skin infection around the site of LSCS also, women who refused to enroll in the study were excluded. Data were collected by using a pre-designed questionnaire. This study was approved by ethical review committee Sylhet Women's Medical College. Data were collected, coding and input in SPSS 25 for further analysis. Both descriptive and inferential statistics done.

Results

In table-1 shows socio- obstetrical status of the patients. Age distribution of the patients were most of the patients belong to 26 to 35 years age group. 36.7% patients were nulliparas followed by 54.2% patients were overweight, 84.6% were housewife.

Table-1: Socio-obstetrical status of the patients

Age group (years)	%
15-25	43.37
26-35	36.14
>35	20.48
Educational status	
Graduate	31.3
HSC	34.9
SSC	30.1
Below SSC	3.6
Occupation	
Housewife	84.6
Employer	15.4
Parity	
Primary	36.7
2 nd	16.7
3 rd	25.0
4 th	13.3
5 th	8.3
BMI	
≥30	54.2
<30	45.8

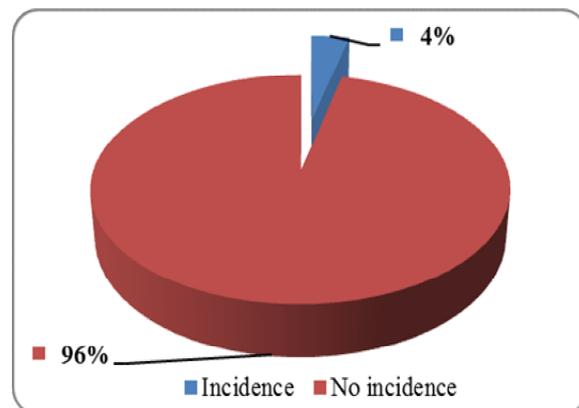


Figure-1: Incidence of infection
Incidence of infection

In figure-1 shows among the 2200 LUCS in last 12 months and total CSI incident was 80. Incident rate were 4% no incidence 96%.

Risk factors

In table-2 shows distribution of the patients according to clinical risk factor of post cesarean wound infection where all incision were horizontal/ transverse name is pfffenestial, 76.3% subcuticular types were seen in skin suturing cases and PROM were seen 29% cases, also microbial infection seen 100% cases. Here, incision all transverse suture maximum subcuticular same as interrupted sutures.

Table-2: Distribution of the patients according to clinical risk factor of Post cesarean wound infection

Types of CS	%
Emergency	76.1
Elective	23.9
Types of incision	
Horizontal/Transverse Pfffenestial	100%
Types of Skin Suturing	%
Subcuticular	76.3
Interrupted	23.7
DM	
Yes	35
No	65
Rupture of membrane before CS	
Yes	47
No	53
Anemia	
Yes	65
No	35
PROM	
Yes	29
No	71
Microbial Infection	100

In table-3 shows distribution of the patients according to previous illness where no patients had hypoproteinemia followed by 2.4% had

tuberculosis and hypothyroidism, 16.9% had hypertensive disease preacclumtia.

Table-3: Distribution of the patients according to diseases

Hypoproteinemia	%
Yes	0
No	100
Tuberculosis	
Yes	2.4
No	97.6
Hypertensive disease preacclumtia	
Yes	16.9
No	83.1
Hypothyroidism	
Yes	2.4
No	97.6

In table-4 shows organisms isolated from the pus where staphylococcus aureus most common organism isolated in pus after culture. In table-5 shows distribution of the patients according to operative risk factor of post cesarean wound infection where 100% cases antibiotic was used preoperative and post operatively followed by 77.8% cases adequate antibiotic prophylaxis were failed, 52.6% cases operative time was >1hour. In figure-2 shows distribution of the patients according to hospital stay where most of the patients were staying in the hospital for 4 to 5 days maximum some are 6 to 7 days.

Table-4: Organisms isolated from the pus

Organism	%
Staphylococcus aureus	55%
Klebsiella	26%
E.coli	14%
Pseudomonas	5%

Table-5: Distribution of the patients according to operative risk factor of post cesarean wound infection

Preoperative antibiotic	%
Yes	100
No	0
Post-operative antibiotic	
Yes	100
No	0
Anesthesia: regional	100
Antibiotic prophylaxis:	
Failure of timely adequate antibiotic prophylaxis:	77.8
Adequate antibiotic prophylaxis:	22.2
Duration of operation	
< 1h	47.4
>1h	52.6

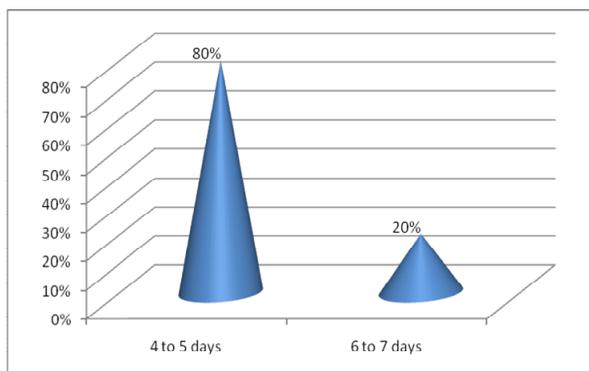


Figure-2: Distribution of the patients according to hospital stay

In table-6 shows distribution of risk factor according to significance level where emergency of CS, DM, PROM, preoperative anemia, rupture of membrane, microbial infection, obesity found as a significant risk factor for wound infection.

Table-6: Distribution of risk factor according to significance level

Risk factor according to significance level	P value
Age	0.015
Emergency of CS	0.001
DM	0.001
PROM	0.001
Preoperative Anemia	0.001
Rupture of membrane	0.001
obesity	0.001
Microbial infection	0.001
Prolong labor obstacle and home trail operation	0.021
Prolong duration of surgery and hospital stay	0.016
Previous illness	0.021
Occupation: Housewife	0.032
Failure of timely Adequate antibiotic prophylaxis	0.012

Discussion

One study reported that, Obesity was a well-known cause for many workers and may be related to hypo-vascular thick subcutaneous tissue which results in lower immunity, larger and/or longer than usual CS incision with wider wound, and less availability of penetrated antibiotics into adipose tissues.⁷ Which was similar to our study where 54.2% patients were overweight and obese.

In our study emergency cesarian cases were 76.1%. One study reported that, Emergency CS has been linked to post cesarian wound infection through more frequent vaginal examinations with greater opportunity for membranes to rupture before delivery, highly urgent operation, less concerns about sterility, and absence of prophylactic antibiotics on time.⁸ Other study found that, type

of CS (either emergency or elective) was not a significant risk factor of SSI.⁹

A vertical incision of CS was mentioned by many papers to increase the risk of post cesarian wound infection and may lead to formation of a hematoma due to less vascular tissues, while a transverse incision was associated with less wound dehiscence. Suturing techniques played an important role in post cesarian wound infection development after CS, interrupted suturing was a good predictor of post cesarian wound infection, when compared to a subcuticular technique which had lower infection events. The rupture of membranes before CS was attributed to post cesarian wound infection risk factors.¹⁰⁻¹¹ An infected amniotic fluid may transfer pathogens into CS incisions with chorioamnionitis could be a final result. We identified similar type of results in our study where 43.9% cases types of incision were vertical and 56.1% horizontal, 76.3% subcuticular types were seen in Skin Suturing cases. During the study we also found that potential microbial growth where staphylococcus aureus most common organism isolated in pus after culture.

One study reported that, antibiotic prophylaxis administered on a timely basis was associated with a lower risk of post cesarian wound infection in univariate analysis [OR 0.46 (0.22-0.95), $p = 0.049$].¹² But in our study 77.8% cases adequate antibiotic prophylaxis were failed. There was a strong relation between post CS wound infection and diabetic mothers. The idea of improper white blood cells function, and the metabolic abnormalities of diabetes lead to impaired migration of neutrophils and macrophages to the infected wound, in line with chemotaxis reduction. Anemia at time of CS in these series did not significantly affect post cesarian wound infection rates, in favor of other articles.¹²⁻¹³

Where as in our study only 8.4% had DM and 40% had anemia. It was observed that a higher level of hemoglobin is associated with a lower risk of having post cesarian wound infection. It is also observed that having suffered from anemia was a high risk factor for post cesarian wound infection. This explains why the hemoglobin reduces the oxygen tension and why there is less collagen synthesis. This increasing the risk of wound infection by compromising the activity of the macrophages and preventing the progress of the wound healing. Since it produces a less stable scar and favors dehiscence and microbial infection¹⁰ and this is supported in other studies.⁹⁻¹⁰

One study in Bangladesh found in their result that, emergency CS, membrane rupture before delivery, and sort of abdominal skin incision and /or suture, played an important statistically significant role being risk factors to develop SSI. Also, they found anemia and diabetes were more common with SSI patients, but only diabetes readings reached the significant level (P value <0.05).¹³ Also, we found in our study that, emergency of CS, DM, PROM, preoperative anemia, rupture of membrane, microbial infection, obesity found as a significant risk factor for post cesarian wound infection occurrence, which was supported by many studies.¹⁰⁻¹³

Conclusion

Obesity, DM, PROM, emergency CS and rupture of membrane before CS, microbial infection common risk factor for post cesarian wound infection. It is high time to pay more attention during daily practice, and paving a roadmap to prevent or decrease the rate of post cesarian wound infection. In addition, identifying risk factors, particularly modifiable ones that may be related to the woman, pregnancy, or to the procedure itself and implementing approaches to prevent, diagnose, and treat infection in time are

all vital steps for reducing the occurrence of SSI and its consequences.

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