

# Determine the Adverse Fetal Outcomes In Women With Non-Reactive Cardiotocography

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## ABSTRACT

**Aim:** To determine the adverse perinatal outcomes in women presented with non-reactive cardiotocography.

**Study Design:** Retrospective

**Place and Duration:** The study was conducted at department of Obstetrics & Gynecology, Shahida Islam Teaching Hospital, Lodhran for duration of six months from April, 2020 to September, 2020

**Methods:** Total 125 pregnant women presented with non-reactive cardiotocography were enrolled in this study. Patients detailed demographics including age, BMI, gestational age, gravidity and mode of delivery were recorded after taking informed written consent. Fetal outcomes such as Apgar score, stillbirth, low birth weight, need for NICU admission and neonatal mortality were examined. Data was analyzed by SPSS 24.0.

**Results:** Mean age of patients was 28.34±5.46 years. Mean BMI was 25.54±3.22 kg/m<sup>2</sup>. Mean gestational age was 38.82±1.74 weeks. 72 (57.6%) patients were primigravida and rest 42.4% were multigravida. 80 (64%) patients had cesarean section mode of delivery. 66 (52.8%) neonates had low birth weight, 44 (35.2%) had Apgar score <5 at 1 minute. Stillbirth was found in 4 (3.2%), 46 (36.8%) neonates had needs for NICU admission and neonatal mortality was found in 9 (7.2%).

**Conclusion:** Cardiotocography is very helpful tool for fetal examination. Non reactive cardiotocography was highly associated with poor fetal outcomes.

**Keywords:** Non-reactive Cardiotocography, Low Birth weight, Apgar Score, NICU Admission.

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## INTRODUCTION

Cardiotocography (CTG) monitoring of the fetal heart rate is usually considered to be a successful fetal test during work. Cardiotocography (CTG) is an electronic record of an ultrasound transducer mounted on the abdomen of the mother that produces a fetal cardiac heart rate. It is the most widely used prenatal antepartum and intrapartum screening test in most hospitals in developing countries. This technology was first introduced in 1950 and was launched on the market in 1960<sup>1</sup>. Cardiotocography typical findings show that the fetus gets enough oxygen<sup>2</sup>. However, the findings in almost half of the tracks are not reassuring<sup>3</sup>. Cardiotocography is very sensitive but poor in characteristics. This means that the normal trace is fine for non-hypoxic fetus, but an irregular trace does not necessarily indicate that the fetus is hypoxic<sup>4</sup>. Cardiotocography has a low positive predictive value for adverse outcome, but a high negative predictive value which has contributed to increased caesarean section incidence. Cardiotocography<sup>5</sup>.

A wide range of factors have been identified in observational studies which can affect fetal activity. Better understanding of fetal movements while the mother lie down and in a relaxed environment than when she works hard.<sup>6</sup> Previously inserted placenta and potentially pre-placed fetal spine were associated with decreased fetal movement before 28 weeks.<sup>7</sup> Placenta cross-sedating drugs, such as alcohol, methadone, benzodiazepines and other opioids, can reduce movements temporarily<sup>8</sup>. Fetuses with severe malformations may have diminished fetal

movements, but the behavior of anencephalic fetuses may have deteriorated or increased.<sup>9</sup> The potential for central nervous system defects, muscle dysfunction or skeletal abnormalities can be considered as fetal development is an indicator of the integrity of the central nervous and musculoskeletal systems.<sup>10</sup> The normal fetus is alive and able to move physically and moves through periods of rest and sleep. A substantial decrease or abrupt change in fetal activity can be an appropriate clinical indication. Reduced or missing fetal movements have been proposed to be a warning sign of imminent fetal death. Studies of ultrasound fetal physiology have shown a relationship between RFM and poor perinatal outcomes<sup>11-12</sup>. We conducted present study with aimed to examine the adverse neonatal outcomes in patients diagnosed to have non-reactive cardiotocography.

## MATERIALS AND METHODS

This Retrospective study was conducted at Obstetrics & Gynecology department of Shahida Islam Teaching Hospital, Lodhran for duration of six months from April, 2020 to September, 2020. In this study total 125 women diagnosed to have non-reactive cardiotocography were enrolled. Patients ages were ranging between 18 to 45 years. Patients detailed demographics including age, BMI, gestational age, gravidity and mode of delivery were recorded after taking informed written consent Patients with twin pregnancies, anomalous fetus and admitted for elective caesarean section were excluded from study.

Cardiotocology was characterized as nonreactive in case of fetal tachycardia>150bpm, fetal bradycardia<110, reduced or absent beat to beat the variability, late deceleration and extreme decline of the variable. Fetal outcomes such as Apgar score, stillbirth, low birth weight, need for NICU admission and neonatal mortality were examined. Data was analyzed by SPSS 27.0. Mean±SD was obtained. Frequencies and percentages were recorded in tabulation form.

**RESULTS**

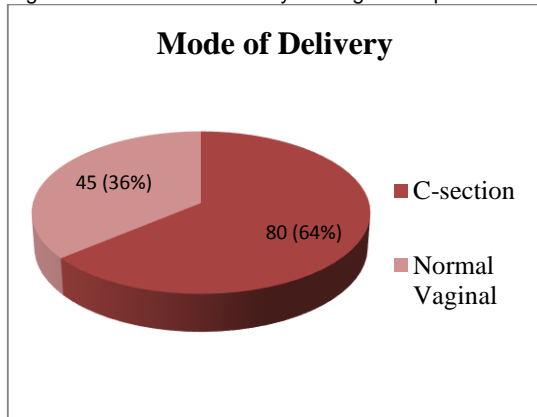
Mean age of patients was 28.34±5.46 years. Mean BMI was 25.54±3.22 kg/m<sup>2</sup>. Mean gestational age was 38.82±1.74 weeks. 72 (57.6%) patients were primigravida and rest 42.4% were multigravida. (Table 1)

Table No 1: baseline details of all the included patients

Characteristics	Frequency No.	% age
Mean Age (Years)	28.34±5.46	-
Mean Gestational age	38.82±1.74	-
Gravidity		
Primigravida	72	57.6
Multigravida	53	42.4

According to the mode of deliver 80 (64%) patients had cesarean section and 45 (36%) had normal vaginal delivery. (Figure 1)

Figure No 1: Mode of Delivery Among all the patients



According to the neonatal outcomes, 66 (52.8%) neonates had low birth weight, 44 (35.2%) had Apgar score <5 at 1 minute. Stillbirth was found in 4 (3.2%), 46 (36.8%) neonates had needs for NICU admission and neonatal mortality was found in 9 (7.2%). (Table 2)

Table No 2: Adverse Fetal associated with non-reactive cardiotocography

Variable	Frequency No.	% age
Low Birth Weight	66	52.8
Apgar Score <7at 1 min	44	35.2
Still Births	4	3.2
NCU Admission	46	36.8
Mortality	9	7.2

**DISCUSSION**

Over recent years, fetal intrapartum monitoring using electronic fetal control has become increasingly common in

our effort to reduce perinatal mortality and morbidity<sup>13</sup>. It is believed to be a superior fetal hypoxia system because it detects subtle fetal cardiac changes which can be overlooked by stethoscopic periodic auscultation<sup>14</sup>.

In this study we included 125 pregnant women diagnosed to have non-rective cardiotocography. Mean age of patients was 28.34±5.46 years. Mean BMI was 25.54±3.22 kg/m<sup>2</sup>. Mean gestational age was 38.82±1.74 weeks. 72 (57.6%) patients were primigravida and rest 42.4% were multigravida. These results were comparable many of previous studies in which majority of patients were ages between 25 to 30 years<sup>15</sup>. A study conducted by Kavitha K et al<sup>16</sup> regarding cardiotocography in labour and fetal outcomes and they reported 40% patients were primigravida while 60% were multigravida.

In our study we found that 64% patients had cesarean section mode of delivery while 36% had normal vaginal delivery. Salahuddin N et al<sup>17</sup> reported that 76.67% non-reactive cardiotocography patients had c-sections mode of deliver while 13.3% had normal vaginal deliveries.

In this study according to the neonatal outcomes we found that 66 (52.8%) neonates had low birth weight, 44 (35.2%) had Apgar score <5 at 1 minute. Stillbirth was found in 4 (3.2%), 46 (36.8%) neonates had needs for NICU admission and neonatal mortality was found in 9 (7.2%). These results showed similarity to many of previous studies in which women with non-rective cardiotocography were significantly associated with poor perinatal outcomes<sup>18-19</sup>. A research by Bhartiya V et al<sup>20</sup> regarding to classify on admission to the delivery unit the foetus at increased risk of intrapartum hypoxia. They conducted a study to assess the effectiveness of CTG in low- and high-risk women. In their study 31 percent patients had low birth weight <2500 g.

Gupta et al<sup>21</sup> reported that 36.5% of cases had Apgar score 0-4 at 1 minute and 58.1% foetus had Apgar score.

A study by Munir SI et al<sup>22</sup> demonstrated that out of 50 non-reactive cardiotocography patients 20% had NICU admission while in 50 reactive CTG patients 10% neonates had NICU admission.

Studies reported that the rate of stillbirths and ENND is lower than Sheikh et al, which were 11.6% and 16.9 percent respectively<sup>23</sup>. This lower rate could be due to timely intervention and advanced neonatal facilities available for neonatal treatment in current setup. The same results were also seen in other studies where incidence of morbidity and mortality in newborns subjected to foetal distress was double that of newborns without foetal distress<sup>24-25</sup>.

**CONCLUSION**

It is concluded that cardiotocography is very helpful tool for fetal examination. Non reactive cardiotocography was highly associated with poor fetal outcomes.

**REFERENCES**

1. Parer JT, King T. Fetal heart rate monitoring: is it salvageable? Am J Obstet Gynecol. 2000;182(4):982-7.
2. Skoczylas M, Laudański T. Usefulness of the examination of fetal blood oxygen saturation (FSpO2) and fetal heart rate (FHR) as a prognostic factor of the newborn outcome. Ginekol Pol. 2003;74(10):1284-9.

3. Ingemarsson I, Ingemarsson E, Spencer JA. Fetal heart rate monitoring: a practical guide: Oxford University Press. 1993;344:902-18.
4. Baker L, Beaves M, Trickey D, Wallace E. Book Review: Ls Baker, MC Beaves, DJ Trickey, EM Wallace, Fetal Surveillance: A Practical Guide, RANZCOG, Melbourne. 2011;24:137.
5. East CE, Leader LR, Sheehan P, Henshall NE, Colditz PB. Intrapartum fetal scalp lactate sampling for fetal assessment in the presence of a non-reassuring fetal heart rate trace. *Cochrane Database Syst Rev.* 2010;3:6174..
6. Johnson TR. Maternal perception and Doppler detection of fetal movement. *Clin Perinatol* 1994;21: 765–77.
7. Neldam S, Jessen P. Fetal movements registered by the pregnant woman correlated to retrospective estimations of fetal movements from cardiotocographic tracings. *Am J Obstet Gynecol* 1980;136:1051–4.
8. Fisher ML. Reduced fetal movements: a research-based project. *Br J Midwifery* 1999;7:733–7.
9. Kansal R, Goel G, Mangala D, Garg P, Verma K, Geetika. Correlation of Admission Test with Neonatal Outcome. *Peoples J of Scientific Research.* 2014; 7(1):27-31.
10. Grivell RM, Alfirevic Z, Gyte GM, Devane D. Antenatal cardiotocography for fetal assessment. *Cochrane Database of Systematic Reviews.* 2015(9). Art. No.: CD007863. DOI: 10.1002/14651858.CD007863.pub4.
11. Smith V, Begley C, Newell J, Higgins S, Murphy DJ, White MJ, et al. Admission cardiotocography versus intermittent auscultation of the fetal heart in low-risk pregnancy during evaluation for possible labour admission—a multicentre randomised trial: the ADCAR trial. *Int J Gynaecol Obstet.* 2019;126(1):114-121.
12. Kumari VR, Indiramani, Chakravarthy K. A Comparative study of perinatal outcome in low risk pregnancies with CTG monitoring and intermittent auscultation. *J of Evolution of Medical and Dental Sciences.* 2015; 4(105):17038-17042.
13. Smith JH. *Obstetrics in the 1990s; Current controversies.* Oxford: Blackwell Scientific; 1992. pp. 192–201.
14. Schiffrin BS, Amsel J, Burdof G. The accuracy of auscultation detection of fetal cardiac deceleration: a computer simulation. *Am J Obstet Gynaecol.* 1992;166:566–576.
15. Xavier AA, Pandey D, Dogra L, Lewis LE. Cardiotocography in a perinatal armamentarium: boon or bane? *Int J Reprod Contracept Obstet Gynecol* 2015; (4):2000-4.
16. Kavitha k, N. Madhavi. Cardiotocography In Labour And Fetal Outcome: *JBCR-VOL-6-issue-1-2019-20.*
17. Salahuddin N., Saif N., Mumtaz A. And Farooq F. Obstetrical And Fetal Outcome In Patients With Abnormal Cardiotocograph. *Biomedica Vol. 33, Issue 4, Oct. – Dec., 2017.*
18. Syeda.R.M, Shakuntala.P.N, Rao SR et. al. Fetal outcome in pregnant women with reduced fetal movements. *Int J Health Sci Res.* 2013;3(7):18-28
19. Salma U, Jabeen M, Shimul S, Akhter D. Analysis of Cardiotocography Findings in Pregnancy with Less Fetal Movement and Its Association with Perinatal Outcome. 2018 30(1):19-22.
20. Bhartiya V, Sharma R, Kumar A, Srivastava H. Admission Cardiotocography: A Predictor of Neonatal Outcome. *J Obstet Gynaecol India.* 2016;66(Suppl 1):321–329. doi:10.1007/s13224-016-0912-0.
21. Manisha Gupta, Teena Nagar, Punit Gupta. Role of cardiotocography to improve perinatal outcome in high risk pregnancy. *International Journal of Contemporary Medical Research* 2017;4(4):853-856.
22. Munir SI, Eusaph AZ, Haq R. Comparison of Outcome in Women with NonReactive Cardiotocography versus Non-Reactive Cardiotocography and Fetal Scalp Blood Sampling. *APMC* 2018;12(2):122-7.
23. Sheikh SM, Kamruddin A, Setna F, Riaz T. Role of Pathological Cardiotocography in evaluating fetal wellbeing. *J Coll Physicians Surg Pak.* 2006; 16 (6): 404-07
24. Blix E, Brurberg KG, Reiherth E, Reinart LM, Øian P. ST waveform analysis versus cardiotocography alone for intrapartum fetal monitoring: a systematic review and meta-analysis of randomized trials. *Acta Obstet Gynecol Scand.* 2016;95(1):16-27.
25. Ghanghoriya V, Patel K, Raghuwansh P, Post PG. Correlation of cardiotocography results and perinatal outcome in gestational hypertension. *Obg Rev: J obstet Gynecol* 2018;4(1):01-05.