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Original Article

Maternal and Fetal Outcomes in Emergency Caesarean Deliveries — An Observational Study

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ABSTRACT

Introduction: *Emergency caesarean sections are critical interventions in obstetric care, often necessitated by various maternal and fetal complications. This study aims to identify the primary indications for emergency caesarean sections and assess the associated maternal and neonatal outcomes.* ***Methods & Materials:*** *A hospital based observational analysis was conducted on cases of emergency caesarean sections performed at a tertiary care hospital over a specified period. Data on indications, maternal complications, and neonatal outcomes were collected and analyzed. The study conducted between January 2024 to June 2024.* ***Results:*** *Fetal distress was identified as the leading indication for emergency caesarean sections, accounting for 18% of cases, followed by previous caesarean sections. The incidence of maternal complications, including hemorrhage (20%) and puerperal infections, was notable. While 59% of neonates experienced no complications, prematurity was recorded in 10% of cases, highlighting a significant area of concern. The average hospital stay post-delivery was 9.0 days, indicating the need for thorough monitoring and management of both maternal and neonatal health.* ***Conclusion:*** *The findings underscore the importance of timely interventions and comprehensive postpartum care to reduce maternal and neonatal morbidity. Continuous monitoring and effective management strategies are essential to improve outcomes in emergency obstetric situations.*

Keywords: *Emergency caesarean section, fetal distress, maternal complications, neonatal outcomes, postpartum care, obstetric intervention*

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INTRODUCTION

Emergency caesarean sections (CS) are life-saving interventions performed when maternal or fetal health is at immediate risk [1]. Unlike elective CS, which are planned, emergency CS are typically performed under urgent conditions, increasing the likelihood of complications [2]. Globally, the World Health Organization (WHO) recommends an optimal CS rate of 10–15% to balance the risks and benefits. However, emergency CS rates often exceed these thresholds, reflecting challenges in healthcare systems, particularly in low-resource settings [3].

The incidence of emergency CS has risen globally. For example, in Ethiopia, women undergoing emergency CS are three times more likely to experience complications compared to those having elective CS, due to inadequate preoperative optimization and delayed labor management [4]. In Bangladesh, emergency CS rates reach 70%, highlighting socioeconomic disparities and limited access to prenatal care as significant contributing factors [5].

Maternal outcomes following emergency CS are often poorer than elective procedures. Common complications include postpartum hemorrhage, anemia, and surgical site infections. Studies show that women undergoing emergency CS are significantly more likely to require blood transfusions and experience longer recovery times [6]. Similarly, fetal outcomes are adversely affected, with higher rates of prematurity, neonatal infections, and perinatal deaths [7].

Antenatal care plays a crucial role in mitigating risks associated with emergency CS. Women with fewer than three antenatal visits are almost three times more likely to experience maternal or fetal complications. Proactive monitoring and early identification of high-risk pregnancies can reduce emergency CS rates [8]. However, in many low-resource settings, inadequate healthcare infrastructure, rural residency, and delayed referrals exacerbate risks for both mothers and infants [9].

Globally, the decision-to-delivery interval (DDI) significantly impacts emergency CS outcomes. Studies suggest that a DDI of

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less than 30 minutes improves neonatal outcomes, particularly in cases of fetal distress. However, logistical challenges, including operating room availability and anesthetic readiness, often delay interventions, leading to worse outcomes [10].

The increasing prevalence of emergency CS calls for targeted interventions to improve maternal and neonatal health. Enhancing antenatal care, optimizing healthcare infrastructure, and reducing socioeconomic disparities are critical to addressing the challenges posed by emergency CS. This study examines maternal and fetal outcomes of emergency CS contributing to the understanding of factors influencing these outcomes and proposing measures to reduce associated risks.

METHODS

Study Design

The study employed an observational, hospital-based design to investigate maternal and fetal outcomes associated with emergency caesarean sections (CS). Observational studies are ideal for capturing real-world data without intervention, providing insights into the natural course of events and outcomes in a clinical setting.

Study Setting

The research was conducted in the Obstetrics and Gynecology Department at Dhaka Medical College Hospital (DMCH). DMCH is a leading tertiary care hospital in Bangladesh and serves as a referral center for high-risk pregnancies from surrounding regions. Its patient base includes a diverse population, offering a comprehensive dataset for understanding emergency CS outcomes.

Study Population

The population included all pregnant women undergoing emergency CS at DMCH during the study period. This population was selected based on the following criteria:

- **Inclusion Criteria:**
  - Pregnant women who underwent emergency CS due to obstetric or fetal complications.
  - Patients who consented to participate in the study.
- **Exclusion Criteria:**
  - Women undergoing elective CS.
  - Cases with incomplete clinical records or patients who refused participation.

Emergency CS was defined as unplanned surgery necessitated by immediate risks to the mother or fetus, such as fetal distress, severe preeclampsia, or obstructed labor.

Sampling Technique

A purposive sampling method was utilized, targeting 100 consecutive emergency CS cases admitted to DMCH during the study period. This approach ensured a focus on relevant cases, maximizing the study's ability to assess the outcomes specific to emergency CS.

Study Duration

The study the study conducted January 2024 to June 2024., allowing sufficient time to include a representative number of cases and identify patterns in maternal and fetal outcomes.

Data Collection

Primary data were collected through structured interviews with patients, focusing on demographic details (age, socioeconomic status, and education), obstetric history, and antenatal care practices, including the number of visits and complications leading to emergency caesarean section (CS). Secondary data were obtained by reviewing medical records to document clinical aspects such as indications for CS (e.g., fetal distress, obstructed labor), type of anesthesia, surgical findings, and both intraoperative and postoperative outcomes. Patients were also observed from admission through discharge, with detailed notes on perioperative and postpartum events, including maternal complications (e.g., hemorrhage, infections) and neonatal issues (e.g., prematurity, birth asphyxia). To ensure accuracy and completeness, interviews were cross-referenced with medical records during the data validation process

Variables Studied

The study comprehensively analyzed outcomes by focusing on maternal, fetal, and procedural variables. Maternal variables included age, parity, socioeconomic status, the frequency and adequacy of antenatal care, perioperative complications such as hemorrhage, infections, and anesthesia-related issues, as well as postoperative recovery parameters like hospital stay duration and blood transfusion requirements. Fetal variables encompassed gestational age at delivery, birth weight, and immediate neonatal outcomes, including prematurity, neonatal jaundice, birth asphyxia, infections, or death. Procedural variables addressed the indications for emergency caesarean section, the timing of surgery and the decision-to-delivery interval, the type of anesthesia administered (general vs. spinal), and operative findings or complications encountered during surgery.

Data Analysis

Data were entered into SPSS software (version 23) for statistical analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize key demographic and clinical variables. Comparative analysis was performed to explore relationships between variables, such as the adequacy of antenatal care and the incidence of maternal complications, using chi-square tests to determine statistical significance. A p-value of <0.05 was considered statistically significant, indicating strong evidence against the null hypothesis and supporting the observed associations.

Ethical Considerations

Ethical considerations were strictly adhered to throughout the study to ensure compliance with ethical research standards. Written and verbally informed consent was obtained from all participants after thoroughly explaining the study objectives, procedures, and potential risks or benefits. Confidentiality

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was maintained by anonymizing all participant data to safeguard their privacy and ensure the information was used solely for research purposes. Furthermore, the study received formal approval from the ethics committee of Dhaka Medical College Hospital (DMCH), confirming that the research complied with institutional and ethical guidelines.

RESULTS

Table I presents the indications for emergency caesarean sections, detailing the frequency and percentage of each indication among the studied cases. The most prevalent indication was fetal distress, accounting for 18 cases (18%), followed closely by previous caesarean section (CS) at 15 cases (15%). Severe eclampsia/eclampsia and prolonged labor were noted in 11 cases (11%) and 12 cases (11%), respectively, indicating significant maternal and fetal health concerns. Obstructed labor was reported in 10 cases (10%), while antepartum hemorrhage, malpresentation, failed labor induction, and failed forceps/ventouse contributed to 9 cases (9%), 8 cases (8%), 6 cases (6%), and 4 cases (4%), respectively. These findings underscore the critical conditions leading to the necessity for emergency caesarean sections, highlighting the importance of timely intervention in managing obstetric complications to ensure maternal and neonatal safety.

Table – I: Indications for Emergency Caesarean Section

Indication	Frequency (%)
Fetal distress	18 (18%)
Previous CS	15 (15%)
Severe eclampsia/eclampsia	11(11%)
Prolonged labor	12 (11%)
Obstructed labor	10 (10%)
Antepartum hemorrhage	9 (9%)
Malpresentation	8 (8%)
Failed labor induction	6 (6%)
Failed forceps/ventouse	4 (4%)

The figure 1 illustrates the distribution of maternal complications, showing that the majority of patients (45%) experienced no complications, while hemorrhage was the most common complication (20%), followed by puerperal infections (16%). Postoperative fever occurred in 6% of cases, anemia in 4%, and urinary tract infections were the least frequent at 2%. These results highlight that although a significant proportion of patients had a complication-free experience, hemorrhage and puerperal infections are notable issues, indicating the need for focused preventive and management strategies in maternal care.

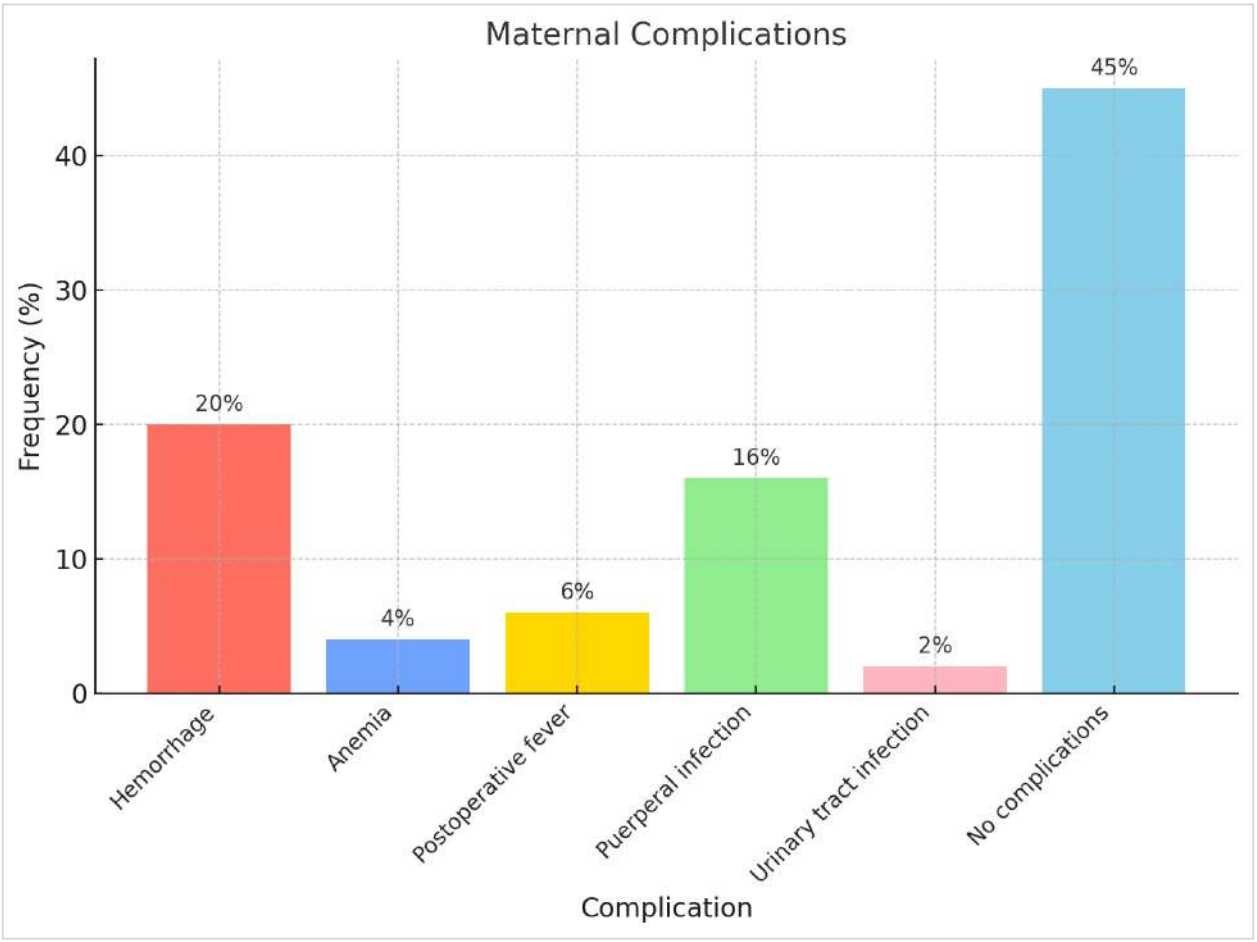

Figure – 1: Maternal Complications

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Figure 2 the analysis of neonatal outcomes revealed that the majority of neonates (59%) experienced no complications. Among adverse outcomes, prematurity was the most frequent, observed in 10% of cases, followed by perinatal death (8%), neonatal jaundice (7%), and birth asphyxia (6%). Neonatal infection accounted for 5% of cases, while neonatal death was the least frequent outcome, occurring in 3% of cases. These findings highlight the predominance of favorable outcomes while underscoring the importance of addressing common neonatal complications to further improve perinatal care.

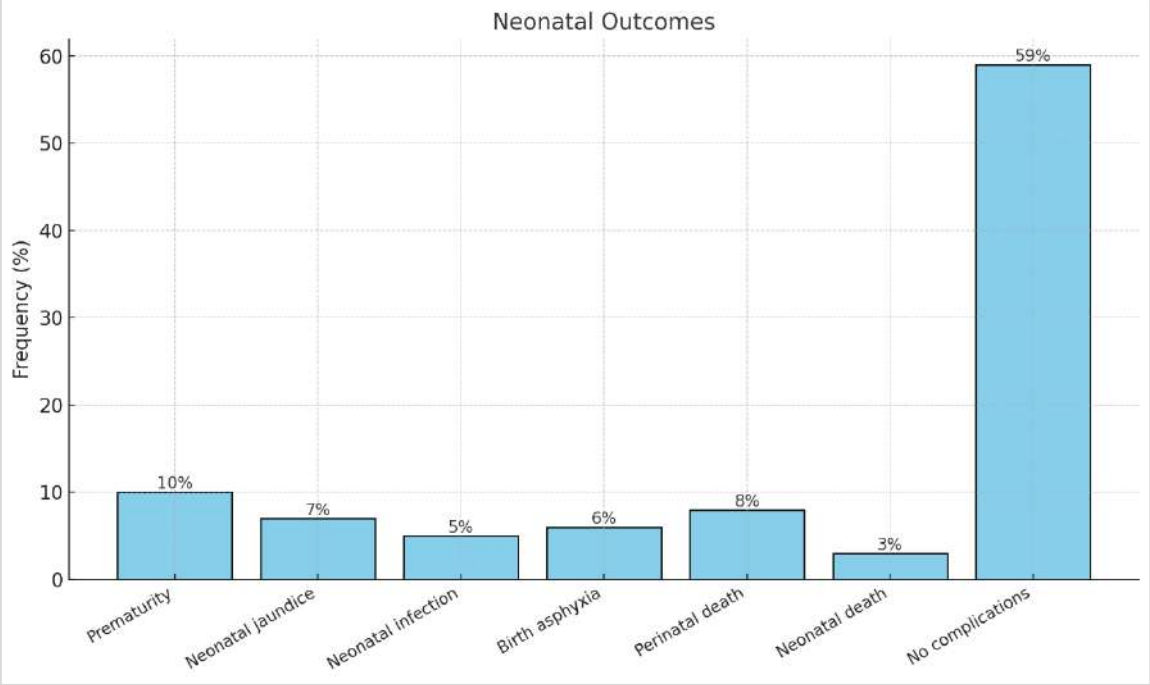

Figure – 2: Neonatal Outcomes

Table II summarizes the duration of hospital stays for patients, categorizing the length of stay into three distinct ranges. The majority of patients, comprising 65 individuals, had a hospital stay of 7 to 8 days. A smaller group of 20 patients stayed between 9 to 12 days, while 15 patients had extended stays of more than 12 days. The overall mean duration of hospital stay was calculated to be 9.0 days, with a standard deviation of 2.22 days, indicating a relatively consistent stay duration among the majority of patients. This data reflects the general trend in hospital stay lengths, which can be crucial for assessing patient recovery and resource allocation within the healthcare facility.

Table – II: Hospital Stay Duration

Days of Stay	Frequency (%)
7–8 days	65
9–12 days	20
>12 days	15
Mean ± STD	9.0±2.22 days

The table III summarizes the relationship between various maternal complications and their impacts on neonatal outcomes during delivery. It lists complications such as hemorrhage, anemia, postoperative fever, puerperal infection, and urinary tract infection, along with their frequency of occurrence. Hemorrhage was the most common complication, reported in 4 cases, and was associated with 2 neonatal deaths and complications in 3 cases. Anemia and postoperative fever also showed significant associations, each linked to one neonatal death and multiple complications. Puerperal infection resulted in 2 neonatal deaths and complications in 2 cases, while urinary tract infection had fewer occurrences but still contributed to complications. Overall, the data highlights the critical need for vigilant monitoring and management of maternal health conditions to improve neonatal outcomes and reduce mortality rates.

Table – III: Association Between Maternal Complications and Neonatal Outcomes in Cases of Delivery

Maternal Complication	Frequency	Associated Neonatal Deaths	Associated Neonatal Complications
Hemorrhage	4	2 (Cases 4, 6)	3 (Cases 1, 4, 6)
Anemia	3	1 (Case 4)	3 (Cases 2, 4, 7)
Postoperative Fever	3	1 (Case 6)	3 (Cases 2, 4, 6)
Puerperal Infection	2	2 (Cases 6, 8)	2 (Cases 3, 6)
Urinary Tract Infection	2	1 (Case 4)	2 (Cases 4, 7)

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DISCUSSION

The findings of this study regarding the indications for emergency caesarean sections and maternal complications provide critical insights into obstetric care. The predominance of fetal distress as the leading indication for emergency caesarean sections, accounting for 18% of cases, aligns with previous research, which similarly identifies fetal distress as a significant factor necessitating surgical intervention, with studies reporting rates as high as 20% [11]. This underscores the importance of continuous fetal monitoring and timely decision-making during labor to mitigate risks associated with fetal hypoxia.

The notable incidence of maternal complications, particularly hemorrhage and puerperal infections, echoes findings from other studies that report these complications as prevalent issues in postpartum care. For instance, a study found that postpartum hemorrhage occurred in 22% of cases, highlighting its status as a leading cause of maternal morbidity and mortality globally [12]. Our study's 20% incidence of hemorrhage is consistent with this literature, reinforcing the need for effective management strategies to address this critical issue.

In terms of neonatal outcomes, while 59% of neonates experienced no complications, the rates of prematurity and perinatal death warrant attention. Our findings indicate that prematurity was the most frequent adverse outcome at 10%, which aligns with studies showing that prematurity rates can range from 8% to 12% in similar populations [13]. The relationship between maternal health and neonatal health is further emphasized by our results showing that maternal complications such as hemorrhage and infections significantly correlated with neonatal deaths and complications indicating that maternal infections were associated with a 30% increase in the risk of neonatal complications [14].

Moreover, the average hospital stays of 9.0 days observed in our study reflects the complexities associated with maternal and neonatal care following delivery. Previous studies have reported similar durations, with an average stay of 8 to 10 days often necessary for monitoring and managing complications [15]. The data presented in Table 5 reinforces the necessity for vigilant monitoring of maternal complications, as their impact on neonatal outcomes is profound. The association between maternal complications and adverse neonatal outcomes highlights the need for targeted interventions and improved clinical practices to enhance both maternal and neonatal health. Overall, these findings emphasize the importance of comprehensive obstetric care and the need for ongoing research to identify effective strategies for reducing maternal and neonatal morbidity and mortality.

CONCLUSION

In conclusion, this study highlights the critical indications for emergency caesarean sections, with fetal distress and previous caesarean sections being the most prevalent reasons necessitating surgical intervention. The findings underscore the importance of timely decision-making and effective monitoring during labor to address potential complications. Additionally, the notable incidence of maternal complications, particularly hemorrhage and puerperal infections, emphasizes the need for vigilant postpartum care and targeted management strategies to enhance maternal health outcomes.

The analysis of neonatal outcomes reveals a predominance of favorable results; however, the rates of prematurity and perinatal death warrant attention and further investigation. The association between maternal complications and adverse neonatal outcomes highlights the interconnected nature of maternal and neonatal health, reinforcing the necessity for comprehensive care that prioritizes both mother and child.

Overall, these findings call for ongoing efforts to improve clinical practices, enhance preventive measures, and promote research aimed at reducing maternal and neonatal morbidity and mortality. By addressing the identified challenges, healthcare providers can better ensure the safety and well-being of mothers and their newborns in obstetric care settings.

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