

# The Value of Cardiotocography for Evaluation of Fetal Condition and Outcome in Women Presenting with Less Fetal Movement

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## ABSTRACT

**Objective:** In this study our main goal is to determine the value of cardiotocography for evaluation of fetal condition and outcome in women presenting with less fetal movement.

**Method:** This cross-sectional study was done at Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka between June 2015 - December 2016. Where women >34 weeks' gestation with singleton pregnancies presenting during the study period with maternal perception of less fetal movement (LFM) in the out-patient Department of Obstetrics and Gynecology in BSMMU.

**Results:** During the study, the mean age was found  $25.61 \pm 5.65$  years varied from 19 to 38 years in normal CTG and  $24.82 \pm 3.81$  years varied from 19 to 38 years in abnormal CTG. Majority patients were primiparous in both groups (56.0% vs. 52.0%). More than half (52.0%) of the patients in normal CTG and a half (50.0%) in abnormal CTG patients were came from lower middle-income group family. Emergency caesarean section was 12.0% and 42.0% in normal and abnormal CTG respectively. Emergency caesarean section was significantly higher in abnormal CTG. At 1-minute APGAR score  $\leq 7$  was found 94.0% babies in normal CTG and 78.0% in abnormal CTG. Needed resuscitation was 4.0% in normal CTG and 22.0% in abnormal CTG. Admission to NICU 10.0% babies in normal CTG and 36.0% in abnormal CTG.

**Conclusions:** Decelerations, tachycardia and non-reactive (absent of accelerations) were the more common types of abnormal CTG. Emergency caesarean section, low APGAR score, needed resuscitation, admission to NICU and prolonged hospital stay were higher in abnormal CTG. CTG can be continued as a good screening test of fetal surveillance but it is not the sole criteria to influence the management of high-risk pregnancies.

**Keywords:** Maternal Perception, Less Fetal Movement (LFM), Cardiotocograph (CTG).

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## INTRODUCTION

Maternal perception of less fetal movement (LFM) causes concern to both pregnant women and obstetricians in late pregnancy. While LFM has been associated with conflicting published perinatal outcomes this symptom constitutes a common reason for unscheduled presentations to maternity units.<sup>1-3</sup> Maternal perception of gross fetal movement appears to be an accurate reflection of fetal activity. Active fetal movement patterns have been associated with good fetal outcome and conversely, LFM suggests the possibility of impending fetal death.<sup>4</sup>

The cardiotocograph (CTG) is an electronic record of the fetal heart rate obtained via an ultrasound transducer placed on the mother's abdomen (external or indirect CTG). A second transducer is placed on the mother's abdomen over the uterine fundus to record simultaneously the presence of any uterine activity. Both fetal heart rate and uterine activity are traced simultaneously on to a paper strip. Components of the fetal heart

rate that can be assessed include: baseline rate, baseline variability, accelerations and decelerations. The relationship between fetal heart rate and the timing of uterine contractions is also assessed. Cardiotocography is used widely in maternity care, both in the antepartum and intrapartum periods. Although the theoretical basis for applying and interpreting the test and indications for monitoring.<sup>5-7</sup>

In this study our main goal is to determine the value of cardiotocography for evaluation of fetal condition and outcome in women presenting with less fetal movement.

## OBJECTIVE

### General Objective

- To evaluate the value of cardiotocography for evaluation of fetal condition and outcome in women presenting with less fetal movement.

**Specific Objective**

- To identify socioeconomic characteristics of the patients.
- To detect frequency of major abnormal in cardiotocography (CTG).

**METHODOLOGY**

**Type of Study**

Cross-sectional study

**Place of Study**

Bangabandhu Sheikh Mujib Medical University.

**Study Period**

June 2015 to December 2016

**Study Population**

Women >34 weeks' gestation with singleton pregnancies presenting during the study period with maternal perception of less fetal movement (LFM) in the out-patient Department of Obstetrics and Gynecology in BSMMU.

**Sampling Technique**

Purposive

**Method**

During the study, The total 100 cases of pregnant women admitted for delivery in Obstetrics and Gynecology in BSMMU department of BSMMU from June 2015 -December 2016 was asked for proper history. Data was collected by face-to-face interview with the woman by using a predesign questionnaire. This

is a cross sectional study of pregnancy outcomes of all women £34 weeks gestation with a singleton pregnancy who presented during the study period with maternal perception of less fetal movement (LFM). Women with LFM was identified through records of all patients attending the Department of the above mentioned Hospital and their medical notes was reviewed. The standard antenatal management protocol at the hospital recommended daily fetal movement counting from 34 weeks onwards, with a recommendation to report maternal appreciation of less than 10 movements in any 12 hours counting period. If maternal perception of LFM will reported, CTG was performed within 1 hour of presentation, continued for up to 20 minutes, and repeated for a further 20 minutes if the fetal heart pattern was initially nonreassuring; Women with nonreassuring or abnormal CTG will undergo full biophysical profile.

**Data Analysis**

Statistical analyses were carried out by using the Statistical Package for Social Sciences version 16.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. Chi-Square test with Yates correction was used to analyze the categorical variables, shown with cross tabulation. Student t-test was used for continuous variables. P values <0.05 was considered as statistically significant.

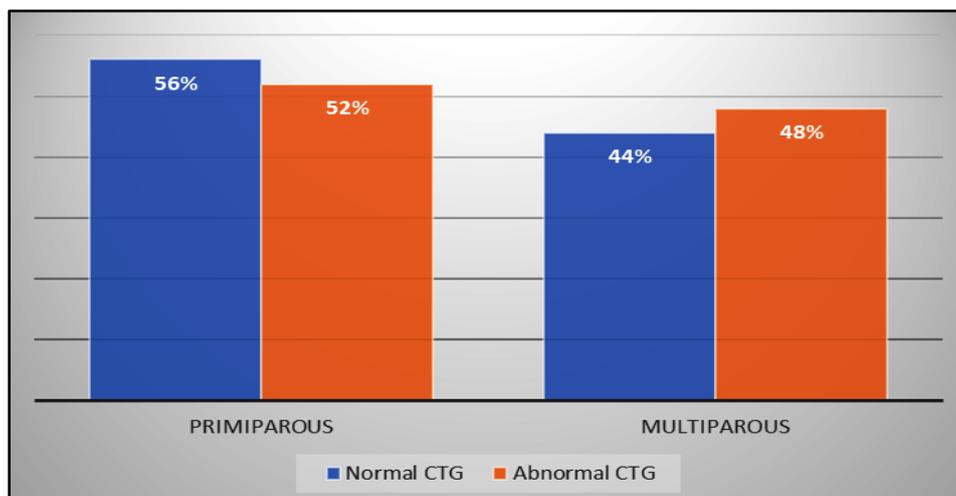


Figure 1: Parity of the study patients.

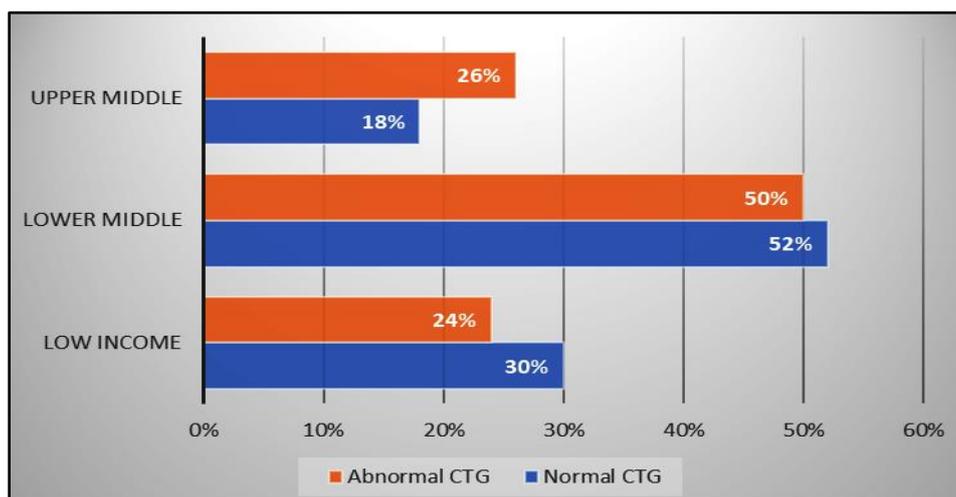


Figure 2: Socioeconomic characteristics of the patients.

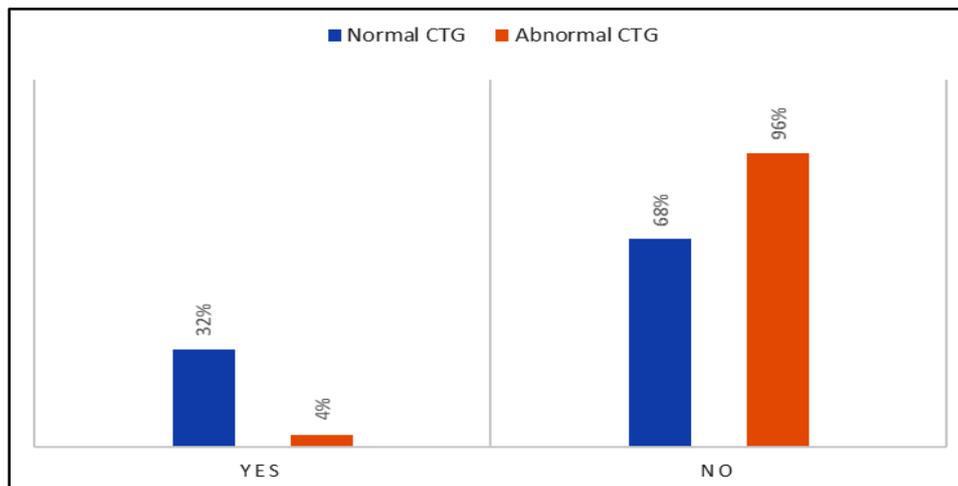


Figure 3: Induction of labour.

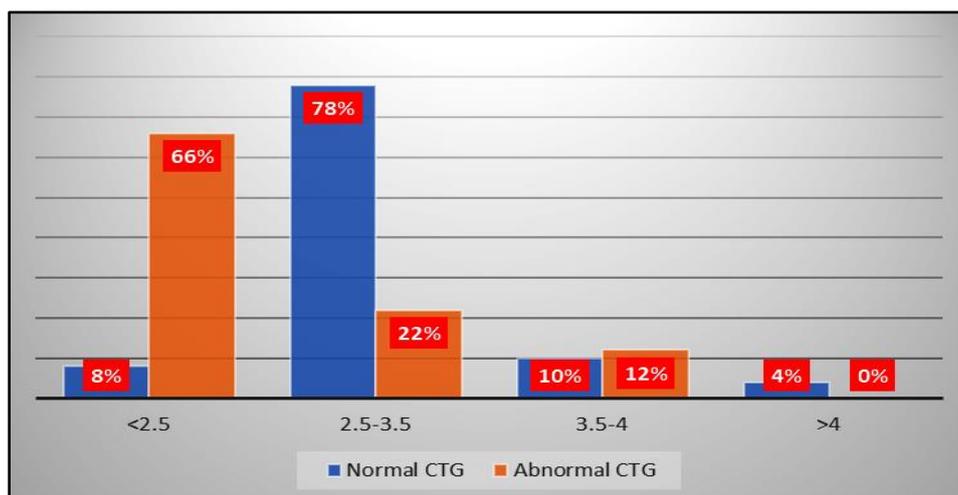


Figure 4: Birth weight of the babies

Table 1: Distribution of the study patients by maternal age (n=100)

Age (years)	Normal CTG (n=50)		Abnormal CTG (n=50)		P value
	n	%	n	%	
<20	5	10.0	3	6.0	0.414 <sup>ns</sup>
21-25	19	38.0	21	42.0	
26-30	16	32.0	17	34.0	
>30	10	20.0	9	18.0	
Mean ± SD	25.61 ±5.65		24.82±3.81		
Range(min-max)	(19-38)		(18-36)		

Table 2: Distribution of the study patients by gestational age (n=100)

Gestational age (weeks)	Normal CTG (n=50)		Abnormal CTG P value (n=50)	
	n	%	n	%
<37	14	28.0	17	34.0
>37	36	72.0	33	66.0
Mean±SD	39.2±1.19		37.7±0.7 0.001 <sup>s</sup>	

Table 3: Distribution of the study patients by frequency of major abnormal in cardiotocography

Variable	%
Decelerations	34.0
Tachycardia	22.0
Non-reactive (absent of accelerations) Bradycardia	20.0
Reduce beat to beat variability Decelerations+ low baseline variability Bradycardia+	8.0
Decelerations	6.0
Tachycardia	6.0
Non-reactive (absent of accelerations) Bradycardia	4.0

Table 4: Model of delivery of the study patients

Mode of delivery	Normal CTG		Abnormal CTG		P value
	n	%	n	%	
Spontaneous vaginal delivery	32	64.0	21	42.0	<sup>a</sup> 0.027 <sup>s</sup>
Operative vaginal delivery	9	18.0	7	14.0	<sup>a</sup> 0.585 <sup>ns</sup>
Emergency caesarean section	6	12.0	21	42.0	<sup>a</sup> 0.001 <sup>s</sup>
Elective caesarean delivery	3	6.0	1	2.0	hQ-SOS <sup>m5</sup>

Table 5: Outcome of study group neonatal outcome of CTG

Outcome	Normal CTG		Abnormal CTG		P value
	n	%	n	%	
APGAR score At 1 min					
<7	3	6.0	11	22.0	0.021 <sup>s</sup>
>7	47	94.0	39	78.0	
At 5 min					
<7	1	2.0	2	4.0	0.500 <sup>ns</sup>
>7	49	98.0	48	96.0	
Admission to NICU	5	10.0	18	36.0	0.002 <sup>s</sup>
Birth asphyxia	7	14.0	11	22.0	0.297 <sup>ns</sup>
Meconium aspiration syndrome	4	8.0	9	18.0	0.137 <sup>ns</sup>

Table 6: Distribution of the study patients by hospital stay (Patients in NICU) (n=23)

Hospital stay (days)	Normal CTG		Abnormal CTG		P value
	(n=5)		(n=18)		
< 7 days	2	40.0	7	38.9	
> 7 days	3	60.0	11	61.1	
Mean $\pm$ SD		13.27 $\pm$ 8.9		23.15 $\pm$ 9.1	0.042 <sup>s</sup>

## RESULTS

Table -1 shows age distribution of the study patients where majority patients were age belonged to 21-25 years in both groups. The mean age was found 25.61  $\pm$ 5.65 years in normal CTG and 24.82 $\pm$ 3.81 years in abnormal CTG. The difference was not statistically significant ( $p>0.05$ ) between normal CTG and abnormal CTG.

In figure-1 shows parity of the study patients it was observed that, majority patients were primiparous in both groups, which was 28(56.0%) in normal CTG and 26(52.0%) in abnormal CTG. The difference was not statistically significant ( $p>0.05$ ) between normal CTG and abnormal CTG.

In figure-2 shows socioeconomic characteristics of the patients where more than half (52.0%) patients in normal CTG and half (50.0%) in abnormal CTG patients were came from lower middle-income group family. The difference was not statistically significant ( $p>0.05$ ) between normal CTG and abnormal CTG.

Table 2 shows gestational age of the study patients it was observed that, majority patients had gestational age  $>37$  weeks in both groups. The mean gestational age was found 39.2 $\pm$ 1.19 weeks in normal CTG and 37.7 $\pm$ 0.7 weeks in abnormal CTG. The difference was statistically significant ( $p<0.05$ ) between normal CTG and abnormal CTG.

In table-3 shows distribution of the study patients by frequency of major abnormal in cardiotocography (CTG).

In figure-3 shows induction of labour, it was observed that induction of labour was found 16(32.0%) in normal CTG and 2(4.0%) in abnormal CTG. The difference was statistically significant ( $p<0.05$ ) between normal CTG and abnormal CTG.

In table-4 shows mode of delivery of the study patients it was observed that, spontaneous vaginal delivery was found 32(64.0%) in normal CTG and 21(42.0%) in abnormal CTG. Operative

vaginal delivery was 9(18.0%) in normal CTG and 7(14.0%) in abnormal CTG. Emergency caesarean section was 6(12.0%) and 21(42.0%) in normal and abnormal CTG respectively. Spontaneous vaginal delivery emergency caesarean section difference was statistically significant between normal CTG and abnormal CTG.

In table-5 shows outcome of study group neonatal outcome of CTG where at 1 minute APGAR score  $>7$  was found 47(94.0%) babies in normal CTG and 39(78.0%) babies in abnormal CTG. At 5 minutes APGAR score  $>7$  was found 49(98.0%) babies in normal CTG and 48(96.0%) babies in abnormal CTG. Admission to NICU 5(10.0%) babies in normal CTG and 18(36.0%) babies in abnormal CTG. Seven (14.0%) babies had birth asphyxia in normal CTG and 11(22.0%) babies in abnormal CTG. Four (8.0%) babies had meconium aspiration syndrome in normal CTG and 9(18.0%) babies in abnormal CTG. APGAR score at 1 minute, needed resuscitation and admission to NICU difference were statistically significant ( $p<0.05$ ).

In figure-4 shows birth weight of the babies where majority 39(78.0%) babies had normal (2.5-3.5 kg) birth weight in normal CTG and 33(66.0%) babies had low ( $<2.5$  kg) birth weight in abnormal CTG. The mean birth weight was found 2.87 $\pm$ 1.6 kg in normal CTG and 2.10 $\pm$ 1.9 kg in abnormal CTG. The difference was statistically significant ( $p<0.05$ ) between normal CTG and abnormal CTG.

In table-6 shows hospital stay duration of the patients where a total of 23 patients were admitted in NICU, however majority patients needed hospital stay  $>7$  days in both groups. The mean hospital stay was 13.27 $\pm$ 8.9 days in normal CTG and 23.1 $\pm$ 9.1 days in abnormal CTG. The difference was statistically significant ( $p<0.05$ ) between normal CTG and abnormal CTG.

## DISCUSSION

In this series it was observed that more than half (52.0%) patients in normal CTG and half (50.0%) in abnormal CTG patients were came from lower middle income group family. The difference was not statistically significant ( $p>0.05$ ) between normal CTG and abnormal CTG. Khatun et al. (2009) showed 52.0% patients in normal CTG and 48.0% in abnormal CTG patients were came from poor family. Middle class family was found 38.0% in normal CTG and 62.0% in abnormal CTG.

In this present study it was observed that, majority patients had gestational age  $\geq 37$  weeks in both groups. The mean gestational age was found  $39.2 \pm 1.19$  weeks in normal CTG and  $37.7 \pm 0.7$  weeks in abnormal CTG. The difference was statistically significant ( $p<0.05$ ) between normal CTG and abnormal CTG, which is closely resembled with many studies.<sup>6</sup> One study had reported that 15% of NST remain non-reactive between 28 and 32 weeks. After 32 weeks, the incidences of reactive and non-reactive tests are comparable to those seen at term and eliminate concern regarding the immature nervous system.<sup>6-7</sup>

In this current study it was observed that more than one third (34.0%) patients had decelerations abnormal CTG, 20.0% had non-reactive (absent of accelerations), 22.0% had tachycardia, 8.0% bradycardia, 6.0% absent beat to beat variability, 6.0% decelerations with low baseline variability and 4.0% had Bradycardia with decelerations. In our country, one study observed 30% had fetal tachycardia, 38% had deceleration, 38% was non-reactive CTG, 4% had fetal bradycardia and 4% had absence beat to beat variability. 18 patients had more than one abnormal findings. In another study, mentioned in their study that CTG abnormalities among the non-reassuring/abnormal CTG group 27 cases overlapped and included one or more decelerations 11 cases, persistent reduced variability 14 cases, reduced variability and decelerations 2 cases, tachycardia found in 1 case and one sinusoidal pattern.<sup>8</sup> In this series it was observed that induction of labour was found 16(32.0%) in normal CTG and 2(4.0%) in abnormal CTG. Induction of labour was significantly ( $p<0.05$ ) higher in normal CTG. Similarly, Daly et al. (2011) found induction of labour 25.0% in normal CTG and 14.8% in abnormal CTG, which support the current study.

In respect to mode of delivery, there was a high incidence of caesarean section in this study. The reason for high incidence of caesarean section in this study in spite of normal test result was due to obstetrical indications, like history of previous caesarean section, cephalopelvic disproportion, severe preeclampsia and severe intrauterine growth retardation. In this study it was observed that, spontaneous vaginal delivery was found almost two third (64.0%) in normal CTG and 42.0% in abnormal CTG. Operative vaginal delivery was 18.0% in normal CTG and 14.0% in abnormal CTG. Emergency caesarean section was 12.0% and 42.0% in normal and abnormal CTG respectively. Emergency caesarean section was significantly higher in abnormal CTG, this finding is similar to the observation of one study.<sup>8</sup>

Published perinatal results following reported less fetal movement are conflicting. In this current study it was observed that, at 1 minute APGAR score  $\leq 7$  was found 94.0% babies in normal CTG and 78.0% in abnormal CTG. At 5 minutes APGAR score  $\leq 7$  was found 98.0% babies in normal CTG and 96.0% in abnormal CTG. Admission to NICU 10.0% babies in normal CTG and 36.0% in abnormal CTG. Seven (14.0%) babies had birth asphyxia in

normal CTG and 22.0% in abnormal CTG. Four (8.0%) babies had meconium aspiration syndrome in normal CTG and 18.0% in abnormal CTG. APGAR score at 1 minute, needed resuscitation and admission to NICU difference were significantly ( $p<0.05$ ) higher in abnormal CTG. One study reported that APGAR score was  $< 7$  at 1 min among the babies of abnormal CTG group than normal CTG that was similar to the study done by one report.<sup>8,9</sup>

## CONCLUSION

Decelerations, tachycardia and non-reactive (absent of accelerations) were the more common types of abnormal CTG. Emergency caesarean section, low APGAR score, needed resuscitation, admission to NICU and prolonged hospital stay were higher in abnormal CTG. CTG can be continued as a good screening test of fetal surveillance but it is not the sole criteria to influence the management of high-risk pregnancies.

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