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Original Research Article

Pregnancy outcomes in women presenting with single versus multiple episodes of reduced fetal movements: A prospective observational study

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ABSTRACT

Aim: Fetal movement counting may assist clinicians to intervene at the right time and improve perinatal outcomes, but may sometimes cause unnecessary interventions. A recent Cochrane review in 2015 concludes that there is insufficient evidence to influence practice. This prospective observational study was conducted to evaluate pregnancy outcomes of 103 pregnant women presenting with primary complaints of reduced fetal movements to our Institute.

Materials and Methods: All patients underwent ultrasonography (USG) and non-stress testing (NST) as preliminary investigations and were followed up till delivery. Labor outcomes like onset of labor, mode of delivery, neonatal outcomes like APGAR scores, admission to NICU for > 24 hours, birth weight, neonatal complications and maternal complications were noted.

Results: One hundred and three pregnant women presented with reduced fetal movements, of whom, 65% were term primigravida between the ages of 18-26 years. 47.5% belonged to the high risk pregnancy group. The rates of admission (62.1%), induction (77.7%) and cesarean section (43.7%) were high in this group. Pregnancy outcomes did not differ between single and multiple episodes of reduced fetal movements. Based on risk categorization we found that a single episode of reduced fetal movement was associated with approximately 70% good neonatal outcomes, whereas there was 50% risk of adverse neonatal outcomes with multiple episodes. Though this was clinically significant we could not establish statistical significance for this result.

Conclusion: Reduced fetal movement can occur in both low and high risk pregnant population. Pregnancy outcomes between single and multiple episodes of RFM were not significantly different.

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1. Introduction

Maternal perception of fetal movement is one of the first signs of fetal life and is regarded as a manifestation of fetal well-being. Mothers perceive fetal movements differently from one another. Fetal movements have been defined as any discrete kick, flutter, swish or roll.¹

Fetal movement counting may assist clinicians to intervene at the right time and improve perinatal outcomes, but may sometimes cause unnecessary interventions. A

recent Cochrane review in 2015 concludes that there is insufficient evidence to influence practice.² In this study, we tried to find out if the outcomes are different in pregnant women with single versus repeated episodes of reduced fetal movements. We also studied the overall maternal and perinatal outcomes of women presenting primarily with reduced fetal movements.

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2. Materials and Methods

2.1. Data source and population

This was a prospective observational study conducted in the Department of Obstetrics and Gynecology of our Institute from December 2016 to May 2018. The Institutional Ethical Committee approved this study. The study population included antenatal women who presented primarily with reduced fetal movements to our department. Further, the study included singleton pregnancies, with cephalic presentation and gestational age > 34 weeks.

The exclusion criteria were multiple pregnancies, previous lower segment caesarean section (LSCS), placenta previa, abruptio placentae and major congenital malformations in the fetus. A system of convenience sampling was used for including patients for this study.

2.2. Methodology

Informed consent was obtained from the participating women, followed by detailed history-taking with respect to maternal demographics (age, height, weight, BMI), pregnancy related characteristics (parity, gestational age), antenatal risk factors, as well as past obstetric, medical and surgical history. Clinical examination was performed in a systematic manner. All women were subjected to ultrasound examination and non-stress test (NST). The NST was performed with cardiotocogram (Bistos BT-350) in Semi-Fowler's position. NST was classified as reactive if 2 or more accelerations of more than 15 beats per minute above the baseline and lasting longer than 15 seconds in 20 minutes window period with no decelerations. If these features were absent NST was classified as non-reactive.

Real-time ultrasound scanning was performed using a 3.5 MHz sector probe (GE Medical system Logic Q P5). After general survey of fetus, presentation and placental location was noted. Parameters measured were estimated fetal weight (EFW) and amniotic fluid index (AFI). Ultrasonography (USG) was termed as normal when all the parameters (including AFI & EFW) were within the normal limits. Oligohydramnios was defined as AFI less than 5 cm and polyhydramnios as AFI more than 25 cm. EFW less than 10th percentile of specific gestational age was used to diagnose intrauterine growth restriction (IUGR).

Women who had presented with first episode of decreased fetal movement, and who had reactive NST with normal USG findings, were allowed to go home and advised for weekly follow up. Pregnant women who presented with a single episode of decreased fetal movements at term, and had oligohydramnios or IUGR or persistent non-reactive NST were offered induction. Pregnant women with gestational age between 34-37 weeks of gestation, who presented with a single episode of reduced fetal movements, underwent biophysical profile scoring if NST or USG was

abnormal. Doppler velocimetry was done if IUGR was present. A course of steroids was given to women with any features suggestive of fetal compromise, and delivery was expedited. Those with normal biophysical profile, were followed up with intensive antenatal surveillance.

Pregnant women who presented with repeated episodes of reduced fetal movement, underwent similar assessment. Decision on whether to induce labor or not when growth, liquor and NST findings were normal was made after consultant-led counselling of the pros and cons of induction on an individualized basis. All the pregnant women were followed up till delivery.

2.3. Outcomes

All obstetric and neonatal outcomes were recorded for those who delivered at initial presentation as well as those who continued pregnancy and delivered at later gestational ages. Labor outcomes included onset of labor (spontaneous vs induced), mode of delivery (vaginal delivery, instrumental delivery caesarean section), and maternal complications like post-partum hemorrhage (PPH), perineal tears etc. Neonatal outcomes assessed were birth weight, APGAR score < 7 at 5 min, neonatal intensive care unit (NICU) admission > 24 hours and neonatal complications.

2.4. Statistical analysis

All data were entered into MS Excel 2011. Privacy and confidentiality was maintained. All numbers that could identify patients, and information related to her, were stripped and replaced by anonymous numbers. Data was entered and analyzed using SPSS 17.0, while MS Word and Excel were used to generate graphs, tables etc. Mean (SD) and median (IQR) were used to summarize continuous variables and proportions to summarize categorical variables. Chi square test was used to compare proportions.

Statistical significance was taken as p value <0.05.

3. Results

During the study period, 107 antenatal women presented with primary complaints of reduced fetal movements, of whom, 4 pregnant women were diagnosed with intra-uterine fetal demise and excluded from analysis. The course of events of these 103 pregnant women is represented in Figures 1 and 2. Among these 103 pregnant women, 83 presented with a single episode of reduced fetal movements, of whom 32 delivered during the time of admission and 51 continued the pregnancy.

Among the 51 continued pregnancies, 35 delivered on further visits and 16 of them presented with further multiple episodes of reduced fetal movements (Figure 2). Among the 103 antenatal women, 20 presented to our hospital for the first time with multiple episodes of reduced fetal

movements. All of them delivered at the initial admission. Table 1 shows the age, BMI and parity details of the study participants. The mean age of the study participants was 25.9 ± 3.8 years. Most of them were overweight (29.1%) and obese (35%) and only 35.9% had a normal BMI.

Most of the study participants (65%) were primigravida. Most (67%) of the women were in the gestational age group of 37 - 40 weeks at the time of presentation to the hospital. Among study participants, the most common gestational age at delivery was also between 37- 40 weeks of gestation. Baseline characteristics among the study participants with single and multiple episodes of reduced fetal movements were similar (Table 2). Among the study participants, more than half of the women (52.4%) had no risk factors and 47.6% had risk factors.

Gestational hypertension (21.6%) was the most common risk factor among the study participants, followed by gestational diabetes mellitus (18.5%) and hypothyroidism (18.5%). Among study participants with reference to AFI, nearly 35% of the pregnant women had oligohydramnios with an AFI of < 5 cm and 65% had AFI more than or equal to 5 cm. Anterior placenta was seen in 28.2% and posterior in 17.5%.

NST was reactive in 75.7% and non-reactive in 24.3% of study participants. Among study participants, 46.7% had abnormal modified biophysical profile of which 58.3% had poor neonatal outcomes and 41.7% had good neonatal outcomes. Of the remaining 53.3% who had normal modified biophysical profile, 14.5% had poor neonatal outcomes and 85.5% had good neonatal outcomes. Study participants with abnormal modified biophysical profiles had 8 times higher chance of having poor neonatal outcomes (Odds Ratio: 8.03). Association of neonatal outcomes with modified biophysical profiles was found to be statistically significant ($p < 0.001$).

More than half (77.7%) of the pregnant women were subjected to induction. Only 22.3% had spontaneous onset of labor. Among total pregnant women, 46.6% had normal vaginal delivery, 43.7% underwent LSCS and 9.7% of had instrumental delivery. The most common indication for induction of labor was oligohydramnios (23.7%), followed by non-reassuring fetal heart rate (20%), post-dated pregnancy (12.5%) and premature rupture of membranes (PROM) (12.5%). Five women were induced for presenting with multiple episodes of reduced fetal movements. Most common indication for LSCS was fetal distress (66.7%), followed by CPD (20.1%), failed induction (8.8%) and non-progression of labor (4.4%).

A total of 89.3% of women had no maternal complications following delivery. Nine women had PPH (8.8%) and two had perineal tears (1.9%) following instrumental delivery. Around 13.6% of the neonates had APGAR score of < 7 at 5 minutes of birth and 86.4% of them had normal APGAR scores. Most of the neonates had

birth weights of $> 2.5 - 3$ kg (40.8%), followed by those $> 3 - 3.5$ kg (32%). A total of 19.5% women had low birth weight babies (< 2.5 kg).

Table 3 shows the comparison of maternal outcomes among of the study participants with single and multiple episodes of reduced fetal movements. When compared between the single and multiple episodes of reduced fetal movement groups, parameters such as the onset of labor, type of delivery and maternal complications, were not found to be statistically significant. Similarly, neonatal outcomes such as APGAR scores at 5 minutes of birth, birth weight, NICU admissions and neonatal complications among the women who presented with single and multiple episodes of reduced fetal movements were not statistically significant (Table 4).

Women with a single episode of reduced fetal movements had good neonatal outcomes (71.9%) in high risk as well as (71.4%) low risk women (Table 5). This difference in outcomes on risk did not reach statistical significance [$p = 0.48$]. Women with multiple episodes of reduced fetal movements had 53% good neonatal outcomes and 47% poor neonatal outcomes, in those with high risk, and this difference was not statistically significant as well (Table 6 ; Figure 3).

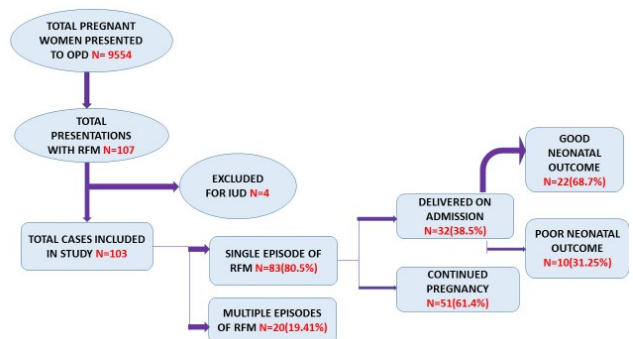


Fig. 1: Course of events from the time of first presentation of reduced fetal movements

4. Discussion

Reduced fetal movements is a usual complaint by pregnant women seeking attention of clinicians. Maternal perception of fetal movements is a subjective phenomenon. Such women should be evaluated, as there is a strong relation between maternal perception of reduced fetal movements and adverse neonatal outcomes like stillbirth, IUGR and small for gestational age (SGA). This was a prospective observational study done to evaluate the pregnancy outcomes in women presenting with reduced fetal movements to our Institute.

The mean age of the study participants was 25.9 ± 3.8 years. In our study most of the study participants were

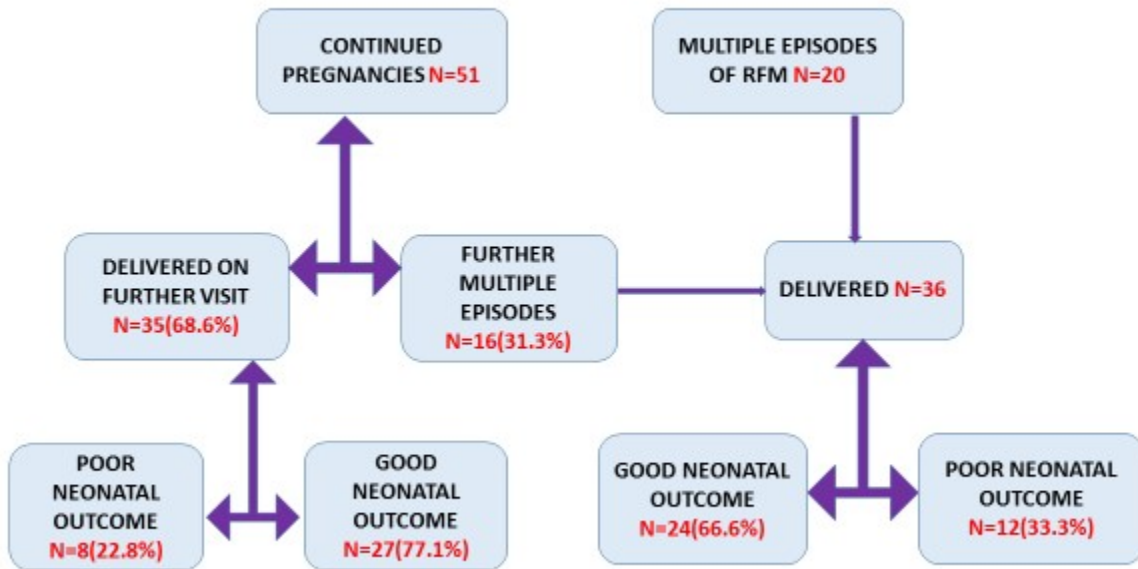


Fig. 2: Course of events among those who had multiple episodes of reduced fetal movements

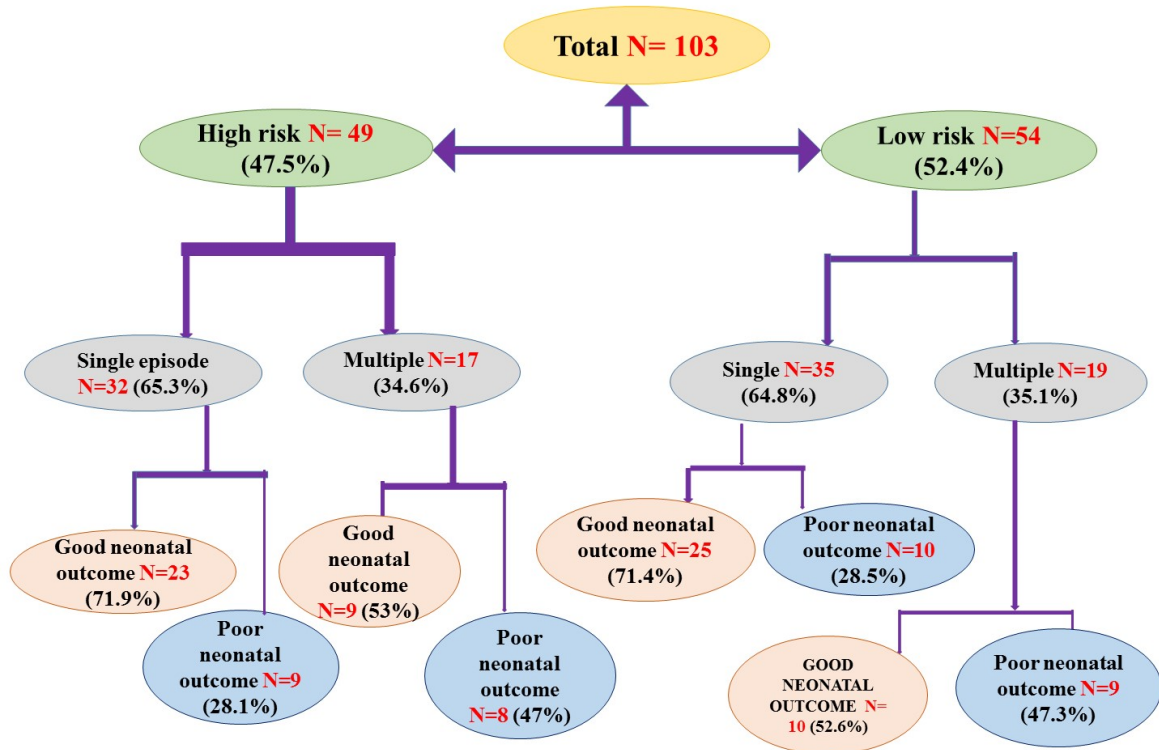


Fig. 3: Neonatal outcomes among low and high risk pregnant women with reduced fetal movements (N= 103)

Table 1: Baseline characteristics of the study participants (N=103)

S.No.	Baseline characteristics	Numbers (%)
1	Age category (In years)	
	18 -26 years	62 (60.19)
	> 26 – 32 years	37 (35.92)
2	> 32 – 38 years	4 (3.88)
	BMI category (Kg/ m²)	
	18.5- 22.9	37 (35.9)
3	23-24.9	30 (29.1)
	>25	36(35)
	Parity	
3	Primi	67 (65)
	Multi	36 (35)

Table 2: Comparison of baseline characteristics among study participants with single and multiple episodes of reduced fetal movements (N=103)

Features	Single episode N (%)	Multiple episode N (%)	Chi-square (p value)
Age (years)			
18-26	36 (53.7%)	24 (66.7%)	1.628 (0.44)
>26-32	28 (41.8%)	11 (30.6%)	
>32-38	3 (4.5%)	1 (2.7%)	
Body Mass Index (Kg/m²)			
Normal	24 (35.8%)	13 (36.1%)	0.056 (0.97)
Overweight	20 (29.9%)	10 (27.8%)	
Obese	23 (34.3%)	13 (36.1%)	
Parity			
Primi	42 (62.7%)	25 (69.4%)	0.470 (0.49)
Multi	25 (37.3%)	11 (30.6%)	

Table 3: Comparison of maternal outcomes among the study participants with single and multiple episodes of reduced fetal movements

S.No.	Maternal outcomes	Single episode (N=67)n (%)	Multiple episodes(N=36)n (%)	p value#
1	Onset of labour			0.13
	Induced	49 (73.1)	31 (86.1)	
2	Spontaneous	18 (26.9)	5 (13.9)	0.15
	Type of delivery			
	SVD	33 (49.3)	15 (41.7)	
3	LSCS	29 (43.3)	16 (44.4)	0.15
	Instrumental delivery	5 (7.4)	5 (13.9)	
3	Maternal complications			0.15
	No	62 (92.5)	30 (83.3)	
	Yes	5 (7.5)	6 (16.7)	

between 18-26 years of age. Many studies have revealed that maternal age of >35 years was associated with low awareness of fetal activity and they belong to a subgroup who are highly anxious about their pregnancy outcomes.⁶

Based on our study, the majority (65%) of the patients who presented with reduced fetal movements were primigravida. This was due to less experience and lack of awareness on normal perception of fetal movements than multigravid women. Similarly in a study by Poojari et al on 210 pregnant women, 75% were primiparous.⁴ Similar findings were also observed in a study on maternal

characteristics and outcome with reduced fetal movements by Holm Tveit et al. in 2009, who suggested that maternal inexperience in these women can be an added risk factor for their pregnancies and better tools are needed to increase their awareness.⁵

We also compared the pregnancy outcomes of parturient presenting with single versus multiple episodes of reduced fetal movement. The baseline characteristics were similar between the two groups. We did not find any statistical significance in maternal and neonatal outcomes between the two groups. We further tried to analyze the neonatal

Table 4: Comparison of neonatal outcomes among the study participants with single and multiple episodes of reduced fetal movements

S.No.	Neonatal outcomes	Single episode (N=67)n (%)	Multiple episodes (N=36)n (%)	p value#
1	APGAR at 5 min			0.06
	< 7	6 (9)	8 (22.2)	
	≥ 7	61 (91)	28 (77.8)	
2	Birth weight (In Kg)			0.22
	>1.5 – 2	2 (3)	3 (8.3)	
	>2 – 2.5	9 (13.4)	6 (16.7)	
	>2.5 – 3	31 (46.3)	11 (30.6)	
	>3 – 3.5	22 (32.8)	11 (30.6)	
	>3.5 – 4	3 (4.5)	5 (13.9)	
3	NICU admission >24 hrs			0.30
	No	51 (76.1)	24 (66.7)	
	Yes	16 (23.9)	12 (33.3)	
4	Neonatal complications			0.20
	No	64 (95.5)	32 (88.1)	
	Yes	3 (4.5)	4 (11.1)	

Table 5: Neonatal outcomes in low and high risk group among study participants with single episode of RFM (N = 67)

	Total	Neonatal outcome		Odds ratio (95% CI)	p value#
		Poor	Good		
High risk	32 (100%)	9 (28.1%)	23 (71.9%)	0.97 (0.33 – 2.83)	0.48
Low risk	35 (100%)	10 (28.6%)	25 (71.4%)	1	

Table 6: Neonatal outcomes in low and high risk groups among study participants with multiple episodes of reduced fetal movements (N= 36)

	Total	Neonatal outcome		Odds ratio (95% CI)	p value#
		Poor	Good		
High risk	17 (100%)	8 (47.1%)	9 (52.9%)	0.98 (0.25 – 3.79)	0.49
Low risk	19 (100%)	9 (47.4%)	10 (52.6%)	1	

Table 7: Comparison of similar studies

S.No.	Author / Year	Name of Study	Total No	Conclusions
1.	Nor Azlin ³ 2015	Pregnancy outcomes with a primary complaint of perception of reduced fetal movements	230	No major neonatal mortality and morbidity
2.	Poojari ⁴ 2017	Obstetric and neonatal outcome among women presenting with reduced fetal movements in third trimester	210	Unnecessary interventions should be avoided especially those among low risk pregnancies
3.	Holm Tveit ⁵ 2009	Maternal characteristics and pregnancy outcomes in women presenting with decreased fetal movements in late pregnancy	2,374	Perception of decreased fetal movements is significantly associated with adverse pregnancy outcomes such as preterm births, IUGR and stillbirths.
4.	In our study	Pregnancy outcomes in women presenting with reduced fetal movements	103	No major maternal and neonatal morbidity and mortality

outcomes based on risk categorization in the women presenting with single versus those presenting with multiple episodes of reduced fetal movements. In pregnant women presenting with a single episode of reduced fetal movement, 70% of high risk as well as low risk women had good neonatal outcomes whereas in those with multiple episodes, both high and low risk women had 50% chance of having poor neonatal outcomes. This can be interpreted as favoring a “wait and watch” policy rather than intervening for those parturients who present for the first time with reduced fetal movements, as the majority of them could have good outcomes, whereas in those who present with multiple episodes of reduced fetal movements, one has to exercise due caution and judiciousness.

We were unable to demonstrate any statistical significance for this, which may be due to our small sample size. Larger studies are warranted to test this intervention strategy. Similar to our study Poojari et al. commented that fetuses who belonged to low risk group mothers who presented with a single episode of RFM and had abnormal biophysical profile had good outcomes.⁴

We therefore believe that low risk pregnant women presenting with a single episode of reduced fetal movement can be expectantly managed with repeat biophysical profile. Those parturients with 2 or more episodes of reduce fetal movements, even if low risk, gave birth to neonates who were more compromised at birth, when the biophysical profile was abnormal, and therefore, these women should have timely delivery to avoid stillbirths. A comparison of the pregnancy outcomes between our study and others has been summarized in Table 7.

Our study has important limitations. First, as stated above, the sample size was small. Second, the study was based only on individual perception of reduced fetal movements, as there is no consensus on its standard definition. Third, we have not studied the effect of other maternal characteristics like educational status, daily exercise or working hours of pregnant women on perception of reduced fetal movement. Fourth, we have included women only after 34 weeks of gestation and hence our findings cannot be extrapolated to the entire third trimester of pregnancy.

Though there was no statistically significant difference in maternal and neonatal outcomes between those pregnant women presenting with single or multiple episodes of reduced fetal movements, analysis of neonatal outcomes based on risk categorization showed that women with single episode in both high and low risk had a 70% chance of

good neonatal outcomes. On the contrary, women with recurrent episodes of reduced fetal movements, had 50% chance of adverse neonatal outcomes, irrespective of risk assessment. Antenatal women who experience reduced fetal movements, should therefore be counselled to report early to care providers for evaluation, since we had 4 incidents of intrauterine fetal demise at presentation, in women who had multiple episodes of fetal movement reduction and did not seek medical attention early.

5. Source of Funding

None.

6. Conflict of Interest

The author declares no conflict of interest.

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