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Original Article

# Maternal Morbidity and Neonatal Outcomes in Elective and Emergency Caesarean Births

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## ABSTRACT

**Background:** Caesarean delivery is an essential obstetric intervention, but the urgency and clinical circumstances surrounding surgery can strongly influence maternal recovery and neonatal adaptation. Evidence from referral hospitals suggests that emergency caesarean sections often occur in the setting of labour abnormalities, fetal compromise, delayed referral, anaemia, or ruptured membranes, all of which can increase perioperative risk. The study is designed to compare maternal, fetal, and early neonatal outcomes between elective and emergency lower-segment caesarean sections in a tertiary maternity hospital.

**Methods:** This hospital-based prospective observational study enrolled 400 women with singleton pregnancies at 30-40 weeks of gestation who underwent caesarean delivery during a two-year period. Two hundred women underwent elective LSCS and 200 underwent emergency LSCS. Maternal demographic, antenatal, intrapartum, operative, postoperative, and neonatal variables were recorded.

**Results:** Emergency LSCS was more frequent among primigravidae (55.0% vs 30.0%), unbooked women (55.0% vs 25.0%), and preterm pregnancies (25.0% vs 10.0%), with all comparisons statistically significant. Ruptured membranes (40.0% vs 5.0%), meconium-stained liquor (22.0% vs 5.0%), abnormal fetal heart rate patterns, prolonged labour, and intrapartum fever were also more common in emergency cases. Emergency LSCS was associated with greater blood loss, more blood transfusion (18.0% vs 4.0%), longer surgery (46.8 ± 8.4 vs 38.5 ± 6.2 minutes), postoperative fever (15.0% vs 4.0%), postpartum haemorrhage (12.0% vs 3.0%), and longer hospital stay (6.1 ± 1.8 vs 4.2 ± 1.1 days). Neonates delivered by emergency LSCS had higher rates of NICU admission (28.0% vs 8.0%), respiratory distress syndrome (15.0% vs 4.0%), early neonatal sepsis (10.0% vs 2.0%), and resuscitation (30.0% vs 10.0%). Apgar scores of at least 7 at 1 minute were recorded in 60.0% of emergency and 85.0% of elective deliveries.

**Conclusion:** Emergency caesarean section carried a substantially greater burden of maternal and neonatal morbidity. Stronger antenatal surveillance, timely referral, careful labour monitoring, and rapid multidisciplinary response may reduce avoidable deterioration before surgery and improve outcomes.

***Keywords:*** *elective caesarean section; emergency caesarean section; maternal morbidity; neonatal outcome; NICU admission; Apgar score.*

## INTRODUCTION

Caesarean section has transformed the management of difficult labour and high-risk pregnancy. When used for a clear maternal or fetal indication, it can prevent severe disability and death. At the same time, the worldwide increase in caesarean delivery has created a more complex clinical discussion, because access remains inadequate in some

populations while use may be excessive in others. Global analyses have documented a sustained rise in caesarean rates and wide socioeconomic and geographic disparities in access and use [1-3].

The clinical context in which the operation is performed is particularly important. An elective caesarean section is planned in advance, allowing time for maternal optimisation, anaesthetic assessment, blood availability, neonatal preparation, and an experienced operating team. Emergency caesarean section is usually undertaken because of an acute or evolving maternal or fetal indication. It may follow prolonged labour, fetal heart rate abnormalities, meconium-stained liquor, hypertensive disease, haemorrhage, failed induction, or cephalopelvic disproportion. The underlying obstetric complication, rather than the abdominal delivery alone, often contributes substantially to adverse outcomes.

Caesarean delivery is associated with short-term surgical risks such as haemorrhage, infection, anaesthetic complications, thromboembolism, visceral injury, and prolonged hospitalisation. It also has implications for subsequent pregnancies, including abnormal placentation and uterine scar-related complications [4-11]. For the neonate, delivery before the onset of labour or before 39 completed weeks may increase respiratory morbidity, whereas an emergency operation undertaken after intrapartum compromise may be followed by low Apgar scores, resuscitation, sepsis, meconium aspiration, or intensive-care admission [12-14].

Comparative assessment of elective and emergency procedures is therefore useful for counselling, service planning, blood-bank preparedness, infection prevention, and neonatal resource allocation. Evidence from South Asian tertiary centres generally indicates a higher complication burden after emergency caesarean delivery, although the magnitude varies with referral patterns, case mix, and institutional capacity [16-20].

The study was undertaken to compare maternal and fetal outcomes among women undergoing elective and emergency caesarean delivery. It also examined differences in demographic characteristics, antenatal factors, intrapartum findings, surgical indications, and the type of anaesthesia used in the two groups. Maternal outcomes were evaluated in terms of intraoperative blood loss, need for blood transfusion, operative difficulty, postpartum haemorrhage, postoperative infections, wound-related complications, intensive care admission, and length of hospital stay. Neonatal assessment included birth weight, requirement for resuscitation, Apgar scores, respiratory complications, neonatal sepsis, admission to the neonatal intensive care unit, and early neonatal death.

## MATERIALS AND METHODS

### Study Design and Setting

A hospital-based prospective observational study was conducted over a period of two years in the Department of Obstetrics and Gynaecology at Government Maternity Hospital, Sultan Bazar, Koti, Hyderabad, a tertiary referral maternity facility affiliated with Osmania Medical College, Hyderabad, Telangana, India. The hospital receives booked patients as well as emergency referrals from peripheral public and private healthcare facilities.

### Study Population and Eligibility

The study included 400 women with singleton pregnancies between 30 and 40 weeks of gestation who underwent lower-segment caesarean section. Irrespective of booking status or parity, eligible participants were classified into an elective LSCS group (n = 200) or an emergency LSCS group (n = 200) according to the circumstances of surgery. Women with gestational age below 30 weeks or above 40 weeks, multiple pregnancy, fetal congenital malformation, uterine malformation, uterine fibroid, coagulopathy, jaundice, or refusal to provide consent were excluded. The study protocol specified a total sample size of 400; a separate sample-size calculation was not available in the source thesis.

### Definitions of Study Groups

Elective LSCS referred to a planned caesarean delivery scheduled before an urgent maternal or fetal indication developed, commonly for a previous caesarean scar, malpresentation, anticipated cephalopelvic disproportion, severe fetal growth restriction, or another recognised obstetric indication. Emergency LSCS referred to an unplanned caesarean delivery undertaken because of an acute maternal, fetal, or labour-related indication requiring prompt operative birth.

### Clinical Assessment and Data Collection

After written consent, a structured clinical assessment was performed. Maternal age, gravidity, parity, booking status, educational and socioeconomic status, gestational age, previous caesarean delivery, antenatal complications, and indication for surgery were recorded. Examination and review of antenatal documents were used to identify anaemia, hypertensive disorders of pregnancy, oligohydramnios, gestational diabetes, antepartum haemorrhage, and relevant medical disorders. Baseline investigations included complete blood count, bleeding and clotting time, blood grouping and typing, random blood glucose, blood urea, liver function tests, serum creatinine, serum electrolytes, antenatal ultrasonography, and uterine artery Doppler where clinically indicated.

**Intrapartum and Operative Variables**
Membrane status, duration of rupture of membranes, onset and duration of labour, Bishop score, fetal presentation, amniotic fluid index, uterine artery Doppler findings, meconium-stained liquor, fetal heart rate abnormalities, intrapartum fever, and estimated fetal weight were documented. Labour progress was followed using a partogram when applicable. Operative records were reviewed for type of anaesthesia, estimated blood loss, blood transfusion, duration of surgery, uterine incision extension, bladder injury, uterine atony, and other intraoperative difficulties.

**Maternal and Neonatal Outcomes**
Maternal outcomes included postoperative fever, surgical-site infection, wound dehiscence, burst abdomen, postpartum haemorrhage, intensive-care admission, analgesic requirement, length of hospital stay, and readmission within 30 days. Neonatal outcomes included birth weight, need for resuscitation, Apgar scores at 1 and 5 minutes, respiratory distress syndrome, meconium aspiration syndrome, early neonatal sepsis, jaundice, NICU admission, congenital anomalies, and early neonatal death.

**Ethical Considerations**
Ethical clearance was obtained from the Institutional Ethics Committee of Osmania Medical College, Hyderabad, before participant recruitment. Written informed consent was obtained from each participant or an authorised guardian. Participant identity and clinical information were kept confidential, and enrolment did not alter routine obstetric or neonatal care.

**Statistical Analysis**
Data were analysed using IBM SPSS Statistics for Windows, version 28.0 (IBM Corp., Armonk, New York, USA). Categorical variables were summarised as frequency and percentage, while continuous variables were expressed as mean ± standard deviation. Between-group comparisons for categorical data used the chi-square test; Fisher exact testing was considered when cell frequencies were small. Continuous variables were compared using the independent-samples t test. All tests were two-sided, and $p < 0.05$ was considered statistically significant. The p values presented below reproduce the analysis reported in the source thesis.

**RESULTS**
**Participant Profile and Antenatal Characteristics**
All 400 enrolled women were included in the analysis, with 200 in each study group. Most participants were aged 21-30 years. The age distribution did not differ significantly between groups ($p = 0.18$). Gravidity, however, showed a clear pattern: primigravidae represented 55.0% of emergency LSCS cases and 30.0% of elective cases ($p < 0.001$). Emergency procedures were also more frequent among unbooked women (55.0% vs 25.0%, $p < 0.001$), while elective procedures were concentrated among women who had received regular antenatal care. Table 1 summarises the demographic profile.

**Table 1: Sociodemographic profile of women undergoing elective and emergency LSCS**

| Characteristic | Elective LSCS (n=200) | Emergency LSCS (n=200) | p-value |
|---|---|---|---|
| Age 18-20 years | 24 (12.0%) | 36 (18.0%) | 0.18 |
| Age 21-30 years | 96 (48.0%) | 104 (52.0%) | |
| Age 31-40 years | 64 (32.0%) | 52 (26.0%) | |
| Age >40 years | 16 (8.0%) | 8 (4.0%) | |
| Primigravida | 60 (30.0%) | 110 (55.0%) | <0.001 |
| Multigravida | 140 (70.0%) | 90 (45.0%) | |
| Booked | 150 (75.0%) | 90 (45.0%) | <0.001 |
| Unbooked | 50 (25.0%) | 110 (55.0%) | |
| Upper/upper-middle socioeconomic class | 60 (30.0%) | 40 (20.0%) | 0.03 |
| Lower-middle class | 70 (35.0%) | 60 (30.0%) | |
| Upper-lower/lower class | 70 (35.0%) | 100 (50.0%) | |
| Illiterate | 30 (15.0%) | 50 (25.0%) | 0.01 |
| Primary education | 90 (45.0%) | 100 (50.0%) | |
| Secondary/graduate education | 80 (40.0%) | 50 (25.0%) | |

*Values are number (percentage). Overall p values are shown for multi-category variables. LSCS, lower-segment caesarean section. Chi-square test was used*

Preterm delivery was more common in the emergency group (25.0% vs 10.0%, $p < 0.001$). A previous caesarean scar was present in 60.0% of elective cases and 40.0% of emergency cases ($p < 0.001$), which reflected the frequent scheduling of planned repeat caesarean delivery. Anaemia also differed significantly: normal haemoglobin was recorded in 65.0% of elective cases and 45.0% of emergency cases, while moderate anaemia was three times more frequent in the emergency

group (15.0% vs 5.0%, p < 0.001). Pregnancy-induced hypertension, oligohydramnios, gestational diabetes, and antepartum haemorrhage were more frequent among emergency cases. These patterns are detailed in Table 2 and illustrated in Figure 1.

**Table 2: Obstetric and antenatal characteristics**

| Characteristic | Elective LSCS (n=200) | Emergency LSCS (n=200) | p-value |
|---|---|---|---|
| Gestation <37 weeks | 20 (10.0%) | 50 (25.0%) | <0.001 |
| Gestation 37-39 weeks | 150 (75.0%) | 110 (55.0%) | |
| Gestation ≥40 weeks | 30 (15.0%) | 30 (15.0%) | |
| Previous LSCS: yes | 120 (60.0%) | 80 (40.0%) | <0.001 |
| Normal Hb (≥11 g/dL) | 130 (65.0%) | 90 (45.0%) | <0.001 |
| Mild anaemia (9-10.9 g/dL) | 60 (30.0%) | 80 (40.0%) | |
| Moderate anaemia (7-8.9 g/dL) | 10 (5.0%) | 30 (15.0%) | |
| PIH/gestational hypertension | 20 (10.0%) | 40 (20.0%) | 0.01* |
| Oligohydramnios | 16 (8.0%) | 24 (12.0%) | |
| Gestational diabetes | 10 (5.0%) | 16 (8.0%) | |
| Antepartum haemorrhage | 4 (2.0%) | 10 (5.0%) | |
| Bishop score <6 | 180 (90.0%) | 80 (40.0%) | <0.001 |
| Bishop score ≥6 | 20 (10.0%) | 120 (60.0%) | |

*Values are number (percentage). *The source thesis reported an overall p value of 0.01 for the antenatal-complication profile; individual complications were not mutually exclusive. Hb, haemoglobin; PIH, pregnancy-induced hypertension*

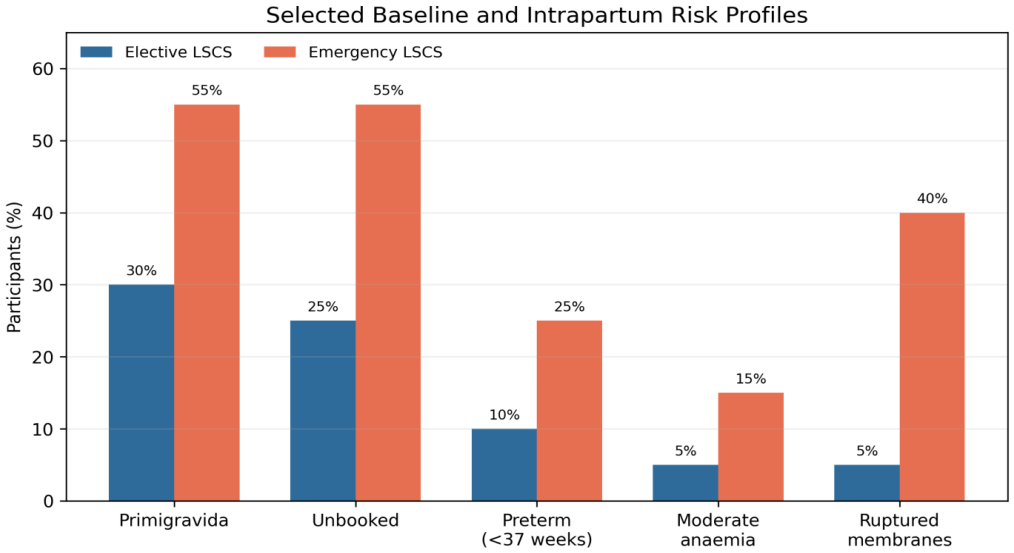


***Figure 1: Selected baseline and intrapartum risk profiles in the elective and emergency LSCS groups. Percentages were calculated within each group.***

**Indications for Caesarean Section and Anaesthesia**

The indication profile differed markedly between the groups (Table 3; Figure 2). Previous LSCS was the leading indication for elective surgery (50.0%), followed by malpresentation and cephalopelvic disproportion. Emergency procedures were most often performed for fetal distress (25.0%), cephalopelvic disproportion (20.0%), combined meconium-stained liquor with fetal distress (15.0%), and hypertensive disorders (12.5%). The overall difference in indication distribution was highly significant (p < 0.001). Spinal anaesthesia remained the predominant technique in both groups, although general anaesthesia was used more often during emergency LSCS (15.0% vs 6.0%, p = 0.002).

**Table 3: Primary indications for caesarean section and anaesthetic technique**

| Variable | Elective LSCS (n=200) | Emergency LSCS (n=200) | p-value |
|---|---|---|---|
| Previous LSCS | 100 (50.0%) | 40 (20.0%) | <0.001 |
| Malpresentation | 30 (15.0%) | 10 (5.0%) | |
| Cephalopelvic disproportion | 30 (15.0%) | 40 (20.0%) | |
| Fetal distress | 10 (5.0%) | 50 (25.0%) | |
| Meconium-stained liquor | 5 (2.5%) | 30 (15.0%) | |

| | | | |
|---|---|---|---|
| with fetal distress | | | |
| Hypertensive disorders | 10 (5.0%) | 25 (12.5%) | |
| Other indications | 15 (7.5%) | 5 (2.5%) | |
| Spinal anaesthesia | 188 (94.0%) | 170 (85.0%) | 0.002 |
| General anaesthesia | 12 (6.0%) | 30 (15.0%) | |

*Values are number (percentage). The p value for indications refers to the overall distribution. Chi-square test was used.*

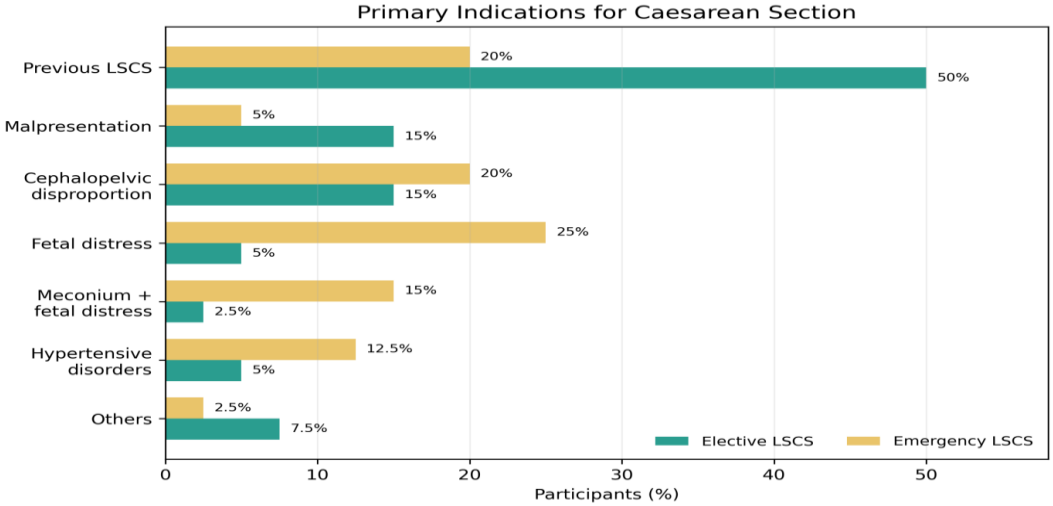


***Figure 2: Distribution of primary indications for elective and emergency caesarean section***

Intrapartum and Fetal Baseline Factors

Intrapartum findings showed that the emergency group entered surgery with a substantially greater burden of labour-related and fetal risk. Ruptured membranes were present in 40.0% of emergency cases compared with 5.0% of elective cases ($p < 0.001$), and 20.0% of emergency cases had rupture of membranes lasting at least 6 hours. Meconium-stained liquor was observed in 22.0% and 5.0% of the emergency and elective groups, respectively ($p < 0.001$). Abnormal fetal heart rate patterns were frequent in emergency cases, including tachycardia in 25.0% and bradycardia or decelerations in 15.0%, compared with 4.0% and 2.0% in elective cases.

The mean amniotic fluid index was lower in the emergency group ($8.6 \pm 2.8$ vs $11.2 \pm 2.1$, $p < 0.001$), and abnormal uterine artery Doppler notching was more frequent (22.0% vs 8.0%, $p < 0.001$). Prolonged labour of at least 6 hours was recorded in 40.0% of emergency cases and 6.0% of elective cases. Intrapartum fever occurred in 12.0% of emergency cases and 2.0% of elective cases ($p = 0.001$). Low estimated fetal weight was also more common before emergency delivery (25.0% vs 10.0%, $p = 0.004$). Table 4 provides the detailed comparison.

**Table 4: Intrapartum and fetal baseline parameters**

| Parameter | Elective LSCS (n=200) | Emergency LSCS (n=200) | p-value |
|---|---|---|---|
| Non-cephalic presentation | 30 (15.0%) | 16 (8.0%) | 0.03 |
| Amniotic fluid index, mean ± SD | 11.2 ± 2.1 | 8.6 ± 2.8 | <0.001 |
| Abnormal uterine artery Doppler | 16 (8.0%) | 44 (22.0%) | <0.001 |
| Ruptured membranes | 10 (5.0%) | 80 (40.0%) | <0.001 |
| ROM ≥6 hours | 0 (0%) | 40 (20.0%) | <0.001 |
| Meconium-stained liquor | 10 (5.0%) | 44 (22.0%) | <0.001 |
| FHR tachycardia | 8 (4.0%) | 50 (25.0%) | <0.001 |
| FHR bradycardia/decelerations | 4 (2.0%) | 30 (15.0%) | |
| Spontaneous labour | 20 (10.0%) | 120 (60.0%) | <0.001 |
| Induced labour | 10 (5.0%) | 50 (25.0%) | |
| Labour duration ≥6 hours | 12 (6.0%) | 80 (40.0%) | <0.001 |
| Intrapartum fever | 4 (2.0%) | 24 (12.0%) | 0.001 |
| Estimated fetal weight <2.5 kg | 20 (10.0%) | 50 (25.0%) | 0.004 |

*Values are number (percentage) unless otherwise indicated. Chi-square tests were used for categorical variables and the independent-samples t test for amniotic fluid index. ROM, rupture of membranes; FHR, fetal heart rate; SD, standard deviation*

Operative and Maternal Outcomes

Maternal morbidity was consistently higher after emergency LSCS (Table 5). Blood loss of at least 500 mL occurred in 45.0% of emergency procedures and 18.0% of elective procedures ($p < 0.001$). Blood transfusion was required in 18.0%

of emergency cases compared with 4.0% of elective cases ($p < 0.001$). The mean operating time was approximately eight minutes longer in the emergency group (46.8 ± 8.4 vs 38.5 ± 6.2 minutes, $p < 0.001$), and intraoperative complications were more common (7.0% vs 1.0%, $p = 0.006$).

Postoperative fever, surgical-site infection, wound dehiscence, postpartum haemorrhage, intensive-care admission, greater analgesic use, and 30-day readmission all occurred more frequently after emergency caesarean section. Mean hospital stay increased from 4.2 ± 1.1 days after elective surgery to 6.1 ± 1.8 days after emergency surgery ($p < 0.001$). The difference in selected adverse maternal outcomes is illustrated in Figure 3.

**Table 5: Operative and postoperative maternal outcomes**

| Outcome | Elective LSCS (n=200) | Emergency LSCS (n=200) | p-value |
|---|---|---|---|
| Blood loss <500 mL | 164 (82.0%) | 110 (55.0%) | <0.001 |
| Blood loss 500-1000 mL | 30 (15.0%) | 70 (35.0%) | |
| Blood loss >1000 mL | 6 (3.0%) | 20 (10.0%) | |
| Blood transfusion required | 8 (4.0%) | 36 (18.0%) | <0.001 |
| Any intraoperative complication | 2 (1.0%) | 14 (7.0%) | 0.006 |
| Uterine incision extension | 2 (1.0%) | 8 (4.0%) | |
| Bladder injury | 0 (0%) | 2 (1.0%) | |
| Atonic uterus requiring additional uterotonics | 0 (0%) | 4 (2.0%) | |
| Duration of surgery, minutes | 38.5 ± 6.2 | 46.8 ± 8.4 | <0.001 |
| Postoperative fever | 8 (4.0%) | 30 (15.0%) | 0.001 |
| Surgical-site infection | 4 (2.0%) | 24 (12.0%)* | 0.001 |
| Wound dehiscence | 2 (1.0%) | 8 (4.0%) | 0.04 |
| Burst abdomen | 0 (0%) | 1 (0.5%) | Not reported |
| Postpartum haemorrhage | 6 (3.0%) | 24 (12.0%) | 0.002 |
| ICU admission | 2 (1.0%) | 10 (5.0%) | 0.03 |
| Hospital stay, days | 4.2 ± 1.1 | 6.1 ± 1.8 | <0.001 |
| Analgesic requirement >3 doses | 56 (28.0%) | 108 (54.0%) | <0.001 |
| Readmission within 30 days | 2 (1.0%) | 8 (4.0%) | 0.04 |

*Values are number (percentage) or mean ± SD. Chi-square/Fisher exact tests were used for categorical variables and independent-samples t tests for continuous variables. *The thesis aggregate maternal-outcome table reported 20 (10.0%) emergency SSIs, whereas its dedicated postoperative-complication table reported 24 (12.0%); the dedicated table value is retained here. ICU, intensive care unit.*

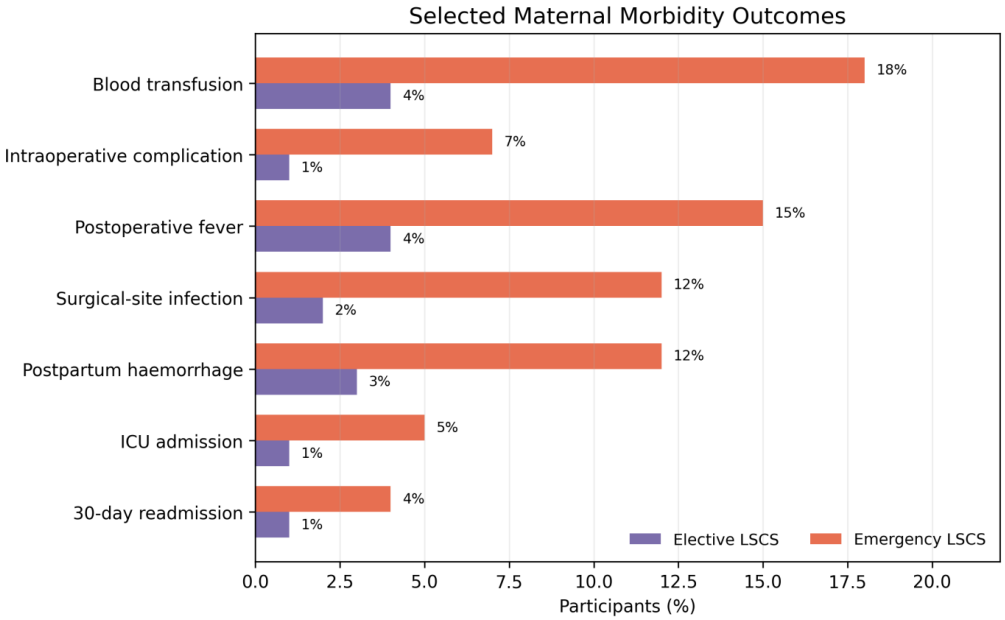


***Figure 3: Selected maternal morbidity outcomes after elective and emergency LSCS***

**Fetal, Neonatal, and NICU Outcomes**

Neonatal outcomes were poorer after emergency LSCS (Table 6). Low birth weight was recorded in 30.0% of emergency-delivery neonates and 15.0% of elective-delivery neonates ($p = 0.002$). Resuscitation was required in 30.0% and 10.0%, respectively ($p < 0.001$). Respiratory distress syndrome occurred in 15.0% of emergency cases compared

with 4.0% of elective cases ($p < 0.001$), while meconium aspiration syndrome occurred in 6.0% and 1.0% ($p = 0.02$). Early neonatal sepsis was five times more frequent following emergency LSCS (10.0% vs 2.0%, $p = 0.003$).

NICU admission was required for 28.0% of emergency-delivery neonates and 8.0% of elective-delivery neonates ($p < 0.001$), as shown in Figure 4. At 1 minute, an Apgar score of at least 7 was achieved by 85.0% of neonates in the elective group and 60.0% in the emergency group. At 5 minutes, the corresponding proportions were 95.0% and 80.0% (Figure 5). Four early neonatal deaths occurred in the emergency group and none in the elective group ($p = 0.04$). Congenital anomaly frequency did not differ significantly.

**Table 6: Fetal and early neonatal outcomes**

| Outcome | Elective LSCS (n=200) | Emergency LSCS (n=200) | p-value |
|---|---|---|---|
| Birth weight <2.5 kg | 30 (15.0%) | 60 (30.0%) | 0.002 |
| Neonatal resuscitation required | 20 (10.0%) | 60 (30.0%) | <0.001 |
| NICU admission | 16 (8.0%) | 56 (28.0%) | <0.001 |
| Respiratory distress syndrome | 8 (4.0%) | 30 (15.0%) | <0.001 |
| Meconium aspiration syndrome | 2 (1.0%) | 12 (6.0%) | 0.02 |
| Early neonatal sepsis | 4 (2.0%) | 20 (10.0%) | 0.003 |
| Neonatal jaundice | 24 (12.0%) | 40 (20.0%) | 0.06 |
| Apgar ≥7 at 1 minute | 170 (85.0%) | 120 (60.0%) | <0.001 |
| Apgar 4-6 at 1 minute | 24 (12.0%) | 60 (30.0%) | |
| Apgar <4 at 1 minute | 6 (3.0%) | 20 (10.0%) | |
| Apgar ≥7 at 5 minutes | 190 (95.0%) | 160 (80.0%) | 0.001 |
| Apgar 4-6 at 5 minutes | 8 (4.0%) | 30 (15.0%) | |
| Apgar <4 at 5 minutes | 2 (1.0%) | 10 (5.0%) | |
| Early neonatal death | 0 (0%) | 4 (2.0%) | 0.04 |
| Congenital anomalies | 2 (1.0%) | 4 (2.0%) | 0.41 |

*Values are number (percentage). Overall p values are shown for the three-category Apgar distributions. NICU, neonatal intensive care unit.*

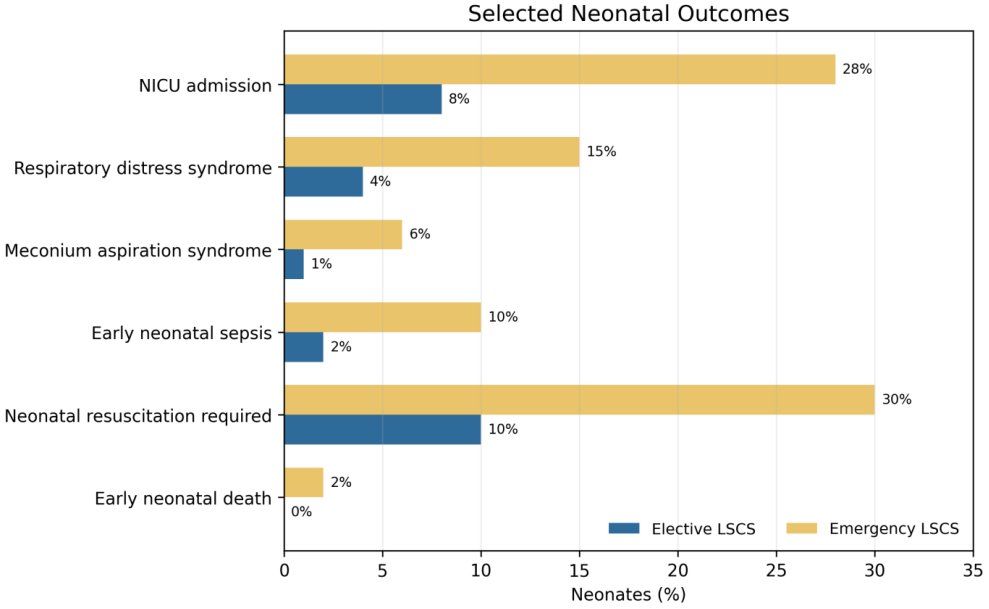


***Figure 4: Selected early neonatal outcomes following elective and emergency LSCS***

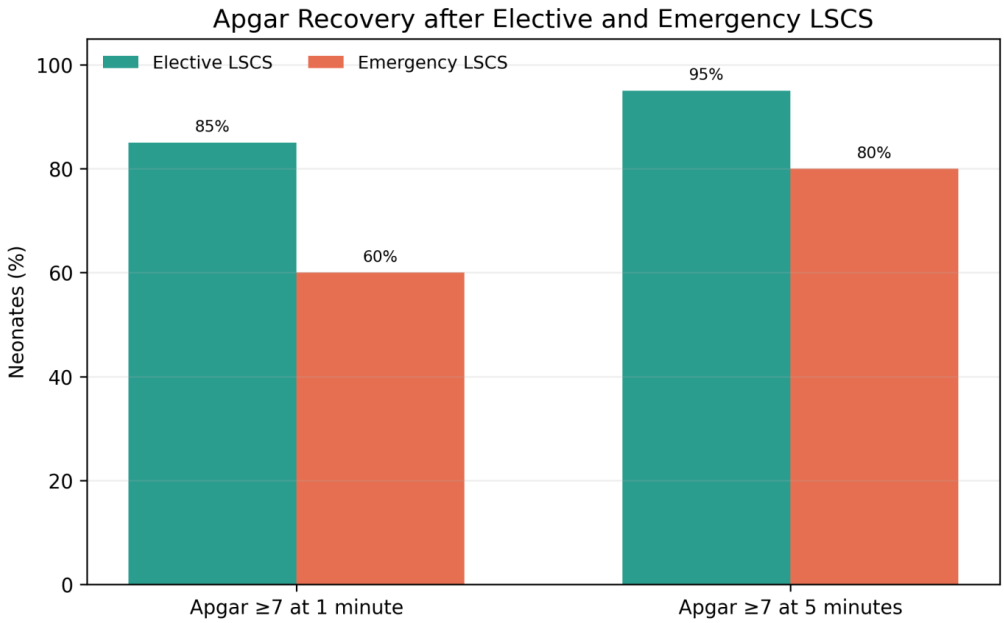


***Figure 5: Proportion of neonates with an Apgar score of at least 7 at 1 and 5 minutes***

## DISCUSSION

### Principal Findings

This study found that emergency caesarean delivery was not simply a different scheduling category. It represented a clinically distinct pathway marked by poorer antenatal engagement, labour complications, fetal compromise, greater operative difficulty, and increased postoperative and neonatal morbidity. Primigravidity, unbooked status, preterm gestation, anaemia, hypertensive disease, ruptured membranes, prolonged labour, meconium-stained liquor, and abnormal fetal heart rate patterns were all more prominent in the emergency group. These conditions plausibly explain the observed increase in blood loss, transfusion, infection, postpartum haemorrhage, intensive-care use, low Apgar scores, resuscitation, and NICU admission.

### Demographic and Antenatal Context

Maternal age did not show a statistically significant group difference, whereas gravidity and booking status did. More than half of emergency procedures occurred in primigravidae. Labour in a first pregnancy is more likely to reveal previously unrecognised cephalopelvic disproportion, failure to progress, or fetal intolerance, which can result in an urgent caesarean decision. The high proportion of unbooked emergency patients is clinically important. Inadequate antenatal contact can delay the diagnosis and treatment of anaemia, hypertensive disorders, fetal growth abnormalities, and placental or amniotic-fluid problems. Global evidence also shows that socioeconomic disadvantage and unequal access influence both underuse of necessary caesarean delivery and delayed access to operative care [2,3].

Lower educational and socioeconomic categories were more frequent among emergency cases. These findings should not be interpreted as direct causal effects, but they point to barriers in health literacy, transport, referral, continuity of antenatal care, and recognition of warning symptoms. Antenatal programmes that identify high-risk women early and link them to an appropriate delivery facility may reduce late presentation and allow a planned approach when caesarean birth is foreseeable.

### Indication Profile and Intrapartum Risk

The indication pattern was consistent with clinical practice. Previous caesarean section and malpresentation predominated in the elective group, while fetal distress, cephalopelvic disproportion, meconium with fetal compromise, and hypertensive disorders were more common in the emergency group. Similar profiles have been reported in comparative studies from India and Nepal [16-20]. The higher use of general anaesthesia in emergency cases probably reflected the need for rapid delivery, maternal instability, or inability to establish a regional block in time.

Emergency cases frequently had ruptured membranes, prolonged labour, intrapartum fever, and meconium-stained liquor. This cluster provides a coherent explanation for postoperative fever, wound infection, neonatal sepsis, and meconium aspiration. Repeated examinations, prolonged membrane rupture, tissue oedema, an impacted fetal head, and difficult extraction can increase operative contamination and trauma. Abnormal Doppler findings, reduced amniotic fluid, and fetal heart rate abnormalities also suggest that many emergency procedures occurred after placental or fetal reserve had already deteriorated.

**Maternal Morbidity**

The emergency group had greater estimated blood loss, a higher transfusion rate, more intraoperative complications, and longer surgery. Population studies and WHO multicountry surveys have similarly linked caesarean delivery, particularly when undertaken after complications have developed, with increased severe maternal morbidity and infection [6-11,14]. The increased frequency of uterine incision extension and atony in emergency procedures is clinically plausible in the setting of advanced labour, an impacted fetal head, uterine exhaustion, and edematous lower-segment tissues.

Postoperative fever, surgical-site infection, wound dehiscence, and postpartum haemorrhage were substantially more common after emergency LSCS. Darnal and Dangal, Nag and colleagues, Thakur and colleagues, Gayathry and colleagues, and Sharma and colleagues also reported a higher maternal complication burden after emergency procedures [16-20]. The longer hospital stay and increased analgesic requirement observed in the current study indicate that these complications translated into greater use of beds, antibiotics, blood products, nursing time, and follow-up services.

Neonatal Morbidity

The neonatal differences were clinically large. Emergency-delivery neonates were more likely to have low birth weight, require resuscitation, develop respiratory distress or sepsis, and be admitted to NICU. Their Apgar recovery was poorer at both 1 and 5 minutes, and early neonatal deaths occurred only in the emergency group. These outcomes are likely to reflect the underlying indications, including fetal distress, prematurity, meconium exposure, placental insufficiency, prolonged labour, and infection risk, rather than urgency alone.

Elective caesarean delivery is not free from neonatal risk. Large cohort studies have shown that elective repeat caesarean delivery before 39 weeks increases respiratory morbidity [12,13]. In the present cohort, however, elective deliveries were predominantly performed at term, and their overall neonatal outcomes were better than those of emergency cases. This reinforces the importance of appropriate timing: planned delivery should avoid unnecessary early-term birth, while emergency systems should minimise delay once maternal or fetal compromise is recognised.

Interpretation and Clinical Relevance

The findings support a two-pronged approach. First, unnecessary caesarean delivery should be avoided because the operation carries immediate and future risks [4,5]. Second, when a caesarean section is medically indicated, delay can be equally harmful. The objective should not be to reduce emergency caesarean sections indiscriminately, but to prevent avoidable emergencies through antenatal risk stratification and to manage genuine emergencies without delay. Monitoring the decision-to-delivery interval, referral time, antibiotic timing, blood availability, and neonatal response would strengthen future quality-improvement work.

**Clinical Implications**

The study has direct implications for tertiary maternity services. Women with previous caesarean delivery, malpresentation, hypertension, oligohydramnios, anaemia, suspected fetal growth restriction, or abnormal Doppler findings should have a documented delivery plan and an appropriate referral pathway. Unbooked women and those arriving after prolonged labour or rupture of membranes require rapid triage for infection, anaemia, fetal compromise, and blood-product needs. Operating-room readiness should include senior obstetric and anaesthetic support, neonatal resuscitation capacity, prophylactic antibiotics, uterotonics, and access to blood components.

Partogram-based labour surveillance, timely escalation for fetal heart rate abnormalities, and structured communication between peripheral centres and the receiving hospital may reduce delays. Postoperative surveillance should focus on fever, wound changes, uterine tone, haemoglobin decline, and early signs of sepsis. Neonates born after emergency LSCS should receive careful assessment for respiratory distress, asphyxia, meconium aspiration, hypoglycaemia, and infection.

**Strengths**

The prospective design enabled systematic collection of antenatal, intrapartum, operative, postoperative, and neonatal information. The equal group sizes and total sample of 400 allowed a broad comparison across clinically relevant outcomes. Conduct in a high-volume tertiary referral hospital captured the real-world complexity of emergency obstetric care. The study also evaluated a wide outcome spectrum rather than relying on a single composite endpoint.

**Limitations**

The findings arise from a single tertiary centre and may not represent lower-volume hospitals or private facilities. Emergency cases were likely affected by referral bias, because women arriving from peripheral centres may already have had delayed care or incomplete antenatal records. The observational design cannot establish that the emergency procedure itself caused the adverse outcomes; the underlying maternal and fetal conditions are important confounders. Multivariable adjustment was not reported, so residual confounding by gestational age, anaemia, hypertensive disease, membrane rupture, and referral status remains possible.

Decision-to-delivery interval and referral-to-arrival time were not recorded, limiting assessment of preventable delay. Follow-up was restricted to the early neonatal period, and long-term maternal recovery and child development were not examined. The source thesis also contained a discrepancy in the emergency surgical-site infection count between its aggregate maternal table and dedicated postoperative table; this manuscript transparently used the dedicated table value. A future analysis should verify the master dataset and use adjusted regression models.

## CONCLUSION

Emergency caesarean section was associated with a markedly higher burden of adverse maternal and neonatal outcomes than elective caesarean section. Women in the emergency group more often presented with limited antenatal follow-up, primigravidity, preterm gestation, anaemia, hypertensive complications, ruptured membranes, prolonged labour, intrapartum fever, meconium-stained liquor, and fetal heart rate abnormalities. These circumstances were accompanied by greater blood loss, transfusion, operative difficulty, postpartum haemorrhage, infection, ICU admission, and prolonged hospital stay. Neonates born after emergency LSCS had more low birth weight, resuscitation, respiratory distress, sepsis, NICU admission, low Apgar scores, and early neonatal mortality.

Improving outcomes requires both prevention and preparedness. High-risk pregnancies should be identified early, referrals should occur before maternal or fetal deterioration, and labour should be monitored with clear escalation criteria. Once an emergency indication is established, coordinated obstetric, anaesthetic, theatre, blood-bank, and neonatal teams are essential for safe and timely delivery.

**Source note:** This research paper was developed from the dissertation dataset and reported analyses. Exact calendar months of recruitment were not stated in the thesis; therefore, the study duration is reported as two years.

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