ORIGINAL ARTICLE

COMPARATIVE ANALYSIS OF MATERNAL AND NEONATAL COMPLICATIONS IN ELECTIVE AND EMERGENCY C-SECTIONS

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ABSTRACT

Introduction: Cesarean section (C-section) is a critical surgical procedure in obstetric care, with elective and emergency C-sections differing significantly in preparation and outcomes. Emergency procedures often carry higher maternal and fetal risks due to limited preoperative optimization.

Objective: To compare maternal and fetal outcomes between elective and emergency C-sections.

Methods: This prospective observational study was conducted in the Obstetrics and Gynecology Department of DHQ, Sheikhupura, from July 2023 to October 2023. A total of 200 pregnant women undergoing C-sections were included through non-probability purposive sampling, with 100 elective and 100 emergency cases. Patients were evaluated for demographic details, clinical presentation, intraoperative and postoperative complications, and fetal outcomes.

Results: In the emergency group (Group A), only 20% were booked cases compared to 94% in the elective group (Group B). Hemorrhage occurred in 20% of emergency cases versus 3% of elective cases. Postpartum hemorrhage was observed in 12% and 2% of cases, respectively. Blood transfusions were needed in 92% of emergency cases compared to 15% of elective cases. Postoperative morbidity affected 100% of emergency cases versus 48% of elective cases, with anemia being the most common complication. Fetal complications, including respiratory distress and meconium aspiration, were significantly higher in the emergency group. Perinatal mortality was also more frequent among emergency C-sections.

Conclusion: Elective C-sections performed with adequate preparation are associated with significantly fewer maternal and neonatal complications compared to emergency procedures. Strengthening antenatal care and timely decision-making can reduce the incidence of emergency interventions, improving overall maternal and fetal outcomes.

Keywords: *Cesarean section, maternal outcome, fetal outcome, elective C-section, emergency C-section.*

INTRODUCTION:

Cesarean section (C-section) is an essential surgical procedure widely employed to preserve the lives of mothers and their babies when complications arise during pregnancy or labor. In recent decades, the global rate of C-sections has risen significantly, influenced by various factors including perceived safety for both mother and fetus, medico-legal pressures, increasing maternal age, obesity, and the presence of comorbidities1,2. Although cesarean delivery can be life-saving, it is not without risks. Studies report that C-sections contribute to a maternal mortality rate of approximately 5.8 per 100,000 deliveries and a morbidity rate of 27.3 per 1,000 deliveries, substantially higher than the morbidity associated with vaginal births (9 per 1,000 deliveries)3,4.

The decision to perform a C-section can be categorized as either elective or emergency based on the underlying clinical scenario. Elective C-sections are planned procedures carried out under controlled settings, usually before the onset of labor, allowing

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for optimal preparation. In contrast, emergency C-sections are unplanned, often necessitated by acute maternal or fetal distress such as fetal bradycardia, obstructed labor, uterine rupture, or placental abruption5-7. Several studies have highlighted that advanced maternal age and high-risk pregnancies increase the likelihood of both elective and emergency cesarean deliveries8,9.

Elective cesarean deliveries, owing to meticulous planning, show a lower incidence of intraoperative and postoperative maternal complications, including hemorrhage, infection, anesthetic issues, and extended hospital stay10. On the other hand, emergency C-sections, due to their urgent nature, are associated with significantly higher risks of maternal morbidity such as postpartum hemorrhage, visceral injuries, anesthetic complications, as well as adverse neonatal outcomes including respiratory distress syndrome and perinatal mortality3,11.

Despite global data supporting these findings, there remains a scarcity of local evidence comparing maternal and fetal outcomes between elective and emergency C-sections, particularly in resource-limited settings like ours. Understanding the differential risks is crucial for optimizing obstetric care and reducing preventable complications. Therefore, this study aims to bridge this gap by comparing maternal and fetal outcomes between elective and emergency C-sections, emphasizing the importance of early antenatal booking, timely risk stratification, and planned delivery approaches to improve maternal and neonatal health.

METHODS:

Study Design and Setting: This prospective observational study was conducted in the Department of Obstetrics and Gynecology, District Headquarters (DHQ) Hospital, Sheikhupura, over a period from July 2023 to October 2023.

Study Population and Sampling: A total of 200 pregnant women undergoing cesarean sections were enrolled through non-probability purposive sampling. Participants were categorized into two groups:

- Group A: Emergency cesarean section (n = 100)
- Group B: Elective cesarean section (n = 100)

Inclusion Criteria:

- All pregnant women undergoing cesarean section, whether admitted through the outpatient department (OPD) or emergency department.
- Women of any age and any parity.

Exclusion Criteria:

- History of previous myomectomy.
- Previous hysterotomy.
- Previous classical cesarean section.

Data Collection Procedure: After obtaining ethical approval and informed consent from participants, data were collected using a structured proforma. Each enrolled patient was categorized into either Group A (emergency cesarean section) or Group B (elective cesarean section). Information recorded included demographic details such as age, parity, antenatal booking status, referral status, clinical presentation, gestational age, and relevant past medical, surgical, and obstetric history. Intraoperative complications assessed included anesthetic accidents, hemorrhage, postpartum hemorrhage (PPH), the need for blood transfusion, extension of uterine tears, obstetric hysterectomy, visceral injuries (bowel and bladder), and maternal death. Postoperative complications were monitored from the recovery room until discharge and included anemia, abdominal distension, transfusion reactions, wound dehiscence, burst abdomen, prolonged hospital stay, admission to the intensive care unit (ICU), prolonged catheterization, urinary tract infections (UTI), chest infections, vesicovaginal fistula (VVF), deep vein thrombosis (DVT), disseminated intravascular coagulation (DIC), and

maternal death. Fetal outcomes such as respiratory distress syndrome (RDS), meconium aspiration, soft tissue injuries, fresh stillbirth, macerated stillbirth, and early neonatal deaths were also recorded.

Data Analysis: Data were entered and analyzed using SPSS version 20.0. Descriptive statistics, including means and standard deviations, were calculated for continuous variables such as maternal age and gestational age. Categorical variables, such as booking status, mode of admission, intraoperative and postoperative complications, and fetal outcomes, were expressed as frequencies and percentages. The proportions of maternal and fetal complications were compared between the elective and emergency cesarean section groups to evaluate any significant differences. Findings were summarized in tables to facilitate comparison between the two groups.

RESULTS:

A total of 200 pregnant women undergoing cesarean section were enrolled in this study, with 100 in the emergency C-section group (Group A) and 100 in the elective C-section group (Group B).

Demographic Characteristics: In Group A (emergency C-section), only 20% of patients were booked cases compared to 94% in Group B (elective C-section). Emergency admissions were more common in Group A (72%), while 82% of Group B patients were admitted through outpatient services. The majority of patients in both groups were between 20–30 years of age (75% in Group A and 88% in Group B). Referral rates were significantly higher in Group A (66%) compared to none in Group B (0%).

Indications for Cesarean Section: The most common indication in Group A was previous two C-sections with labor pains and scar tenderness (16%), followed by antepartum hemorrhage (APH), obstructed labor, and chorioamnionitis (11% each). In Group B, the leading indication was previous two C-sections (32%), followed by previous one C-section (22%).

Table 1: Demographic Characteristics of Patients

Variable	Emergency C-Section (n=100)	Elective C-Section (n=100)
Booked	20%	94%
Unbooked	80%	6%
OPD Admission	28%	82%
Emergency Admission	72%	18%
Age 17–20 years	5%	1%
Age 20–30 years	75%	88%
Age >30 years	20%	11%
Referral cases	66%	0%

Table 2: Indications for Cesarean Section

Indication	Emergency C-Section (%)	Elective C-Section (%)
Breech	5	3
Bad Obstetric History (BOH)	0	4
Previous 1 C-Section	6	22
Previous 2 C-Sections	16	32
Previous 3 or More C-Sections	10	20
Fetal Distress	6	0
Ruptured Uterus	6	0
Eclampsia/PIH	8	0
Obstructed Labor	11	0
Chorioamnionitis	11	0
Antepartum Hemorrhage	11	10
Cephalopelvic Disproportion (CPD)	5	8
Retained Second Twin	1	0
Transverse Lie	1	1
Failure to Progress	4	0

Intraoperative Maternal Complications: Intraoperative complications were notably higher in Group A. Hemorrhage occurred in 20% of emergency cases compared to 3% of elective cases. Other complications such as difficult intubation (12%), bladder injury (12%), and need for blood transfusions (92%) were also significantly more common in Group A.

Table 3: Intraoperative Maternal Complications

Complication	Emergency C-Section (%)	Elective C-Section (%)
Difficult Intubation	12	1
Aspiration	4	0
Hemorrhage	20	3
Bowel Injury	2	0
Bladder Injury	12	0
Incision Extension	28	3
Postpartum Hemorrhage	12	2
Obstetric Hysterectomy	12	2
Blood Transfusion	92	15
No Complications	5	27

Postoperative Maternal Complications: Postoperative morbidity was significantly higher in Group A (100%) compared to Group B (48%). Anemia was the most common complication observed in both groups, affecting 82% of emergency cases and 24% of elective cases.

Table 4: Postoperative Maternal Complications

Complication	Emergency C-Section (%)	Elective C-Section (%)
Abdominal Distension	15	5
Anemia	82	24
Blood Reaction	12	1
Burst Abdomen	6	0
Postpartum Hemorrhage	18	4
Wound Dehiscence	12	4
Prolonged Catheterization	31	4
ICU Admission	16	3
Maternal Death	1	0
Disseminated Intravascular Coagulation (DIC)	5	0
Deep Vein Thrombosis (DVT)	1	0
Vesicovaginal Fistula (VVF)	1	0
Chest Infection	15	5
Prolonged Hospital Stay	31	7
No Complications	2	52

Fetal Complications: Fetal morbidity was also higher in the emergency group, with respiratory distress syndrome (RDS) being the most common complication, affecting 25% of emergency C-sections compared to 5% of elective cases.

Table 5: Fetal Complications

Fetal Complication	Emergency C-Section (%)	Elective C-Section (%)
Meconium Aspiration	**5**	**0**
Respiratory Distress Syndrome (RDS)	**25**	**5**
Soft Tissue Injury	**1**	**0**

Fetal Outcomes: Live births were recorded in 86% of emergency C-section cases and 97% of elective cases. The rate of fresh stillbirths and neonatal deaths was higher among emergency deliveries.

Table 6: Fetal Outcomes

Fetal Outcome	Emergency C-Section (%)	Elective C-Section (%)
Fresh Stillbirth	**6**	**1**
Macerated Stillbirth	**0**	**0**
Live Birth	**86**	**97**
Neonatal Deaths	**8**	**2**

DISCUSSION:

This study compared maternal and fetal outcomes between elective and emergency cesarean sections. Our findings revealed that maternal and neonatal complications were significantly higher in the emergency C-section group compared to the elective group. Intraoperative complications, particularly hemorrhage, anesthetic complications, and visceral injuries, were more frequent among emergency cases. Similarly, postoperative morbidities such as anemia, wound dehiscence, ICU admission, and prolonged hospital stay were markedly elevated following emergency procedures. Fetal outcomes also favored elective C-sections, with lower incidences of respiratory distress syndrome, meconium aspiration, and neonatal deaths.

Our results are consistent with previous literature. Neelofer et al. also reported higher rates of postpartum hemorrhage, respiratory complications, uterine incision extension, and bladder injury among emergency C-section cases compared to elective ones12. Similarly, Al Riyami et al. observed a higher incidence of birth asphyxia, sepsis, and adverse neonatal outcomes following emergency cesarean deliveries, supporting our findings of increased neonatal morbidity and mortality in the emergency group13. Previous studies further emphasized that postpartum hemorrhage and NICU admissions were substantially more common in emergency C-sections than elective ones, which aligns with our observation of a significantly higher need for blood transfusion and neonatal intensive care among emergency deliveries14,15.

The underlying reason for poorer outcomes in emergency C-sections is likely the lack of preoperative optimization, compounded by the acute maternal and fetal distress necessitating urgent intervention. In contrast, elective C-sections benefit from better surgical planning, controlled timing, optimized maternal health, and prepared neonatal support, thus minimizing complications.

Our study adds important local evidence to the growing international literature highlighting the risks associated with emergency C-sections, particularly in resource-limited settings where delayed referrals and inadequate antenatal care are common contributors to emergency interventions.

Strengths and Limitations: The strengths of this study include its prospective design, structured data collection, and comprehensive evaluation of both maternal and fetal outcomes. However, limitations must be acknowledged. Being a single-center study may limit the generalizability of our findings. The non-probability purposive sampling method could introduce selection bias, and the lack of long-term maternal and neonatal follow-up restricts the understanding of delayed complications. Additionally, potential confounding factors such as surgical expertise, intraoperative decision-making, and hospital resource availability were not fully accounted for.

CONCLUSION:

This study demonstrates that elective cesarean sections, when planned under optimal conditions, are associated with significantly lower maternal and neonatal complications compared to emergency cesarean sections. Emergency

procedures, often performed under urgent and suboptimal circumstances, resulted in higher rates of intraoperative and postoperative morbidity, as well as adverse fetal outcomes. These findings underscore the importance of early antenatal booking, regular monitoring, and timely decision-making to identify high-risk pregnancies and plan deliveries appropriately. Strengthening antenatal care services, improving patient education, and ensuring efficient referral systems can reduce the incidence of emergency cesarean sections, ultimately enhancing maternal and neonatal health outcomes. Future research involving multicenter data and long-term follow-up is recommended to further validate and expand upon these findings.

DECLARATION OF INTEREST: The authors declare no conflict of interest.

AUTHORS CONTRIBUTIONS:

A.S.: Conceptualization, write-up, proofreading, and final editing of the manuscript.

I.M.: Data collection, data analysis, Literature review, and references

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