

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20175488>

## Original Research Article

# Obstetric and neonatal outcome among women presenting with reduced fetal movements in third trimester

Vidyashree G. Poojari, Sahan S. Kumar, Akhila Vasudeva\*

Department of Obstetrics and Gynecology, Kasturba Medical College, Manipal University, Manipal, Karnataka, India

**Received:** 14 November 2017

**Accepted:** 21 November 2017

### \*Correspondence:

Dr. Akhila Vasudeva,

E-mail: [akhilavasudeva@gmail.com](mailto:akhilavasudeva@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** Reduced maternal perception of fetal movements allows early identification, timely evaluation and intervention for fetuses at risk of adverse outcome. The primary objective of this study was to assess the pregnancy characteristics and outcomes of pregnant women presenting to hospital with reduced fetal movements (RFM).

**Methods:** Prospective observational study, recruiting all women with singleton pregnancy at or beyond 28 weeks of gestation presenting with a subjective perception of RFM from April 2015 to December 2016. Maternal characteristics, antenatal risk factors, management pathways and perinatal outcome studied.

**Results:** 47% belonged to high risk pregnancy. Among high risk women, although only 39% showed poor BPP at the first presentation, 58% were delivered irrespective of their gestational age, out of which 32.75% had poor neonatal outcome. Among low risk who had >2 episodes of RFM, 50% had poor neonatal outcome. 7% among high risk pregnancies and 18% among low risk, presented with RFM within 48 hours following steroid prophylaxis. 24% of high risk women showed liquor volume abnormalities as compared to low risk (6.3%).

**Conclusions:** Significant proportion of those with RFM belonged to high risk pregnancy. Among high risk group, there were high rates of stillbirth and poor BPP at the time of admission when compared to low risk group. Due to early approach to the hospital and timely intervention, significant women with abnormal BPP had good perinatal outcome. All those fetuses who were delivered on first episode of RFM in low risk group did not show evidence of compromise at birth, probably indicating unnecessary delivery. More than 2 episodes of RFM even among low risk group seems significant as good number of fetuses were compromised at birth. Steroids prophylaxis for the fetal lung maturity causes transient changes in BPP, hence unnecessary delivery should be avoided especially those among low risk pregnancy.

**Keywords:** Biophysical profile, Reduced fetal movements, Stillbirth, Steroid prophylaxis

### INTRODUCTION

Maternal perception of fetal movements is a self-screening method for assessing fetal well-being. Studies have shown that reduced fetal movement (RFM) is a risk factor for several adverse perinatal outcomes. About a quarter of women presenting with RFM have pregnancies complicated by fetal growth restriction, preterm delivery, fetal distress or stillbirth. A growing number of studies

have confirmed a correlation between episodes of RFM and stillbirth.<sup>1</sup> RFM has been shown to occur in up to 15% of pregnancies.<sup>2</sup> Women who have a stillbirth note a reduction in fetal movement prior to diagnosis in up to 55%.<sup>3</sup> Inadequate clinician response to the complaint of RFM is an important contributory factor to stillbirth.<sup>4</sup>

Fetal movement counting may allow the clinician to make appropriate interventions in right time to improve

perinatal outcomes. After 28 weeks of gestation, it is treating obstetrician's responsibility to sensitize the pregnant women regarding importance of counting the fetal movements as it allows early identification, timely evaluation and intervention for fetuses at risk of adverse outcome.<sup>5,6</sup> However, fetal movement counting may sometimes cause unnecessary anxiety to pregnant women, or elicit unnecessary interventions.

A recent Cochrane Review in 2015 concludes that there is insufficient evidence to influence practice. There are no current randomized trials comparing pregnancy outcomes in those who employed fetal movement counting and those who did not utilize formal fetal movement counting, and therefore there is little consensus to advise clinical practice in the area of RFM.<sup>7</sup> Hence this study aimed to know the perinatal outcome among these pregnancies versus the impact of possible unnecessary interventions.

The primary objective of this observational study was to assess the pregnancy characteristics and outcomes of pregnant women presenting to hospital with RFM. We studied the demographics of these women, pregnancy risk factors, biophysical profile (BPP) and management pathways.

## METHODS

This was a prospective cohort study, recruiting all women with singleton pregnancy at or beyond 28 weeks of gestation presenting to a tertiary referral hospital with a subjective perception of reduced fetal movements from April 2015 to December 2016. Pregnant women belonged to both high and low risk category. In our tertiary institution catering to predominantly a high risk category, all pregnant women in the third trimester are instructed to monitor their fetal movements using either Count to 10 method or counting three times a day after meals. Women with multiple pregnancy and/or pregnancies with antenatally diagnosed congenital anomalies, were excluded. Informed written consents were obtained from all participants. Institutional Ethical Committee clearance was obtained prior to the study commencement. During data collection, medical conditions and medication taken at the time of booking were recorded.

Demographic data (e.g. age and marital status), pregnancy related characteristics (e.g. parity, and gestational age) and perinatal risk factors were noted. Antenatal presentation was detailed, blood pressure was recorded, followed by a detailed BPP (Ultrasound assessment of fetal cardiac activity, fetal tone, breathing movements, liquor volume and a Non Stress Test). Maternal perception of fetal movements were recorded during BPP. In the Ultrasound we also looked for placental location and abruption. Finally, deliveries done as indicated by either RFM or poor BPP at the time of presentation, were noted down. Among those who continued pregnancy, further episodes of RFM were

recorded. Ultimately all perinatal outcomes were recorded including those who were delivered at the first presentation, as well as those who continued pregnancy and delivered at a later gestational age. Poor perinatal outcome was defined as one or all of the following: poor APGAR, need for resuscitation, neonatal acidosis, perinatal asphyxia requiring interventions, meconium stained liquor, NICU admission.

## RESULTS

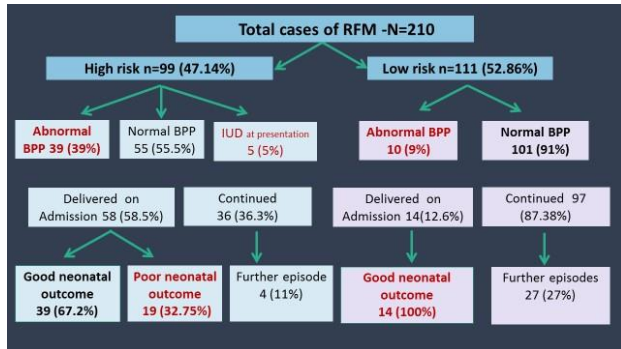
Table 1 shows baseline characteristics and demographics. About one fourth (24%) were overweight/obese, which is a known factor limiting the subjective perception of fetal movements. Three fourth were primigravida. Fifty percent belonged to term gestation. Anterior placenta is a known factor limiting the perception of FM, found in 54%. A significant proportion (47%) belonged to high risk category, as shown in Table 1.

**Table 1: Maternal baseline characteristics and demographics.**

Maternal characteristics	N=210 (%)
Maternal age > 35 years	54 (21.4)
<b>Education</b>	
Primary schooling	48 (22.85)
Secondary schooling or above	162 (77.15)
<b>BMI (kg/m<sup>2</sup>)</b>	
18.5-24.9	159 (75.7)
25-29.9	41 (19.5)
>30	10 (4.8)
<b>Parity</b>	
Primigravida	158 (75.2)
Multigravida	52 (24.8)
<b>Gestational age at presentation with RFM</b>	
28-34weeks	41 (19.5)
34-37 weeks	62 (29.5)
37-40 weeks	98 (46.67)
>40 weeks	9 (4.3)
<b>Placental location</b>	
Anterior	115 (54.8)
Posterior	58 (27.6)
Other sites	37 (17.6)
High risk pregnancies	99 (47.14)
<b>High risk factors</b>	
Preeclampsia	25 (11.9)
Fetal growth restriction	22 (10.47)
GDM/ Overt diabetes	20 (9.5)
Placenta Previa	4 (1.9)
Abruption	2 (0.9)
Oligohydramnios	15 (7.14)
Polyhydramnios	09 (4.2)

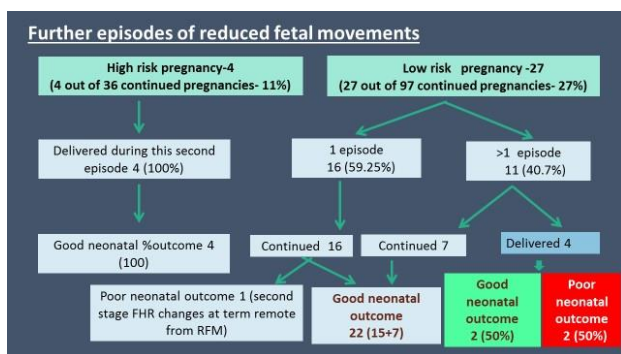
Figure 1 describes the further course of events among all those presenting with RFM >28 weeks. In our hospital, we offer admission to all those presenting with RFM. Hence majority were admitted and monitored on inpatient basis for at least 24 hours. As seen here a significant

proportion belonged to high risk pregnancy, as ours is a tertiary referral institute. High risk factors belonged to either mother or the fetus. Abnormal BPP comprised of a non-reassuring/pathological NST or poor fetal behavioral pattern on USG. Among high risk women, although only 39% showed poor BPP, 58% were delivered irrespective of their gestational age. Indications were either RFM, or they were term/near term, or due to high risk nature of pregnancy resulting in obstetrician's anxiety.



**Figure 1: Course of events at the time of presentation with Reduced Fetal Movements (RFM).**

Figure 2 describes pregnancy outcome among high risk and low risk pregnancies presenting with further episodes of RFM. Among high risk group, 4 women presented with further episodes of RFM. All 4 women were delivered irrespective of their BPP. All had good neonatal outcome. Among low risk pregnancy, a higher proportion (27%) reported with RFM on a subsequent occasion. In this group, there were 15 women more susceptible to subjective perception of RFM, including anterior placenta, obesity, and high levels of maternal anxiety. Among those 16 with one subsequent episode, all but one had good outcome. One poor neonatal outcome appears to be unrelated to the episode of RFM as pregnancy went onto term, and there were FHR alterations in the second stage.

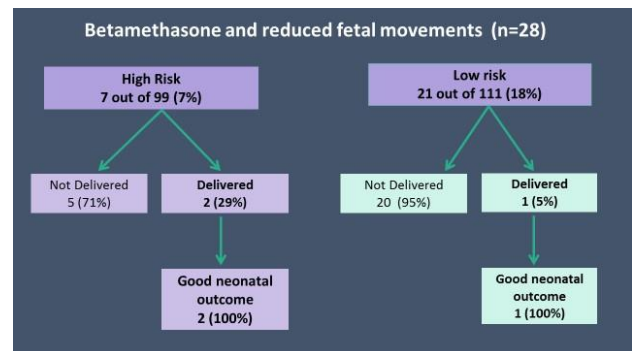


**Figure 2: Course of events among those who presented with further episodes of RFM.**

Among 11 low risk pregnancies who presented with >1 subsequent episodes of RFM (Figure 2), 4 showed poor BPP either in the form of abnormal NST, oligoamnios, or

poor fetal behavioral pattern on USG. Hence, they were delivered during this episode. Among them 50% had meconium stained liquor and poor APGAR.

The present study shows that 7% among high risk pregnancies and 18% among low risk, presented with RFM within 48 hours following steroid prophylaxis for lung maturity (Figure 3). All those who presented with RFM following steroid prophylaxis, showed good BPP except for sluggish gross body movements/reduced variability in NST which settled over a period of time. However, a small number were delivered at presentation, both among high and low risk categories. They all had good neonatal outcome.



**Figure 3: RFM following steroid prophylaxis (n=28).**

At presentation, 24% of high risk women showed liquor volume abnormalities, 15% oligoamnios and 9% polyhydramnios as shown in Table 2. Proportionately, there was lower prevalence of liquor abnormalities among the low risk population (6.3%).

**Table 2: Liquor volume and reduced fetal movements.**

Liquor volume	High risk (99)	Low risk (111)
>20	09	2
Normal	75	104
<8	15	5

**DISCUSSION**

Subjective perception of RFM is a common problem among pregnant women. Irrespective of the background risks, this complaint raises concerns among pregnant women as well as care givers. Such women should be given due attention as there is a strong association between this perception and stillbirth.<sup>1</sup> However, most of the times, this is a transient perception, followed by appreciation of normal fetal activity by the mother. Sheikh et al, studied 729 normotensive pregnancies ultimately leading to healthy term newborns.<sup>8</sup>

In this group, 8% perceived RFM in third trimester which was independently associated with maternal employment, counting in supine position, and being sedentary. Hence, hasty decision may lead to unnecessary preterm delivery.

This leads to overburdening of neonatal services, heavy costs, and neonatal morbidity due to prematurity. Hence in this study we attempted to analyze further course of events among these women. Aim of present study was to know the subset of women who are likely to have poor perinatal outcome who need delivery. It was also aimed to know what proportion of deliveries were unindicated.

It is noteworthy that 5 out of 210 were diagnosed with intrauterine death (IUD) at first presentation itself. All 5 belonged to high risk category. All revealed episodes of RFM for a variable period of time, which they ignored leading to delay in presentation. Hence this study confirms that even a single episode of RFM in a high risk pregnancy should be taken seriously. Timely delivery would have prevented most of these perinatal losses. Studies have shown that about 40% women would seek medical help only after perceiving no movements for 24 hours.<sup>9</sup> Hence it is important to advice that urgent medical help is needed for RFM, and not after a long time nor until they feel no movements.

Majority (75%) were primigravidae. This is in accordance with other recent studies.<sup>10</sup> About 21% were elderly (>35 years). This describes a subset of pregnant population who are high risk and extremely anxious about their pregnancy outcome. Three fourth (77%) had good education hence good understanding of fetal kick count monitoring. Studies have shown that education is strongly associated with good understanding of fetal monitoring followed by appropriate health care seeking behavior for RFM.<sup>9</sup> A significant proportion (24%) were either obese or overweight, and this is a known factor leading to reduced perception of fetal movements (FM).

About 50% belonged to term pregnancy. However, an equal proportion belonged to gestational ages between 28 to 37 weeks. This probably is due to the fact that all pregnant women in third trimester are routinely advised how to monitor fetal activity. They are also instructed to report to the hospital if they perceive RFM. Maternal education on FM monitoring thus brings a good number to the hospital with RFM, which in turn burdens the care givers. There is no data on who among them belong to high risk category for stillbirth. Until then, we need to monitor all those with RFM, in order to prevent stillbirth.

Olagbuji et al, performed a survey on 225 pregnant women in Nigeria to know the maternal educational levels regarding fetal behavioral monitoring in third trimester.<sup>9</sup> Majority (87.6%) had no understanding of normal fetal activity patterns in the third trimester.

Significant proportions (53% and 70%) had no understanding of what is meant by excessive and RFM. Only 39% said their antenatal care givers had informed them about fetal movement monitoring. Also, only 35% knew that this complaint may be associated with adverse outcomes such as stillbirth. Maternal education significantly improved this understanding. Lack of such

maternal understanding may significantly contribute to stillbirths. Hence routine advice on maternal monitoring of fetal activity is an essential part of our antenatal care.

Maternal educational levels on fetal behavioral monitoring are not very different in the developed countries.<sup>11,12</sup> A study performed at New Zealand concluded that a proportion of pregnant women in Auckland do not have optimum information about fetal movements. They opined that strategies like a pamphlet about fetal movements may be helpful in improving this awareness. Although majority reported being asked about FM by their care givers, about 60% received appropriate information on fetal movement patterns in third trimester, only 40% were advised to seek help if they observed a change in fetal movement patterns.

Rates of admission are low in other studies compared to ours.<sup>10</sup> High rates of admission in our institution reflects high risk nature of our pregnant population. This practice would not be ideal for general obstetric population, as this increases burden on health care providers. Instead, a BPP monitoring followed by observation of fetal behavior using kick count charting would probably suffice, especially in low risk population.

As seen in present study, we are likely to find a very significant proportion with abnormal BPP (39%) among high risk group and corresponding proportion among low risk group being only 9%. Thus, RFM should be taken very seriously among high risk group and they need timely delivery to prevent stillbirth. Significant proportion had poor perinatal outcome in this group (32.75%), which substantiates our decision. Clearly, maternal education on fetal monitoring has benefitted these women.

Among low risk group, 9% had poor BPP, which is still a significant number. However, more number were delivered at this point (12%), which is probably due to maternal/obstetrician's concerns about perinatal loss. This tendency must be avoided, to prevent untimely delivery of a healthy fetus. All those who delivered had good outcome. This shows that RFM among low risk, even though associated with abnormal BPP at that point, is not strongly associated with poor perinatal outcome. There is role for expectant management for a short period of time and repeat BPP, in order to prevent untimely delivery.

Among low risk, 27 (27%) presented with subsequent episode of RFM, and this is higher than the similar proportion (11%) among high risk group. Good proportion (15 of these 27) showed factors commonly associated with RFM. Literature review shows that fetal/maternal factors such as obesity, anterior placenta, malpresentation, liquor abnormalities, smoking, and primiparity are all associated with increased prevalence of RFM among pregnant women.<sup>8</sup> We must recognize these factors in order to recognize false positives and thus

provide reassurance as well as to prevent unnecessary interventions.

In this study, more than 2 episodes of RFM proved to be highly significant. Four of these 11 had poor BPP, all of them were delivered. Among the 4, 2 (50%) had poor perinatal outcome. This shows that repeated episodes of RFM, even among low risk women should be taken seriously. Timely delivery in this group prevents large number of stillbirths, mainly due to unidentified risk factors (e.g. Fetal Growth Restriction).

Coming to presentation with RFM following steroid administration, two among the high risk and one among low risk pregnancies were delivered due to obstetrician's concerns as well as maternal anxiety of adverse neonatal outcome. But, there were no features of fetal compromise in these cases, which means to say that there would be transient sluggish fetal movements as well as changes in the fetal heart rate variability during first 48 hours after steroid administration. A study performed in Netherlands showed that these changes are transient in normal fetuses. Regular fetal surveillance would suffice. However, the compromised fetus may be adversely affected by betamethasone.<sup>13</sup>

Liquor abnormalities both oligohydramnios and polyhydramnios can present with RFM. Multiple studies have reported increased perinatal morbidity for fetuses with oligohydramnios.<sup>14</sup>

It is recommended to assess fetal growth centiles, along with liquor and Doppler velocimetry when a woman presents with RFM. This helps to reveal unidentified placental insufficiency with or without cerebral redistribution.<sup>15</sup> As seen in our study, 10.5% Fetal growth restriction and 7.1% of oligoamnios among the RFM group contribute to significant numbers. However, literature has so far not shown improved perinatal outcome following such investigations and directed interventions.<sup>10</sup> Further studies may prove such a beneficial association.

As there are no set guidelines/protocols regarding the assessment and management of RFM, our decisions were based on individual experiences rather than protocols.

## CONCLUSION

Significant proportion of those with RFM belonged to high risk pregnancy. Among high risk group, there were high rates of stillbirth and poor BPP at the time of admission when compared to low risk group. Due to early approach to the hospital and timely intervention, significant women with abnormal BPP had good perinatal outcome. All those fetuses who were delivered on first episode of RFM in low risk group did not show evidence of compromise at birth, probably indicating unnecessary delivery. More than 2 episodes of RFM even among low risk group seems significant as significant number had

poor BPP and majority of these fetuses were compromised at birth. Steroids prophylaxis for the fetal lung maturity causes transient changes in BPP, hence unnecessary delivery should be avoided especially those among low risk pregnancy.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. O'Sullivan O, Stephen G, Martindale E, Heazell AEP. Predicting poor perinatal outcome in women who present with decreased fetal movements. *J Obstet Gynaecol.* 2009;29(8):705-710.
2. Sergent F, Lefevre A, Verspyck E, Marpeau L. Decreased fetal movements in the third trimester: what to do? *Gynecol Obstet Fertil.* 2005;33(11):861-9
3. Efkarpidis S, Alexopoulos E, Kean L, Liu D, Fay T. Case-control study of factors associated with intrauterine fetal deaths. *Medscape General Med.* 2004;6(2):53.
4. Saastad E, Vangen S, Froen JF. Suboptimal care in stillbirths - a retrospective audit study". *Acta Obstet Gynecol Scand.* 2007;86(4):444-50.
5. Winje BA, Saastad E, Gunnes N, Tveit JV, Stray-Pedersen B, Flenady V, et al. Analysis of 'count-to-ten' fetal movement charts: A prospective cohort study. *BJOG.* 2011;118:1229-38.
6. Saastad E, Winje BA, Stray Pedersen B, Froen JF. Fetal movement counting improved identification of fetal growth restriction and perinatal outcomes--a multi-center, randomized, controlled trial. *PLoS One.* 2011;6:e28482.
7. Mangesi L, Hofmeyr GJ, Smith V, Smyth RM. Cochrane Collaboration. Fetal movement counting for assessment of fetal wellbeing. *Cochrane Database Syst Rev.* 2015;10: CD004909.
8. Sheikh M, Hantoushzadeh S, Shariat M. Maternal perception of decreased fetal movements from maternal and fetal perspectives, a cohort study. *BMC Pregnancy Childbirth.* 2014;14:286.
9. Olagbuji BN, Igbaramah S, Akintayo AA, Olofinbiyi BA, Aduloju PO, Alao OO. Maternal understanding of fetal movement in third trimester: A means for fetal monitoring and reducing stillbirth. *Nigerian J Clinic Pract.* 2014;17(4):489-494.
10. Claire M, Meaney S, O'Donoghue K. Perinatal outcomes of reduced fetal movements: a cohort study. *BMC Pregnancy Childbirth.* 2016;16:169.
11. Andrea MP, Tomasina S, Robin C and Lesley M. E. M. Maternal knowledge of fetal movements in late pregnancy. *Australian New Zealand J Obstet Gynecol.* 2012;52(5):445-9.
12. Anne ML, Colleen M, Lynne M. Fetal movement monitoring: how are we doing as educators? *J Obstet Gynaecol Can.* 2013;35(1):22-28.

13. Simone L, Kees B, Hans W, Sander K, Jeanette KV, Eduard JH. Short-Term (0–48 H) Effects of Maternal Betamethasone Administration on Fetal Heart Rate and its Variability. *Pediatric Res.* 2005;57(4):545-9.
14. Elizabeth GV, Susan T, Deborah AW. Low amniotic fluid index as a predictor of adverse perinatal outcome. *J Perinatol.* 2002;22:282-5.
15. Royal College of Obstetrics and Gynecology (RCOG) Reduced Fetal Movements. Green-top guideline No 57. 2011. Available at

<https://www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg57/>

**Cite this article as:** Poojari VG, Kumar SS, Vasudeva A. Obstetric and neonatal outcome among women presenting with reduced fetal movements in third trimester. *Int J Reprod Contracept Obstet Gynecol* 2018;7:88-93.