



Sociodemographic and Obstetric Factors Influencing Perinatal Outcomes in Pregnancy with Reduced Fetal Movement

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Abstract

Background: Reduced fetal movement is a concern during late pregnancy and may indicate fetal compromise. Perinatal outcomes are influenced by maternal characteristics, obstetric factors and fetal surveillance. **Objective:** This study evaluated how sociodemographic and obstetric factors affect perinatal outcomes in women with reduced fetal movement. **Methodology:** This cross-sectional study was conducted at the Department of Obstetrics and Gynaecology, Bangladesh Medical University (BMU), Dhaka, from June 2015 to December 2016. A total of 100 women with singleton pregnancies of at least 34 weeks' gestation presenting with reduced fetal movement were included. Participants were categorized into normal and abnormal CTG groups. **Results:** Maternal age and socioeconomic status were comparable between groups ($p = 0.414$ and $p = 0.582$). Gestational age was lower in the abnormal CTG group (37.7 ± 0.7 vs. 39.2 ± 1.19 weeks; $p = 0.001$) and labour induction was more frequent in the normal CTG group (32.0% vs. 4.0% ; $p = 0.001$). Emergency caesarean section was higher in abnormal CTG (42.0% vs. 12.0% ; $p = 0.001$). Neonates in the abnormal CTG group had lower APGAR scores at one minute (22.0% vs. 6.0% ; $p = 0.021$), higher NICU admission (36.0% vs. 10.0% ; $p = 0.002$) and lower birth weight (2.10 ± 1.9 vs. 2.87 ± 1.6 kg; $p = 0.03$). **Conclusion:** Integrating sociodemographic and obstetric factors with CTG assessment may improve risk stratification and neonatal outcomes in pregnancies with reduced fetal movements. [*Journal of National Institute of Neurosciences Bangladesh, July 2025;11(2):159-164*]

Keywords: Reduced fetal movement, perinatal outcome, obstetric factors, cardiotocography.

Introduction

Reduced fetal movement (RFM) is a prevalent concern for expectant mothers in late pregnancy and frequently leads to unscheduled visits to maternity care units. Maternal perception of fetal activity is widely accepted as a simple, cost-effective marker of fetal well-being, especially in the third trimester. Declines in fetal movement have been linked to adverse perinatal outcomes such as fetal growth restriction, preterm birth and stillbirth, though findings across studies are sometimes inconsistent^{1,2}. Nonetheless, RFM remains a vital clinical warning sign necessitating prompt assessment.

Management of pregnancies complicated by RFM combines maternal history, clinical examination and fetal

surveillance methods. Among these, cardiotocography (CTG) is frequently employed to monitor fetal heart rate patterns and uterine activity. While CTG is extensively studied in high-risk pregnancies for its utility in fetal status evaluation, its predictive value for perinatal outcomes has shown variable results³. Furthermore, perinatal outcomes are modulated not only by fetal monitoring but also by maternal sociodemographic and obstetric factors, which influence clinical decision-making and neonatal prognosis.

Maternal age, parity and socioeconomic status significantly influence access to antenatal care and health-seeking behaviors, thereby affecting pregnancy outcomes^{1,4}. Advanced maternal age, for instance, is associated with increased obstetric complications and

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can correlate with altered fetal growth patterns and neonatal outcomes^{4,5}. Obstetric variables such as gestational age at presentation, induction of labor and mode of delivery critically influence neonatal morbidity and mortality^{6,7}. In resource-limited settings, these factors may have even greater effects on perinatal outcomes in women presenting with RFM.

Although prior research has primarily concentrated on the diagnostic and prognostic utility of CTG in RFM, less emphasis has been placed on how sociodemographic and obstetric determinants interact with RFM within clinical contexts. Recognizing these interactions is essential for refining risk stratification and optimizing perinatal care pathways^{5,8}. Current literature underscores the necessity for context-specific analyses integrating maternal characteristics with obstetric management and neonatal outcomes.

This study intends to address these gaps by evaluating the influence of sociodemographic and obstetric factors on perinatal outcomes in women presenting with RFM. Utilizing data from a tertiary care setting, the research aims to generate actionable insights to inform clinical protocols and enhance maternal and neonatal outcomes in comparable populations.

Methodology

Study Settings and Population: This cross-sectional analytical study was conducted in the Department of Obstetrics and Gynaecology at Bangladesh Medical University (BMU), Dhaka, Bangladesh, from June 2015 to December 2016. The study population consisted of 100 pregnant women aged 18 years and above with singleton pregnancies of at least 34 weeks' gestation who presented with maternal perception of reduced fetal movement and were admitted for delivery during the study period.

Study Procedure: Data were collected using a structured, predesigned questionnaire through face-to-face interviews and review of medical records. Sociodemographic variables, obstetric history, clinical findings, cardiotocography results, mode of delivery and neonatal outcomes were recorded. Cardiotocography was performed within one hour of presentation and interpreted according to standard clinical criteria. Neonatal outcomes were assessed using APGAR scores, need for resuscitation, admission to the neonatal intensive care unit and birth weight measurements.

Statistical Analysis: Data were entered and analyzed using the Statistical Package for Social Sciences version

16.0. Continuous variables were expressed as means with standard deviations, while categorical variables were presented as frequencies and percentages. Comparisons between groups were performed using the chi-square test for categorical variables and the student's t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant.

Ethical Consideration: Ethical approval was obtained from the institutional review board of Bangladesh Medical University. Written informed consent was taken from all participants before enrolment. Confidentiality and anonymity of participants were strictly maintained throughout the study.

Results

A total of 100 pregnant women presenting with reduced fetal movement at or beyond 34 weeks of gestation were included in the analysis. The study population was divided equally into normal cardiotocography (CTG) and abnormal CTG groups, with 50 women in each group. Most women were aged 21 to 25 years and the mean maternal age did not differ significantly between groups ($p = 0.414$). The majority belonged to the lower middle-income category. Overall, sociodemographic variables showed no significant association with CTG status ($p = 0.582$) (Table 1).

Table 1: Sociodemographic Characteristics of Women Presenting with Reduced Fetal Movement (n = 100)

Variables	Normal CTG (n = 50)	Abnormal CTG (n = 50)	P value
Maternal Age Group			
• Less Than 20 Years	5(10.0%)	3(6.0%)	0.414
• 21 to 25 Years	19(38.0%)	21(42.0%)	
• 26 tp 30 Years	16(32.0%)	17(34.0%)	
• More than 30 Years	10(20.0%)	9(18.0%)	
Mean ± SD	25.61 ± 5.65	24.82 ± 3.81	
Socioeconomic Status			
• Low income	15 (30.0%)	12 (24.0%)	0.582
• Lower middle	26 (52.0%)	25 (50.0%)	
• Upper middle	9 (18.0%)	13 (26.0%)	

Mean gestational age was significantly lower in the abnormal CTG group compared with the normal CTG group ($p = 0.001$). Induction of labour was significantly more frequent among women with normal CTG ($p = 0.001$). Parity distribution was similar between groups and showed no statistical significance ($p = 0.688$) (Table 2).

Table 2: Obstetric Characteristics of the Study Population (n = 100)

Variables	Normal CTG	Abnormal CTG	P value
	(n = 50) n (%)	(n = 50) n (%)	
Gestational Age			
• <37 Weeks	14 (28.0%)	17 (34.0%)	0.001
• ≥37 Weeks	36 (72.0%)	33 (66.0%)	
Mean ± SD	39.2 ± 1.19	37.7 ± 0.7	
Parity			
• Primiparous	28 (56.0%)	26 (52.0%)	0.688
• Multiparous	22 (44.0%)	24 (48.0%)	
Induction of Labour			
• Yes	16 (32.0%)	2 (4.0%)	0.001
• No	34 (68.0%)	48 (96.0%)	

P-value=Chi square test

Spontaneous vaginal delivery was more common in the normal CTG group ($p = 0.027$). Emergency caesarean section occurred significantly more often among women with abnormal CTG ($p = 0.001$). Operative vaginal and elective caesarean deliveries showed no significant differences between groups (Table 3).

Table 3: Mode of Delivery Among Women with Reduced Fetal Movement (n = 100)

Mode of delivery	Normal CTG	Abnormal CTG	P value
	(n = 50) n (%)	(n = 50) n (%)	
Spontaneous vaginal delivery	32 (64.0%)	21 (42.0%)	0.027
Operative vaginal delivery	9 (18.0%)	7 (14.0%)	0.585
Emergency caesarean section	6 (12.0%)	21 (42.0%)	0.001
Elective caesarean section	3 (6.0%)	1 (2.0%)	0.308

P-value=Chi square test

Low APGAR score at one minute and NICU admission were significantly higher in the abnormal CTG group (p

$= 0.021$ and $p = 0.002$, respectively). APGAR score at five minutes, birth asphyxia and meconium aspiration syndrome did not show statistically significant differences. Overall, abnormal CTG was associated with poorer early neonatal condition (Table 4).

Table 5: Birth Weight Distribution of Neonates (n = 100)

Birth weight	Normal CTG	Abnormal CTG	P value
	(n = 50) n (%)	(n = 50) n (%)	
<2.5 kg	11 (22.0%)	33 (66.0%)	0.03
2.5–3.5 kg	39 (78.0%)	17 (34.0%)	
Mean ± SD (kg)	2.87 ± 1.6	2.10 ± 1.9	

P-value= student's t-test

Low birth weight was markedly higher among neonates with abnormal CTG findings. The mean birth weight was significantly lower in the abnormal CTG group compared with the normal CTG group ($p = 0.03$). These findings indicate an association between abnormal CTG and reduced fetal growth (Table 5).

Discussion

The study critically examines how maternal and obstetric variables correlate with perinatal outcomes when women present with reduced fetal movement (RFM), an established clinical marker indicative of potential fetal compromise and adverse neonatal consequences. The findings deepen understanding of these interactions, aligning with and extending prior research insights.

A key observation from this investigation was the absence of significant differences in maternal age between normal and abnormal cardiotocography (CTG) groups, with mean ages around 25.61 ± 5.65 and 24.82 ± 3.81 years, respectively. This aligns with findings from an Ethiopian cohort where advanced maternal age was an independent risk factor for adverse perinatal outcomes but did not consistently predict poor neonatal outcomes specifically in RFM contexts. Similarly, data

Table 4: Perinatal Outcomes Among Pregnancies with Reduced Fetal Movement (n = 100)

Outcomes		Normal CTG	Abnormal CTG	P value
		(n = 50) n (%)	(n = 50) n (%)	
APGAR score at 1 minute	<7	3 (6.0%)	11 (22.0%)	0.021
	≥7	47 (94.0%)	39 (78.0%)	
APGAR score at 5 minutes	<7	1 (2.0%)	2 (4.0%)	0.500
	≥7	49 (98.0%)	48 (96.0%)	
NICU admission		5 (10.0%)	18 (36.0%)	0.002
Birth asphyxia		7 (14.0%)	11 (22.0%)	0.297
Meconium aspiration syndrome		4 (8.0%)	9 (18.0%)	0.137

P-value=Chi square test

from a large eastern Chinese sample documented increasing maternal age alongside adverse obstetric events, yet the specific influence of maternal age on fetal movement patterns remains complex and warrants nuanced interpretation⁵.

The lack of a significant association between socioeconomic status (SES) and CTG abnormalities also reflects varied literature reports. International cohort studies in high-income countries have noted minimal relationships between individual-level SES and neonatal outcomes, though socioeconomic disparities continue to influence certain pregnancy complications, emphasizing the multifactorial nature of perinatal risk⁹. The predominance of patients from lower-middle-income groups in our study corresponds with public healthcare access patterns in developing regions, an important contextual consideration¹⁰.

Gestational age emerged as a decisive obstetric determinant of perinatal outcomes, with the abnormal CTG group displaying a significantly lower mean gestational age (37.7 ± 0.7 weeks) than the normal CTG group (39.2 ± 1.19 weeks). Earlier gestational ages are often linked to placental insufficiency or fetal compromise, corroborating findings that abnormal fetal surveillance patterns frequently occur in earlier term fetuses¹¹. This underscores gestational age's critical role in CTG interpretation and management planning, endorsing its inclusion in clinical risk assessment models to optimize outcomes.

Parity differences were not observed between groups, consistent with other research indicating that parity is not an independent predictor of adverse neonatal results in RFM pregnancies. Labor induction was more frequent in the normal CTG group, possibly reflecting clinical confidence in scheduling delivery when fetal monitoring suggests well-being. Conversely, abnormal CTG patterns often prompt emergent delivery to mitigate fetal hypoxia risks¹².

Analysis of delivery mode revealed a significantly increased emergency cesarean section rate in the abnormal CTG group (42.0% vs. 12.0%), corroborating prior evidence linking abnormal fetal heart tracings with higher operative delivery rates aimed at reducing fetal compromise⁵. This aligns with trends in clinical settings where proactive responses to fetal distress optimize neonatal survival and minimize morbidity¹³.

Neonatal outcomes further confirm the clinical significance of combining RFM with abnormal CTG results. Infants in the abnormal group exhibited significantly lower one-minute APGAR scores and higher NICU admissions, signaling early neonatal

compromise consistent with previous reports linking abnormal antepartum surveillance to increased neonatal morbidity. Although five-minute APGAR scores were not significantly different, the initial depressions signify a greater need for resuscitative interventions¹⁴. Additionally, a significantly higher proportion of low-birth-weight infants in the abnormal CTG group supports earlier research associating RFM with intrauterine growth restriction and placental insufficiency, conditions increasing morbidity risk and explaining the elevated NICU admissions^{13,15}.

This study reinforces that while CTG is a crucial fetal surveillance tool, perinatal outcomes arise from an interplay of sociodemographic and obstetric factors. Integrating maternal characteristics such as age and SES with obstetric variables including gestational age and delivery strategies, creates a composite risk profile better suited to clinical decision making. Combined with fetal monitoring data, such parameters enhance risk stratification and enable timely obstetric interventions, potentially reducing adverse neonatal outcomes associated with RFM¹⁶. The findings underline the necessity for holistic prenatal evaluation and multifactorial management approaches in pregnancies complicated by decreased fetal activity.

Overall, this research contributes valuable data from a developing setting and complements the growing body of literature emphasizing the complexity of factors influencing fetal health. Future studies are warranted to further elucidate the mechanistic pathways linking reduced fetal movement, sociodemographic factors and fetal monitoring abnormalities to perinatal morbidity, ultimately refining protocols to enhance maternal-fetal care.

There are some limitations of the study. This study was conducted in a single tertiary care center with a relatively small sample size, which may limit generalizability. Long-term neonatal outcomes were not assessed and potential confounding variables such as maternal comorbidities were not analyzed separately.

Conclusion

Sociodemographic and obstetric factors significantly influenced perinatal outcomes in women with reduced fetal movements. Abnormal cardiotocography findings were associated with lower gestational age, higher rates of emergency cesarean section, NICU admission and lower birth weight, highlighting the need for comprehensive risk assessment to improve neonatal outcomes.

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Conflict of interest

There are no conflicts of interest.

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Contribution to authors

Farzana Sharmin: Conceptualization, Resources, Manuscript writing
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All authors read and approved the final manuscript.

Data Availability

The datasets generated and analyzed during this study are not publicly available due to patient confidentiality and institutional data protection policies. However, anonymized data may be made available from the corresponding author upon reasonable request, subject to approval by the institutional ethics committee.

Ethics Approval and Consent to Participate

Ethical approval for the study was obtained from the Institutional Review Board. As this was a prospective study the written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

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