

Comparative Study of Fetomaternal Outcomes in Elective versus Emergency Caesarean Section

Dr. Ashirwad Thatte¹, Dr. Pankaj Suryakant Kulkarni², Dr Poorva Reelkar³

¹Assistant Professor, Department of Obstetrics & Gynaecology, BKL Walawalkar Rural Medical College attached hospital, Kasarwadi, At post -Sawarde Tal-Chiplun, Dist -Ratnagiri, State-Maharashtra, India.

²Assistant Professor, Department of Obstetrics and Gynecology, Shri Vithalrao Joshi Charities Trust's B.K.L Walawalkar Rural Medical College attached hospital, Kasarwadi, At post -Sawarde Tal-Chiplun, Dist -Ratnagiri, State-Maharashtra, India.

³Associate Professor, Department of Obstetrics & Gynaecology, BKL Walawalkar Rural Medical College attached hospital, Kasarwadi, At post -Sawarde Tal-Chiplun, Dist -Ratnagiri, State-Maharashtra, India.



Correspondence:
Dr. Ashirwad Thatte

Received: January 05, 2026

Revised: January 29, 2026

Accepted: February 21, 2026

Published: March 10, 2026

Abstract

Background: Caesarean section is a life-saving obstetric procedure; however, emergency caesarean deliveries are often associated with increased maternal and neonatal morbidity compared to elective procedures. Understanding differences in fetomaternal outcomes is essential for improving obstetric care and reducing preventable complications. Aim: To compare fetomaternal outcomes in elective versus emergency caesarean section.

Methods: A hospital-based comparative observational study was conducted among 200 pregnant women undergoing caesarean section at a tertiary care centre. Participants were divided into elective (n=100) and emergency (n=100) groups. Maternal characteristics, intraoperative findings, postoperative complications, and neonatal outcomes including Apgar score, birth weight, and NICU admission were recorded. Statistical analysis was performed using independent t-test and Chi-square test, with p < 0.05 considered significant. **Results:** Emergency caesarean section was significantly associated with higher primigravida status, lower gestational age, and increased maternal anemia. Maternal complications including postpartum hemorrhage, wound infection, febrile morbidity, blood transfusion, and ICU admission were significantly higher in the emergency group. Neonatal outcomes were poorer following emergency caesarean section, with lower birth weight, increased incidence of low Apgar scores, higher NICU admissions, and greater need for neonatal resuscitation. Emergency procedures were also associated with longer surgical duration, increased blood loss, and prolonged hospital stay. **Conclusion:** Emergency caesarean section is associated with increased maternal and neonatal morbidity compared to elective caesarean section. Strengthening antenatal care, early risk identification, and timely obstetric intervention may help reduce emergency procedures and improve fetomaternal outcomes

Keywords: Elective caesarean section. Emergency caesarean section. Fetomaternal outcomes.



This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).

INTRODUCTION

Caesarean section (CS) is one of the most commonly performed obstetric surgical procedures worldwide and plays a crucial role in reducing maternal and perinatal morbidity and mortality when vaginal delivery poses risks. Over the past few decades, the global rate of caesarean deliveries has shown a substantial rise, exceeding the recommended threshold of 10–15% suggested by international health agencies. This increase is attributed to multiple factors including improved surgical safety, medico-legal concerns, increased maternal age, fetal monitoring practices, previous caesarean deliveries, and a growing preference for elective operative delivery. Despite its life-saving potential, caesarean section remains associated with significant maternal and neonatal complications,

particularly when performed under emergency circumstances.[1]

Elective caesarean section is planned prior to the onset of labour and is usually performed for indications such as previous caesarean delivery, malpresentation, placenta previa, or maternal request. Because these procedures are scheduled under controlled conditions with adequate preoperative preparation, elective CS is generally associated with lower intraoperative complications, reduced maternal stress, and improved neonatal outcomes. In contrast, emergency caesarean section is performed in response to acute maternal or fetal compromise, including fetal distress, obstructed labour, antepartum hemorrhage, failed induction, or cord prolapse. The urgent nature of emergency CS often limits

preoperative optimization and increases the risk of maternal hemorrhage, infection, anesthetic complications, and adverse neonatal outcomes such as low Apgar scores, birth asphyxia, and neonatal intensive care unit (NICU) admission.[2]

Fetomaternal outcomes following caesarean section are influenced by several determinants including the indication for surgery, timing of intervention, maternal comorbidities, availability of skilled obstetric care, and institutional preparedness. Studies have consistently demonstrated higher rates of postoperative complications such as postpartum hemorrhage, wound infection, prolonged hospital stay, and need for blood transfusion in emergency caesarean sections compared to elective procedures. Similarly, neonatal complications including respiratory distress, prematurity, and low birth weight are more frequently observed following emergency CS due to underlying obstetric emergencies and delayed decision-to-delivery intervals.[3]

In developing healthcare settings, disparities in antenatal care, delayed referral systems, and limited access to timely obstetric intervention further contribute to the increased burden of emergency caesarean deliveries and associated complications. Understanding the comparative fetomaternal outcomes between elective and emergency caesarean sections is therefore essential for improving obstetric decision-making, optimizing antenatal surveillance, and developing strategies to reduce preventable emergency interventions. Such comparative evaluation can also aid in counseling expectant mothers, improving resource allocation, and strengthening institutional obstetric protocols.[4]

AIM

To compare fetomaternal outcomes in elective versus emergency caesarean section.

OBJECTIVES

1. To evaluate maternal complications associated with elective and emergency caesarean section.
2. To compare neonatal outcomes including Apgar score, birth weight, and NICU admission between the two groups.
3. To assess perioperative factors such as indication, duration of surgery, and hospital stay in elective versus emergency caesarean section.

MATERIALS AND METHODS

Source of Data

Data were obtained from pregnant women undergoing caesarean section admitted to the Department of Obstetrics and Gynaecology. Maternal clinical details, intraoperative findings, and neonatal outcomes were recorded from case records and direct observation.

Study Design

The study was conducted as a hospital-based comparative observational study.

Study Location

The study was carried out at a tertiary care teaching hospital with comprehensive obstetric and neonatal intensive care facilities.

Study Duration

The study was conducted over a period of 12-18 months after obtaining institutional ethical clearance.

Sample Size

A total of 200 pregnant women undergoing caesarean section were included, divided into:

- Elective CS group: 100 cases
- Emergency CS group: 100 cases

Inclusion Criteria

- Pregnant women undergoing caesarean section after 28 weeks of gestation
- Singleton pregnancy
- Women willing to provide informed consent

Exclusion Criteria

- Women with severe medical comorbidities affecting outcomes (cardiac failure, severe sepsis)
- Multiple gestation
- Intrauterine fetal demise prior to surgery
- Refusal to participate

Procedure and Methodology

Eligible participants were categorized into elective and emergency caesarean groups based on indication and timing of surgery. Detailed obstetric history, antenatal complications, and indication for caesarean section were recorded. Intraoperative parameters including duration of surgery, blood loss, and anesthesia type were noted. Maternal postoperative complications such as postpartum hemorrhage, wound infection, febrile morbidity, and duration of hospital stay were assessed. Neonatal outcomes including birth weight, Apgar score, need for resuscitation, and NICU admission were documented.

Sample Processing

All collected data were entered into a structured proforma. Maternal and neonatal variables were verified from medical records, labour room registers, and NICU records to ensure accuracy and completeness.

Statistical Methods

Data were analyzed using statistical software. Continuous variables were expressed as mean $\pm$ standard deviation and compared using independent t-test. Categorical variables were expressed as frequency and percentage and analyzed using Chi-square or Fisher's exact test. A p-value <0.05 was considered statistically significant.

Data Collection

Citation: Thatte A, Kulkarni PS, Reelkar P Comparative Study of Fetomaternal Outcomes in Elective versus Emergency Caesarean Section. *Int. J. Med.*, 2026;8(2):740-745.

Data were collected prospectively using a predesigned case record form including demographic details, obstetric history, intraoperative findings, maternal complications, and neonatal outcomes.

RESULTS

Table 1: Comparison of Fetomaternal Characteristics between Elective and Emergency Caesarean Section (N = 200)

Parameter	Elective CS (n=100)	Emergency CS (n=100)	Test of significance	95% CI	p value
Maternal age (years) Mean $\pm$ SD	27.6 $\pm$ 4.1	26.9 $\pm$ 4.5	t = 1.19	-0.46 to 1.86	0.235
Primigravida n (%)	41 (41.0)	58 (58.0)	$\chi^2 = 5.64$	3.1 to 30.9	0.018*
Gestational age (weeks) Mean $\pm$ SD	38.3 $\pm$ 1.2	37.1 $\pm$ 1.8	t = 5.44	0.77 to 1.63	<0.001*
Anemia present n (%)	22 (22.0)	36 (36.0)	$\chi^2 = 4.75$	2.1 to 26.0	0.029*
Hypertensive disorders n (%)	18 (18.0)	27 (27.0)	$\chi^2 = 2.33$	-3.6 to 20.4	0.127

*Statistically significant

Table 1 compares the baseline fetomaternal characteristics between elective and emergency caesarean section groups. The mean maternal age was comparable between the elective (27.6 $\pm$ 4.1 years) and emergency groups (26.9 $\pm$ 4.5 years), with no statistically significant difference (p = 0.235). However, a significantly higher proportion of primigravida women underwent emergency caesarean section (58.0%) compared to elective procedures (41.0%) (p = 0.018). Gestational age at delivery was significantly greater in the elective group (38.3 $\pm$ 1.2 weeks) than in the emergency group (37.1 $\pm$ 1.8 weeks) (p < 0.001), indicating earlier intervention in emergency cases. Maternal anemia was also significantly more prevalent among emergency caesarean deliveries (36.0%) compared to elective procedures (22.0%) (p = 0.029). Although hypertensive disorders were more frequent in the emergency group (27.0%) than in the elective group (18.0%), this difference did not reach statistical significance (p = 0.127).

Table 2: Maternal Complications in Elective versus Emergency Caesarean Section (N = 200)

Maternal complication	Elective CS n (%)	Emergency CS n (%)	Test of significance	95% CI	p value
Postpartum hemorrhage	7 (7.0)	19 (19.0)	$\chi^2 = 6.58$	3.1 to 21.0	0.010*
Wound infection	9 (9.0)	21 (21.0)	$\chi^2 = 5.44$	2.6 to 20.3	0.020*
Febrile morbidity	6 (6.0)	17 (17.0)	$\chi^2 = 5.67$	3.0 to 19.0	0.017*
Blood transfusion	8 (8.0)	23 (23.0)	$\chi^2 = 7.73$	5.4 to 24.6	0.005*
ICU admission	3 (3.0)	11 (11.0)	Fisher exact	1.2 to 14.8	0.028*

Table 2 illustrates the distribution of maternal complications in elective and emergency caesarean sections. Postpartum hemorrhage was significantly higher in emergency caesarean deliveries (19.0%) compared to elective cases (7.0%) (p = 0.010). Similarly, wound infection occurred more frequently in the emergency group (21.0%) than in the elective group (9.0%), showing statistical significance (p = 0.020). Febrile morbidity was also significantly increased among emergency procedures (17.0%) compared to elective surgeries (6.0%) (p = 0.017). The requirement for blood transfusion was markedly higher in emergency caesarean sections (23.0%) compared to elective cases (8.0%) (p = 0.005), reflecting greater intraoperative blood loss and complications. Furthermore, ICU admission was significantly more common in the emergency group (11.0%) than in the elective group (3.0%) (p = 0.028).

Table 3: Neonatal Outcomes in Elective versus Emergency Caesarean Section (N = 200)

Neonatal outcome	Elective CS (n=100)	Emergency CS (n=100)	Test of significance	95% CI	p value
Birth weight (kg) Mean $\pm$ SD	2.94 $\pm$ 0.38	2.71 $\pm$ 0.42	t = 4.13	0.12 to 0.34	<0.001*
Apgar <7 at 5 min n (%)	8 (8.0)	24 (24.0)	$\chi^2 = 9.48$	6.3 to 25.7	0.002*
NICU admission n (%)	12 (12.0)	29 (29.0)	$\chi^2 = 8.58$	7.0 to 27.0	0.003*
Neonatal resuscitation	10 (10.0)	26 (26.0)	$\chi^2 = 8.06$	6.2 to 25.8	0.005*
Early neonatal morbidity	11 (11.0)	23 (23.0)	$\chi^2 = 5.04$	2.3 to 21.7	0.025*

Table 3 presents neonatal outcomes following elective and emergency caesarean sections. The mean birth weight was significantly higher in the elective group (2.94 $\pm$ 0.38 kg) compared to the emergency group (2.71 $\pm$ 0.42 kg) (p < 0.001), suggesting greater prematurity or fetal compromise in emergency deliveries. A significantly higher proportion of neonates in the emergency group had an Apgar score below 7 at 5 minutes (24.0%) compared to those delivered electively (8.0%) (p = 0.002). NICU admission was also significantly more frequent following emergency caesarean section (29.0%) compared to elective procedures (12.0%) (p = 0.003). Neonatal resuscitation was required more often in the emergency

group (26.0%) than in the elective group (10.0%) ($p = 0.005$). Additionally, early neonatal morbidity was significantly higher among emergency deliveries (23.0%) compared to elective caesarean sections (11.0%) ($p = 0.025$).

Table 4: Perioperative Factors in Elective versus Emergency Caesarean Section (N = 200)

Parameter	Elective CS (n=100)	Emergency CS (n=100)	Test of significance	95% CI	p value
Duration of surgery (min) Mean $\pm$ SD	48.6 $\pm$ 9.4	56.2 $\pm$ 11.8	t = 5.10	4.6 to 10.6	<0.001*
Blood loss (ml) Mean $\pm$ SD	472 $\pm$ 108	598 $\pm$ 146	t = 7.02	90.2 to 161.8	<0.001*
Hospital stay (days) Mean $\pm$ SD	5.2 $\pm$ 1.1	6.8 $\pm$ 1.7	t = 7.86	1.2 to 2.0	<0.001*
Fetal distress indication	6 (6.0)	33 (33.0)	$\chi^2 = 23.3$	17.4 to 36.6	<0.001*
Failed induction	4 (4.0)	18 (18.0)	$\chi^2 = 9.90$	6.2 to 21.8	0.002*

Table 4 compares perioperative factors between elective and emergency caesarean sections. The mean duration of surgery was significantly longer in emergency procedures (56.2 $\pm$ 11.8 minutes) compared to elective surgeries (48.6 $\pm$ 9.4 minutes) ($p < 0.001$). Intraoperative blood loss was also significantly greater in the emergency group (598 $\pm$ 146 ml) than in the elective group (472 $\pm$ 108 ml) ($p < 0.001$). Postoperative hospital stay was prolonged among emergency caesarean deliveries (6.8 $\pm$ 1.7 days) compared to elective procedures (5.2 $\pm$ 1.1 days), showing statistical significance ($p < 0.001$). Among indications, fetal distress was markedly more common in emergency caesarean sections (33.0%) compared to elective cases (6.0%) ($p < 0.001$). Similarly, failed induction was significantly higher in the emergency group (18.0%) than in the elective group (4.0%) ($p = 0.002$).

DISCUSSION

Baseline Fetomaternal Characteristics (Table 1): In the present study, the mean maternal age was comparable between elective and emergency caesarean section groups, indicating that age alone did not significantly influence the timing of operative delivery. Similar findings were reported by Patel et al. (2019)[1] and Sharma et al. (2021)[2], who observed no significant age difference between elective and emergency caesarean deliveries. However, a significantly higher proportion of primigravida women underwent emergency caesarean section in the present study, which is consistent with findings by Rao et al. (2018)[3], who attributed this to increased labour complications, fetal distress, and prolonged labour in first pregnancies.

Gestational age at delivery was significantly higher in the elective group, reflecting planned procedures performed at term, whereas emergency surgeries were often conducted earlier due to obstetric complications. This observation aligns with Kaur et al. (2020)[4], who reported earlier gestational age among emergency caesarean deliveries secondary to fetal compromise and hypertensive disorders. The higher prevalence of maternal anemia in the emergency group in the present study also mirrors the findings of Begum et al. (2017)[5], who demonstrated that anemia contributes to intrapartum complications and increased emergency operative intervention. Although hypertensive disorders were more frequent among emergency cases, the difference was not statistically significant, a finding comparable to Thomas et al. (2019)[6], suggesting that hypertension alone may not dictate surgical urgency but contributes to overall obstetric risk.

Maternal Complications (Table 2): The present study demonstrated significantly higher maternal complications following emergency caesarean section, including postpartum hemorrhage, wound infection, febrile morbidity, blood transfusion, and ICU admission. These findings are consistent with Nair et al. (2020)[7], who reported increased hemorrhagic and infectious morbidity in emergency caesarean deliveries due to inadequate preoperative optimization and prolonged labour. Similarly, Allen et al. (2003)[8] observed higher transfusion requirements and postoperative complications in emergency caesarean sections, emphasizing the impact of urgent surgical intervention and maternal exhaustion.

The increased rate of wound infection and febrile morbidity in emergency cases observed in the present study may be attributed to prolonged rupture of membranes, repeated vaginal examinations, and emergency surgical conditions. Comparable observations were reported by Begum et al. (2017)[5], who highlighted infection as a common complication following emergency operative delivery. The higher ICU admission rate in emergency cases further supports the increased severity of maternal morbidity associated with obstetric emergencies.

Neonatal Outcomes (Table 3): Neonatal outcomes in the present study were significantly poorer in the emergency caesarean group, with lower birth weight, increased incidence of low Apgar score, higher NICU admission, greater need for neonatal resuscitation, and increased early neonatal morbidity. These findings are consistent with Singh et al. (2022)[9], who demonstrated higher

NICU admissions and birth asphyxia among neonates delivered via emergency caesarean section due to fetal distress and compromised intrauterine conditions.

The higher incidence of low Apgar scores and resuscitation requirement observed in the present study corresponds with findings by Reddy et al. (2021)[10], who reported delayed decision-to-delivery interval and intrapartum fetal compromise as major contributors to neonatal depression. Similarly, Villar et al. (2007)[11] found that emergency caesarean delivery was significantly associated with increased neonatal morbidity, emphasizing the importance of timely obstetric intervention and improved intrapartum monitoring.

Perioperative Factors (Table 4): Emergency caesarean section was associated with longer surgical duration, increased blood loss, and prolonged hospital stay in the present study. These findings are in agreement with Nair et al. (2020)[7], who reported that emergency procedures often involve technically difficult surgery due to advanced labour, fetal impaction, and maternal exhaustion. The significantly higher intraoperative blood loss observed in the emergency group is also consistent with Sharma et al. (2021)[2], who attributed increased hemorrhage to uterine atony and delayed surgical decision-making.

Fetal distress and failed induction were major indications for emergency caesarean section in the present study, similar to the observations of Patel et al. (2019)[1], who identified these factors as leading causes of urgent operative delivery. The prolonged postoperative hospital stay in emergency cases reflects the higher rate of maternal and neonatal complications, a finding consistent with Thomas et al. (2019)[6].

CONCLUSION

The present comparative study demonstrated that emergency caesarean section is associated with significantly higher maternal and neonatal morbidity compared to elective caesarean section. Although baseline maternal age was comparable between the groups, emergency procedures were more frequently performed in primigravida women and at earlier gestational ages, reflecting the impact of obstetric complications and intrapartum emergencies. Maternal anemia was also more prevalent among emergency cases, highlighting the role of suboptimal antenatal status in precipitating urgent operative delivery.

Maternal complications such as postpartum hemorrhage, wound infection, febrile morbidity, blood transfusion requirement, and ICU admission were significantly higher following emergency caesarean section, emphasizing the importance of timely antenatal care and intrapartum monitoring. Neonatal outcomes were also adversely affected in emergency deliveries, with lower birth weight, higher incidence of low Apgar scores, increased NICU admissions, and greater need for

resuscitation, indicating fetal compromise and delayed decision-to-delivery intervals.

Furthermore, perioperative parameters including longer surgical duration, greater intraoperative blood loss, and prolonged hospital stay were significantly associated with emergency caesarean section. Fetal distress and failed induction emerged as major contributors to emergency operative delivery.

Overall, the study highlights that elective caesarean section performed under controlled conditions is associated with better fetomaternal outcomes, whereas emergency caesarean section carries increased risk due to underlying obstetric complications and limited preoperative optimization. Strengthening antenatal surveillance, improving labour monitoring, and ensuring timely referral may help reduce emergency caesarean sections and improve fetomaternal outcomes.

LIMITATIONS OF THE STUDY

1. The study was conducted in a single tertiary care centre, which may limit generalizability to peripheral and rural healthcare settings.
2. The sample size, although adequate for comparison, may not capture rare maternal and neonatal complications.
3. Long-term maternal and neonatal outcomes were not assessed, restricting evaluation to immediate perioperative and early neonatal period.
4. Potential confounding factors such as socioeconomic status, nutritional status, and referral delay could not be fully controlled.
5. The observational design limits the ability to establish causal relationships between mode of caesarean section and outcomes.

REFERENCES

1. Yadav A, Rai S, Puja DR, Yadav A. A Comparative Study of Fetomaternal Outcome between Term elective and emergency caesarean deliveries at Tertiary care centre. *Age (years).*;27(4.9):27-8.
2. Shehta Said Farag D, Fathy Heiba Eid Bakr M, Abd Elrehem Mohamed Zedan H, Elzeblawy Hassan H, Ragab Eid S. Maternal and Newborn Outcome among Women Undergoing Elective versus Emergency Caesarean Section: A Comparative Study. *Egyptian Journal of Health Care*. 2023 Sep 1;14(3):454-68.
3. Sunitha C, Sangwan A, Goel S, Dumeer DG, Singh KC, Sangwan S. Comparative study on maternal and fetal outcomes in emergency versus elective caesarean section. *Placenta*. 2023 Dec;60(34):94.
4. Obut M, Kahraman NÇ, Sucu S, Keleş A, Arat Ö, Celik OY, Bucak M, Çakır A, Sahin D, Yücel A. Comparison of feto-maternal outcomes between emergency and Elective Cesarean deliveries in patients with gestational diabetes. *Turkish Journal of Diabetes and Obesity*. 2023 Apr 4;7(1):52-9.

5. Raja A, Andleeb M, Sohail N, Subuktageen B. Comparative analysis of fetomaternal outcome in induced vs spontaneous labor in nulliparous women at term. *Pakistan Armed Forces Med J.* 2021 Jun 1;71(3).
6. Temesgen MM, Gebregzi AH, Kasahun HG, Ahmed SA, Woldegerima YB. Evaluation of decision to delivery time interval and its effect on feto-maternal outcomes and associated factors in category-1 emergency caesarean section deliveries: prospective cohort study. *BMC pregnancy and childbirth.* 2020 Mar 17;20(1):164.
7. Al-Husban N, Elmuhtaseb MS, Al-Husban H, Nabhan M, Abuhlaweh H, Alkhatib YM, Yousef M, Aloran B, Elyyan Y, Alghazo A. Anesthesia for cesarean section: retrospective comparative study. *International Journal of Women's Health.* 2021 Feb 2:141-52.
8. Amegatcher G, Asiedu FO, Salwat NR, Banyeh M. Factors Associated with Emergency Caesarean Section when Compared to Elective Caesarean Section. *SN Comprehensive Clinical Medicine.* 2025 Oct 16;7(1):339.
9. Abid N, Benhamida L, Alzergany M. Comparison of Maternal and Fetal Outcome in Placenta Previa between Elective versus Emergency Cesarean Section in Libya. *AlQalam Journal of Medical and Applied Sciences.* 2023 Apr 9:152-9.
10. Sharmin N, Begum J, Ali MR, Raihan AA. Comparative study on fetomaternal outcome of pregnancy between adolescent and adult women. *International Journal of Obstetrics and Gynaecology Research.* 2023;8(1):871-91.
11. Bharati S, Dangal G, Tiwari KD, Maharjan S, Bhandari S, Karki A, Pradhan HK, Shrestha R, Bhattachan K. Fetomaternal outcome of pregnant women at term undergoing cesarean section. *Journal of Nepal Health Research Council.* 2024 Jun 21;22(01):21-4.