



# Profile of Wound Infection Following Caesarean Delivery at Institute of Child & Mother Health, Matuail, Dhaka

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Received date: 08 May 2023; Accepted date: 25 May 2023; Published date: 31 May 2023

**Citation:** Zaman F, Akhtar S, Fatema B, Begum M (2023). Profile of Wound Infection Following Caesarean Delivery at Institute of Child & Mother Health, Matuail, Dhaka. SunText Rev Med Clin Res 4(2): 180.

**DOI:** <https://doi.org/10.51737/2766-4813.2023.080>

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## Abstract

**Background:** Post caesarean wound infection is a bacterial infection in the surgical incision following caesarean delivery. Wound infection following caesarean section is not only a leading cause of prolonged hospital stay but a major cause of the widespread aversion to caesarean delivery in developing countries. The incidence ranges from 5% to 25% depending on the nature and area of practice. Objective: The aim of this study was to evaluate the possible etiopathology of wound infection and to take possible measures to reduce the incidence of wound infection at hospitals.

**Methods:** This descriptive type of cross-sectional study was carried out in the Department of Obstetrics and Gynaecology in Institute of Child and Mother Health (ICMH), Dhaka from November 2009 – April 2010. Here in ICMH, fifty patients who developed post caesarean wound infection were randomly selected for the study. Data was collected from the patients regarding history, pre-operative, per-operative, post-operative findings and bacteriological studies. The data was analyzed by using computer software program SPSS (version- 10).

**Results:** This study showed that there was close relationship between inadequate antenatal checkup (56%), anaemia (76%), and malnutrition and wound infection. It is evident that prolonged labour (48 hrs. 40%), premature ruptures of membrane (48hrs, 28%), emergency operation (92%), intervention for delivery before admission, prolonged operation time (>1hrs) were important predisposing factors for wound infection. Serosanguinous discharge was present in 68% of the patients and culture of wound discharge showed in 64% positive and Pseudomonas (28%) was the most frequent organism and Escherichia coli (24%) was the second most common organism.

**Conclusion:** This study shows that post caesarean wound infection is more following emergency operation. Effort should be geared towards the prevention of wound infection by a well-equipped obstetric ward with clean environment and adequate facilities, modern planned operation theatre, the reduction of prolonged operation time, the use of potent antibiotics, early intervention and use of good surgical technique.

**Keywords:** Post caesarean; Wound infection; Surgical incision; Bacterial infection

## Introduction

Caesarean section is a common operation in obstetric practice. The incidence is raising worldwide and the reported incidence ranges from 5% to 25% depending on the nature and area of

practice [1]. Surgical site infection following caesarean section is a common cause of morbidity with socio-economic consequences for the woman and her family [2]. Recovery from caesarean section is more difficult for women who developed post-operative wound infection. The most recent data from the National Nosocomial Infection Surveillance (NNIS) of Centre for Disease Control and Prevention indicates that surgical site infections are the third most frequently reported hospital associated infection, accounting for 14% to 16% of all infections in hospitalized patients [3]. Surgical site infection is confined to either incisional wound or involving structures adjacent to the wound that were entered or exposed during an operation [4]. Post caesarean wound infection is a bacterial infection in the surgical incision following caesarean delivery [5]. This complication accounts approximately 4% to 12% of women who have a caesarean delivery [6]. A study done in Lagos, Nigeria over a period of 56 months (Jan 2004 to August 2008) had shown that post caesarean wound infection varied from zero to 20.5% in a hospital survey. The risk of developing infection is proportionate to the amount and type of microbial contamination in the wound. It also depends on the condition of the wound at the end of the operation, surgical technique and lastly on host susceptibility that is the patient intrinsic ability to deal with microbial contamination. Poor surgical technique, prolonged operation time, presence of dead space or haematoma can result wound infection [5]. A common cause is poor hand washing. Inadequately filtered air in the operating theatre or contamination at surgery can also result infection. The following risk factors predispose to subsequent wound infection in women undergoing caesarean section – obesity, diabetes, prolonged hospitalization before caesarean section, prolonged rupture of the membrane, chorioamnionitis, endomyometritis, prolonged labor, emergency rather than elective indications for caesarean section and anemia [6,7]. Usually post-operative wound infection appears in early post-operative period between 3rd to 5th post-operative day. Fever with no apparent cause which persists to the 4th or 5th post-operative day strongly suggest a wound infection. The organisms responsible for most wound infections originate on the patient’s skin [8]. Facultative and anaerobic gram-negative rods, beta-hemolytic streptococci and staphylococci are the pathogens most commonly cultured from infected wound [9]. Avoidance of the factors as well as early diagnosis by clinical features and laboratory finding and thereby using most appropriate antibiotic according to wound culture sensitivity test, the morbidity and mortality of post caesarean wound infection can be reduced.

### Methodology

This is a descriptive type of cross-sectional study. This study was carried out on 50 post-operative patients to find out about the population in the department of Obstetrics and Gynaecology, in

Institute of Child and Mother Health, Matuail, Dhaka Bangladesh. The duration of the period from Six months (November 2009 to April 2010). After collection, the data were checked and cleaned, followed by editing, compiling, coding and categorizing according to the objectives and variable to detect errors and to maintain consistency, relevancy and quality control. The choice of treatment was made by the patient after a full discussion with the multidisciplinary team consisting of Transfusionists. The data for this study about had been accumulated from patients’ medical information. Statistical evaluation of the results used to be got via the use of a window-based computer software program devised with Statistical Packages for Social Sciences (SPSS-24).

### Result

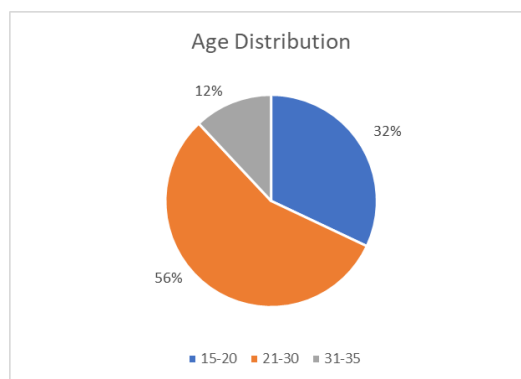


Figure 1: Age distribution (n=50).

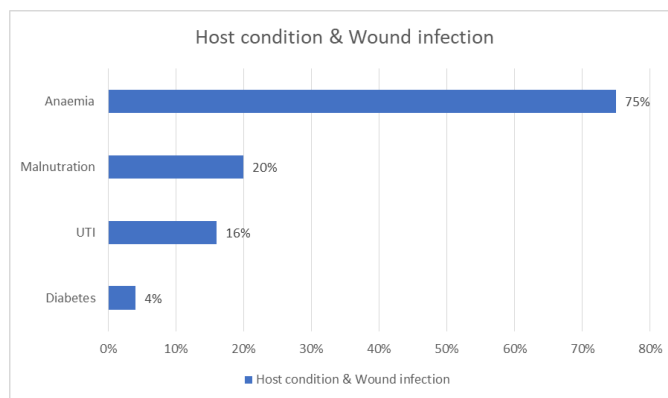


Figure 2: Host condition and wound infection (n=50).

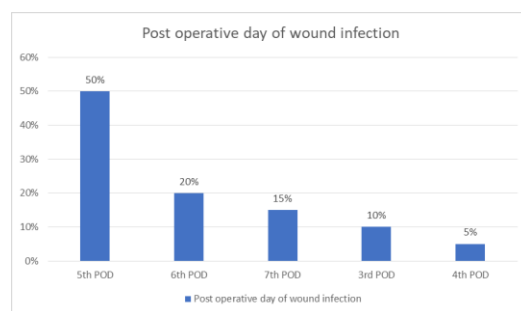


Figure 3: Occurrence of Wound infection in post-operative days.

(Figure 1) shows that rate of wound infection height in the age group between 21-30 years (56%), followed by 15-20 years (32%) and 31-40 years (12%). (Table 1) shows that wound infection is most common 56% of women who had no antenatal check-up. (Table 2) shows that post-operative wound infection is more common (56%) in patients who belong to poor social circumstances. (Table 3) shows that post-operative wound infection is more common (40%) in patients having 25-48 hours labour pain. (Table 4) shows that maximum wound infection is among patients having rupture membrane 25-48 hours (28%). Intact membrane was present in 12% patients (Table 5).

**Table 1: Status of Ante natal Check-up (n=50).**

Status	Number of patients (n=50)	Percentage
Regular	06	12%
Irregular	16	32%
None	28	56%

**Table 2: Status of Socio-economic circumstances (n=50).**

Status	Number of patients (n=50)	Percentage
Poor	28	56%
Low-middle	06	12%
Middle	06	12%

**Table 3: Duration of Labour Pain in patients having wound infection.**

Duration (hour)	Number of patients (n=50)	Percentage
0 - 12	06	12%
13 - 24	12	24%
25 - 48	20	40%
>48	06	12%
No Labour Pain	06	12%

**Table 4: Duration of Rupture of Membrane (n=50).**

Time (hour)	Number of patients (n=50)	Percentage
<12	08	16%
13 - 24	12	24%
25 - 48	14	28%
>48	10	20%
Intact membrane	06	12%

The rate of wound infection is highest among patients who underwent emergency operation (92%) and majority is due to obstructed labour (32%). (Figure 2) shows that height rate wound infection is due to moderate to severely anaemia (75%). (Figure 3) shows that wound infection developed in 50% cases on 5th postoperative day, followed by 20% on the 6th postoperative day,

15% on 7th postoperative day, 10% on 3rd postoperative day and 5% on 4th postoperative day. (Table 6) shows color and smell of wound discharge. Color is Serosanguineous in 60% cases and purulent in 40% cases, and foul-smelling discharge is present in 32% cases.

**Table 5: Indication for Operation (n=50).**

Indication	Number of patients (n=50)	Percentage
<b>Elective (n=4)</b>		
Previous H/O Caesarean section	03	06%
Twin pregnancy (1 <sup>st</sup> baby breech)	01	02%
<b>Emergency (n=46)</b>		
Obstructed labour	16	32%
PROM and Fetal distress	14	28%
Antepartum Eclampsia	06	12%
Prolonged labour & Cervical dystosia	10	20%
<b>Total</b>	<b>50</b>	<b>100%</b>

**Table 6: Character of Wound Discharge (n=50).**

Characteristics of wound discharge	Number of patients (n=50)	Percentage
Color Serosanguineous	30	60%
Purulent	20	40%
Smell Foul smelling	16	32%
No smell	24	48%

**Table 7: Bacteriological study of Wound Discharge (n=50).**

Organism isolated	Number of patients (n=50)	Percentage
Escherichia coli	12	24%
Staphylococcus	06	12%
Pseudomonas	14	28%
No growth	18	36%

**Table 8: Post-operative Hospital Stay (n=50).**

Hospital stays (days)	Number of patients (n=50)	Percentage
7-10	12	24%
11-15	24	48%
>16	14	28%

(Table 7) shows that 64% wound discharge have organisms and the rest 36% shows no growth. Pseudomonas is isolated from highest number of patients (28%). (Table 8) shows that hospital stay of the patients varies from seven to more than sixteen days. Among the patients 48% of the patients stay for 11 to 15 days and for 28% of the patients, the hospital stay is seven to ten days.

## Discussion

This descriptive type of cross-sectional study was investigated to find out the possible profile of wound infection that developed in patients following caesarean section at ICMH and to take maximum possible measures to reduce the rate of wound infection. Decherney and Nathan in 2004 showed that, this complication accounts approximately 4% to 12% of women who have a caesarean delivery [10]. Riou et al, in 1992 showed an incidence of wound infection of 0.2 to 6 percent, and Al-Fallouje and Mc Brien in 1998 showed the peak incidence between sixth and eighth post-operative day [11]. My study found that, the appearance of abdominal wound infection was highest on fifth postoperative day (50%), followed by sixth post-operative day (20%), seventh post-operative day (15%). So, it indicates the prime source of infection is Operation Theatre. Usually wound infection manifested on the fifth post-operative day. In case of superficial wound infection half of the abdominal wound infection started to appear on the fifth post-operative day and majority of the deep wound infection occurred on the seventh post-operative day. Wound infection occurred on an average of 8 +/-2 post-operative day [12]. Haddad, Alexander and Prudden showed that largest number of wound dehiscence became clinically evident on the seventh post-operative day and on an average of 6.8 post-operative days, respectively [13]. They suggested that early development of wound infection indicate the source of contamination was likely to be operation theatre. However, in their series, late development of wound infection was associated with formation of haematoma, anaemia, wound infection, hypoproteinaemia etc. Various factors affect wound healing and then give rise to wound dehiscence. The factors that cause wound infection have been studied extensively throughout the world. In this study, post-operative wound infection occurred with peak incidence at third decade (21-30yrs) of life (56%) and among the people of low-middle social circumstances (56%). Actually, there was no direct relationship between age and social circumstances with wound infection. Probably as number of operated cases were more in this age group and regarding social circumstances that group of people are more in that particular area, so infection rate was also high among them. Aziz in 1997 in Bangladesh also made similar observation in that age group [14]. Royal Women's Hospital, Australia have shown that repeated antenatal visit reduces the incidence of wound infection following

caesarean section [15]. Regarding Antenatal check-up this study showed, 56 percent patients had no ANC whereas only 12 percent had regular ANC. The rate of infection is more in the patients no ANC is due to absence of detection of complication during pregnancy like anaemia, malnutrition, PET, CPD etc. This study showed that there was direct relationship between higher duration of labour pain had highest rate of wound infection. It was 40% who had labour pain 25-48 hours, followed by 13-24 hours (24%) and <12 hours (12%). Prolonged rupture membrane was also related with wound infection, rupture membrane for 25-48 hours was highest (28%) and 12 percent had intact membrane. Oliver C Ezechi in 2009 shown that the risk of developing wound infection was increased by more than four times in patients having prolonged rupture of membrane when adjustment was made for the potential confounders. Bacteria are now able to traverse the cervical canal into the amniotic cavity leading to chorioamnitis and its sequel. The prevalence of wound dehiscence was highest among the patients who underwent emergency operation (92%) rather than elective (4%). Majority of emergency operations were due to obstructed labour (32%) followed by PROM and Fetal distress (28%), prolonged labour and cervical dystocia (20%) and ante partum eclampsia (12%) Among the four elective caesarean section, three patients had history of previous caesarean section and another patient had twin pregnancy with first baby breech presentation. Haddad et al in 1980 observed a higher incidence of wound infection in cases of vertical incision [16]. Riou et al in 1992 found that 93 percent of wound infection had midline incision compared with 63 percent in non-dehiscence group [17]. In my study all the cases were given Pfannenstiel incision. There is direct relationship between haemoglobin status and wound healing. Decreased haemoglobin level contributes to wound infection by hypoxic effect in tissue of healing area. Riou et al in 1992 defined anaemia as haemoglobin less than 10 gm/dl at the time of wound disruption in the infection group or early post-operative period in the non-infection group. In this series patients had moderate anaemia was among 48 percent patients, severe anaemia 28 percent patients and mild anaemia accounted 24 percent cases. Makle et al in 1995 recorded anaemia in 38 percent patients in the infection group and only 10 percent in the control group. Patients considered to be malnourished prior to surgery were more common in the infection group (41%) than that of control group (21%) [18]. Cruse PJE, Frood R in their study of prospective study of surgical wound have shown that wound infection rate rises with anaemia, DM and malnutrition [19]. Riou et al found anaemia in 90 percent patients in the dehiscence group and only 16 percent in the control group. This study revealed all most all of the patients (75%) were moderate to severely anaemic, 20 percent were malnourished which contribute to infection by defective collagen synthesis. Urinary tract infection is the associated infection (16%). William J et al have found wound

infection in only 1.54 percent cases and UTI in 4.64 percent cases after caesarean section at Sioux Valley Hospital, South Dakota, which is much less than in our situation [20]. Operation time also had contribution in wound infection. My study showed that infection rate was higher (70%) when operation time is more than one hour. Osime U et al in 1988 and Ezechi O C in 2009 found that the risk of developing postoperative wound infection is considerably reduced when the operation time is short. In the course of prolonged operation, there is significant tissue devitalisation resulting from tissue handling and reduced tissue perfusion and the bacterial contamination increases with time [21]. A. Johnson, D. Young, J. Reilly have showed in their study done in the Queen Mother's Hospital at Glasgow in UK in 2006 that, suture materials and wound infection also has some relation Catgut, dixon, vicryl, silk were used in different cases. The conventional absorbable suture material provokes strong inflammatory reaction and prolonged the lag phase of wound healing. It is also synergistic with organisms in the promotion of wound infection [22]. Regarding bacteriological study of wound discharge, negative culture was in 36 percent cases probably due to use of antibiotics. Positive culture was 64 percent and microorganisms isolated were *Pseudomonas* (28%), *Escherichia coli* (24%) and *Staphylococcus* (12%). Nature of wound discharge revealed that serosanguinous (60%) and 32 percent were foul smelling discharge. Riou et al, in 1992 stated that *Staphylococcus aureus* was the most common organism responsible for wound infection and polymicrobial infection were noted in a smaller number of patients [23]. Pollock and Greenal in 1979 found *Escherichia coli* as the commonest infecting organism. They also found *Salmonella typhi* in one of his cases [24]. Matin in 1981 in the Institute of Post Graduate Medicine and Research (now BSMMU) noted the commonest infective organism in his series as Coliform (60%) followed by *Staphylococcus* (40%).

### Limitations of the Study

1. This small study of only fifty patients cannot be the representative of the entire spectrum of post caesarean wound infection.
2. Anaerobic culture of the wound discharge could not be done due to limitation of time and hospital facilities
3. Due to low socioeconomic status and shortage of hospital bed number some patients had to be released earlier from hospital.

### Conclusion

In this study it is evident that there was close relationship between inadequate antenatal check-up, anaemia, and malnutrition and wound infection. So, great importance should be given for regular antenatal check-up, adequate assessment and preoperative

preparation of the patients. The quality of surgical care is often correlated with post-operative wound infection rate in a hospital. So, it is important to prevent the development of wound infection by targeting – educating and intervention strategies to the identified risk factors to community health workers and nurses as it increases the cost of care and ties up professional care and resources that might otherwise be available to clients residing in the community.

### Recommendation

As the series was conducted with only 50 cases, similar studies with large sample size and longer duration are required for further evaluation.

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