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# FETAL OUTCOME IN WOMEN UNDERGOING EMERGENCY CESAREAN SECTION DUE TO FETAL DISTRESS ON CARDIOTOCOGRAPHY

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**Abstract**

***OBJECTIVE:*** *"To determine the fetal outcomes in women undergoing emergency cesarean section due to presumed fetal distress on Cardiotocography (CTG)." Study Design: Descriptive case series Study place and period: Chaudhary Muhammad Akram Teaching and Research hospital, Lahore January to June 2025.*

***Methodology:*** *After meeting selection criteria total 135 women were enrolled. CTG was performed to monitor the fetal heart rate and contractions, thus identifying presumed fetal distress. The primary outcome variables for this study are fetal outcomes. The Apgar score was assessed at one and five minutes after birth. The outcome was assessed on proforma. All the collected data was entered and analyzed on SPSS version 26. Results: This study included women with a mean age of 30.01 (±8.19) years and an average gestational age of 38.41 (±1.10) weeks. Regarding fetal outcomes, 29 infants (21.5%) experienced birth asphyxia, and the same number had low Apgar scores. Additionally, 29 newborns (21.5%) were admitted to the NICU, while early neonatal death occurred in 11 cases (8.1%).*

***Conclusion:*** *It can be concluded that in women undergoing emergency cesarean section, low Apgar scores and birth asphyxia are most common complications, followed by NICU admissions and early neonatal deaths.*

## INTRODUCTION:

The perinatal period represents a critical phase in obstetrics where the health and well-being of both the mother and the unborn child demand meticulous attention. Among these, fetal distress emerges as a pivotal concern, where in compromised fetal well-being during labor and delivery demands prompt assessment and management [1, 2]. Fetal distress, a term commonly used to describe potential signs of fetal compromise during labor, can be identified through anomalies in the STG traces. These may include changes in the fetal heart rate pattern, such as decelerations, bradycardia, or reduced variability. It poses significant challenges to both mother and child and often prompts the consideration of an emergency Cesarean section (C-section) [3].

Detecting fetal distress in the antenatal period employs a range of methods. CTG monitors fetal

heart rate and uterine contractions, while ultrasound scanning and Doppler velocimetry visualize the fetus and assess blood how respectively [4, 5]. The biophysical profile and non-stress test (NST) assess fetal heart rate, breathing, movements, and amniotic fluid levels. In certain cases, fetal blood sampling or amniotic fluid analysis may be used. The choice of method depends on the pregnancy stage, clinical context, and resources available [6, 7].

CTG has become a cornerstone in perinatal monitoring, enabling real-time assessment of fetal heart rate and uterine contractions during labor. This non-invasive tool plays a vital role in identifying possible fetal distress, offering valuable insights into the condition of the unborn child. However, the application of CTG in clinical settings is not without limitations, and its interpretation may sometimes lead to falsely presumed fetal distress resulting in unwarranted C-sections [8, 9].

Despite the potentially lifesaving role of emergency C-sections, they are not without risks, which may include increased blood loss, infection injury to other organs, increased recovery time, and potential implications for future pregnancies. Therefore, the decision to undertake an emergency C-section due to presumed fetal distress on CTG is one of critical clinical judgement balancing the risks to the fetus against the risks of surgery. By focusing on detailed CTG patterns and their correlation with neonatal outcomes, this research seeks to refine the criteria for diagnosing fetal distress, thereby minimizing unnecessary cesarean sections. Additionally, the findings contribute to global knowledge by providing data relevant to settings with similar resources and clinical challenges, ultimately improving neonatal health outcomes through tailored clinical practices. So, the objective of this study was to determine the fetal outcomes in women undergoing emergency cesarean section due to presumed fetal distress on CTG.

## MATERIAL & METHODS

This descriptive study was carried out at Chaudhary Muhammad Akram Teaching and Research Hospital, Lahore from January to June 2025. The calculated sample size for this study was 135 by assuming the frequency of early neonatal death as 3.2%[10], considering 95% confidence interval and 3% margin of error. All the mothers were selected by applying non-probability consecutive sampling technique as who fulfilled the following criteria were considered eligible or the study.

**Inclusion:**

Pregnant females aged between 18 to 45 years, women undergoing emergency cesarean sections due to presumed fetal distress as indicated by CTG during the intrapartum period, women with singleton pregnancies and women having gestational age of 36 weeks or more at time of delivery were fall in inclusion criteria.

**Exclusion:**

While the women where emergency C-section was done with reason other than presumed fetal distress on CTG, women with pre-existing health condition that might independently affect perinatal outcome, such as pre-eclampsia, diabetes, or heart disease and children have fetal anomalies on anomaly scan were fall in exclusion criteria.

After meeting selection criteria, informed consent and demographic detail was taken through a structured questionnaire. Cardiotocography (CTG) was performed by consultant obstetric surgeons to monitor the fetal heart rate and contractions, thus identifying presumed fetal distress. The primary outcome variables for this study are fetal outcomes. The Apgar score was assessed at one and five months after birth. Fetal outcome was noted in terms of "low Apgar score", early neonatal death, birth asphyxia, admission to NICU. The Apgar score is measured by assessing the new born physical condition on one and five minutes after the birth. A low Apgar score was labeled if score of <7 after 5 minutes of birth was observed. Early neonatal death was observed if death occurred live born baby within first 07 days of life. Birth asphyxia was labeled if operationally defined based on the presence of at least one of the following: a) Apgar score of less than 7 at 5 minutes post birth, b) the newborn requiring resuscitation at birth, c) acidemia in umbilical artery blood sample (pH less than 7.1), or d) the presence of neurological manifestations 1ike seizures, hypotonia or coma within 48 hours of birth. Similarly admission to NICU was defined was defined as the requirement for the newborn to be admitted to NICU due to the

need for advanced medical care and monitoring immediately after birth or within the first 28 days of life. In this study premature distress was labeled as the presence of atypical or abnormal CTG tracings that suggest the fetus might be compromised or suffering from hypoxia during labor. It includes baseline fetal heart rate abnormalities, reduced FHR variability, deceleration, and sinusoidal accelerations.

All the collected data was entered and analyzed on SPSS version 26. Fetal outcomes were presented in form of frequency and percentage. Data was stratified for effect modifiers and fetal outcomes were compared in stratified groups by applying chi-square test. P-value ≤0.05 was kept as significant.

**RESULTS:**

In this study, a total of 135 female participants were enrolled. The mean age was 30.01 ± 8.19 years, and the mean gestational age was 38.41 ± 1.10 weeks. The majority of participants (50.4%) were primiparous, followed by nulliparous and multiparous women. A history of previous cesarean section was observed in 68 (50.4%) of the participants. **Table-I**

In terms of fetal outcomes, birth asphyxia was observed in 29 (21.5%) babies, and a low Apgar score was also noted in 29 (21.5%) cases. Additionally, 29 (21.5%) babies required NICU admission, while early neonatal death occurred in 11 (8.1%) cases. **Table-II**

According to this study, low Apgar scores were observed in 8 (20%) babies born to nulliparous women, 13 (19.1%) in primiparous women, and 8 (29.6%) in multiparous women (p-value = 0.512). Among women aged ≤30 years, 12 (17.1%) babies had low Apgar scores, compared to 17 (26.2%) in those aged >30 years (p-value = 0.203). Similarly, low Apgar scores were noted in 17 (23.3%) babies with a gestational age of 37–38 weeks and in 12 (19.4%) with a gestational age of 39–40 weeks (p-value = 0.579). Likewise, birth asphyxia was recorded in 8 (20%) babies of nulliparous women, 13 (19.1%) of primiparous women, and 8 (29.6%) of multiparous women (p-value = 0.512). In women aged ≤30 years, birth asphyxia occurred in 12 (17.1%) babies, while in those aged >30 years it was noted in 17 (26.2%) babies (p-value = 0.203). Birth asphyxia was also observed in 17 (23.3%) babies born at 37–38 weeks of gestation and in 12 (19.4%) born at 39–40 weeks (p-value = 0.579).In this study, NICU admission was recorded in 8 (20%) babies born to nulliparous women, 13 (19.1%) in primiparous women, and 8 (29.6%) in multiparous women (p-value = 0.512). Among women aged ≤30 years, 12 (17.1%) babies required NICU admission, compared to 17 (26.2%) in women aged >30 years (p-value = 0.203). Likewise, NICU admission was observed in 17 (23.3%) babies of mothers with a gestational age of 37–38 weeks and in 12 (19.4%) babies with a gestational age of 39–40 weeks (p-value = 0.579). In this study, early neonatal death was reported in 2 (5%) babies born to nulliparous women, 5 (7.4%) in primiparous women, and 4 (14.8%) in multiparous women (p-value = 0.334). Among women aged ≤30 years, early neonatal death occurred in 6 (8.6%) cases, compared to 5 (7.7%) cases in those aged >30 years (p-value = 0.852). Similarly, for women with a gestational age of 37–38 weeks, early neonatal death was noted in 5 (6.8%) babies, while in those with a gestational age of 39–40 weeks, it was observed in 6 (9.7%) babies (p-value = 0.549). **Table-III**

**Table-I: Descriptive statistics of parity, previous C-section and quantitative variables of the respondents**

| Parameters | | Output |
|---|---|---|
| Age (years) | | 30.01 ± 8.19 |
| Gestational age (weeks) | | 38.41 ± 1.10 |
| Parity | Nulliparous | 40 (29.6%) |
| | Primiparous | 68 (50.4%) |
| | Multiparous | 27 (20.0%) |
| Previous C-section | Yes | 68 (50.4%) |
| | No | 67 (49.6%) |

**Table-II: Frequency distribution of fetal outcome**

| Fetal outcomes | | Frequency (%) | Percent |
|---|---|---|---|
| Birth Asphyxia | Yes | 29 (21.5%) | |
| | No | 106 (78.5%) | |
| Low Apgar | Yes | 29 (21.5%) | |
| | No | 106 (78.5%) | |
| NICU | Yes | 29 (21.5%) | |
| | No | 106 (78.5%) | |
| Early neonatal death | Yes | 11 (8.1%) | |
| | No | 124 (91.9%) | |

**Table-III: Comparison of fetal outcome between age, gestational age and parity**

| | | Low Apgar | | p-value |
|---|---|---|---|---|
| | | Yes | No | |
| Parity | Nulliparous | 8 (20.0%) | 32 (80.0%) | 0.512 |
| | Primiparous | 13 (19.1%) | 55 (80.9%) | |
| | Multiparous | 8 (29.6%) | 19 (70.4%) | |
| Age Groups | ≤30 | 12 (17.1%) | 58 (82.9%) | 0.203 |
| | >30 | 17 (26.2%) | 48 (73.8%) | |
| Gestational age (weeks) | 37-38 | 17 (23.3%) | 56 (76.7%) | 0.579 |
| | 39-40 | 12 (19.4%) | 50 (80.6%) | |
| | | Birth Asphyxia | | p-value |
| | | Yes | No | |
| Parity | Nulliparous | 8 (20.0%) | 32 (80.0%) | 0.512 |
| | Primiparous | 13 (19.1%) | 55 (80.9%) | |
| | Multiparous | 8 (29.6%) | 19 (70.4%) | |
| Age Groups | ≤30 | 12 (17.1%) | 58 (82.9%) | 0.203 |
| | >30 | 17 (26.2%) | 48 (73.8%) | |
| Gestational age (weeks) | 37-38 | 17 (23.3%) | 56 (76.7%) | 0.579 |
| | 39-40 | 12 (19.4%) | 50 (80.6%) | |
| Variables | | NICU | | p-value |
| | | Yes | No | |
| Parity | Nulliparous | 8 (20.0%) | 32 (80.0%) | 0.512 |
| | Primiparous | 13 (19.1%) | 55 (80.9%) | |
| | Multiparous | 8 (29.6%) | 19 (70.4%) | |
| Age Groups | ≤30 | 12 (17.1%) | 58 (82.9%) | 0.203 |
| | >30 | 17 (26.2%) | 48 (73.8%) | |
| Gestational age (weeks) | 37-38 | 17 (23.3%) | 56 (76.7%) | 0.579 |
| | 39-40 | 12 (19.4%) | 50 (80.6%) | |
| Variables | | Early Neonatal Death | | p-value |
| | | Yes | No | |
| Parity | Nulliparous | 02 (5.0%) | 38 (95.0%) | 0.334 |
| | Primiparous | 5 (7.4%) | 63 (92.6%) | |
| | Multiparous | 4 (14.8%) | 23 (85.2%) | |
| Age Groups | ≤30 | 6 (8.6%) | 64 (91.4%) | 0.852 |

| | | | | |
|---|---|---|---|---|
| | >30 | 5 (7.7%) | 60 (92.3%) | |
| Gestational age (weeks) | 37-38 | 5 (6.8%) | 68 (93.2%) | 0.549 |
| | 39-40 | 6 (9.7%) | 56 (90.3%) | |

**DISCUSSION:**

For the past few decades, the most frequent reason for a caesarean delivery has been suspected foetal distress identified by CTG. CTG has been accused of causing an unnecessarily high percentage of surgical deliveries, and many foetuses exhibit heart rate fluctuations without suffering any negative effects[11]. But during the last ten years, the increase of caesarean sections has grown to be a serious global public health issue and has been widely accepted in most developing countries, including Pakistan. According to a recent health and demographic survey, 22% of Pakistanis have cesarean section [12, 13].

In this study regarding fetal outcomes, 29 infants (21.5%) experienced birth asphyxia, and the same number had low Apgar scores. Additionally, 29 newborns (21.5%) were admitted to the NICU, while early neonatal death occurred in 11 cases (8.1%). Some of the studies are discussed below showing their results as.

A descriptive case series was conducted on 110 pregnant women, who underwent emergency C-sections at Holy Family Hospital as a result of persistently unsettling CTG were included. 24.55% (27/110) of women who had emergency C-sections for foetal distress at term experienced perinatal outcome in terms of delivery asphyxia. Women who had emergency C-sections for suspected foetal distress did not have a particularly high perinatal outcome in terms of delivery asphyxia[14].

Another study analyzed the perinatal outcome of 67 I deliveries went through caesarean section for Metal distress. Regarding perinatal outcomes, 21 (3.2%) had early neonatal deaths, and 6 (0.9%) were still born[10]. According to Roy *et al.*, 217 pregnant women had caesarean sections during labour, mostly due to unsettling foetal cardiac conditions. In 106 cases (48.8%), persistent bradycardia was the most prevalent foetal heart anomaly. This was followed by late deceleration in 38 cases (I 7.5%) and decreased beat-to-beat variability in 7.8% cases. Thirty-three (15.2%) newborns had a 5-minute Apgar score of less than 7. For suspected birth asphyxia, (15.2%) infants needed to be admitted to the NICU. The remaining (84.7%) newborns were healthy at birth and were given care by their mother [15].

According to a research by Raees et al., 671 deliveries throughout the study period were caesarean sections due to foetal distress. The pregnant ladies were 28.25±6.87 years old on average. Of the pregnant women, the majority (33.4%) were between the ages of 26 and 30. A history of fresh meconium stain liquor was present in more than half (52.75%). The majority of patients (644) had A/H, followed by 21 early neonatal fatalities, and the remaining six instances (6) were stillborn [16]. Reports indicate that babies born to nulliparous women are more likely to die and to have other adverse outcomes, including low birth weight, tiny for gestational age, and preterm [17].

These risks were highest among nulliparous women, according to a meta-analysis that compared data from Asia, Africa, and Latin America to women aged 18 to 35 who had one or two previous pregnancies [18]. Foetal heart rate, gestational age, length of CS, and mother age group did not significantly correlate with perinatal outcomes. As in previous studies, pregnant women who gave birth within 30 minutes of the choice and those who gave delivery after 30 minutes did not differ statistically significantly in the perinatal outcome [19, 20].

**CONCLUSION:**

It can be concluded that in women undergoing emergency cesarean section, low Apgar scores and birth asphyxia are most common complications, followed by NICU admissions and early neonatal deaths. Therefore, before making the decision to undertake an emergency C-section due to presumed fetal distress on CTG, detailed CTG patterns will be monitored to minimize the unnecessary cesarean sections.

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