

Perinatal Outcome in Women with Perception of Reduced Fetal Movements at Term Pregnancy - A Prospective Observational Study

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KEYWORDS

Perinatal, Fetal Movements, Pregnancy, fetal growth restriction, preterm birth, stillbirth

ABSTRACT

Background: A significant reduction or sudden alteration in fetal movements is a potentially an important clinical symptom for induction, caesarean section, low neonatal Apgar score at delivery. In this context this study was conducted to evaluate the association between perception of reduced fetal movements and perinatal outcome in pregnant women with singleton term gestation.

Methods: The present study was a prospective observational study done to evaluate the pregnancy outcomes in women presenting with perception of decreased fetal movements (PDFM). 154 women were enrolled out of which 77 were cases (with PDFM) and 77 were controls (without PDFM).

Results: IUD was reported in 1.3% of the cases and none in controls. Induction of labor (IOL) was done in 78% cases and 41.6% controls and need for NICU admission was high in cases when compared to controls but not statistically significant.

Conclusion: Decreased fetal movements warrant immediate evaluation as obstetric and perinatal outcomes are poor.

1. Introduction

The human fetus spends 10% of its time making gross body movements during third trimester. The mother is able to perceive about 70-80% of fetal movements. A growing number of studies confirmed a correlation between episode of reduced fetal movements and still birth. Perception of decreased fetal movements has been shown to occur in up to 15% of pregnancies.(1) Women who have a stillbirth note a reduction in fetal movements prior to diagnosis in up to 55%.(2)

Decreased fetal movements (DFM) is a common cause for maternal concern, with 40% of pregnant women overall expressing concern about DFM one or more times during pregnancy and 4 - 16% of women contacting their health care provider because of concern during the third trimester. Even in pregnancies that are initially deemed as low risk, DFM is associated with the risk of adverse perinatal outcome, including fetal growth restriction (FGR), preterm birth and stillbirth.(3) The idea to conduct a study pertaining to neonatal outcome in women with reduced fetal movements evolved when we encountered in our day to day practice that neonatal outcomes were not satisfactory when pregnant women complained about reduced fetal movements. In this context this study was conducted to evaluate the association between perception of reduced fetal movements and perinatal outcome in pregnant women with singleton term gestation.

2. Methods

This prospective observational study was conducted among pregnant women who fulfilled the inclusion criteria such as term singleton pregnancy attending the tertiary care hospital in South India. Women with perception of decreased fetal movements formed the cases and with no such complaint served as controls. Women with known structural or chromosomal abnormalities in their fetus were excluded. The sample size was calculated as 77 cases and 77 controls based on previous study conducted by Poojari et al.(4) For cases, patients were advised to lie on their left side and asked to record the fetal kick count for two consecutive hours. If the patient did not feel 10 or more discrete movements, they were intervened immediately. Non-Stress test (NST) & baseline ultra-

sonogram (USG) with Fetal Bio-Physical Profile (BPP) were done. NST was considered as reactive if there are two or more Fetal Heart Rate (FHR) accelerations peaking up to 15 beats / minute lasting for 15 seconds with a baseline fetal heart rate of 110-160 beats / minute, with a variability of > 5 beats / minute in a 20 minute trace and absence of decelerations.(5) If USG / NST was abnormal on admission and if patient persistently perceiving decreased fetal movement, then patient was managed as per hospital protocol. All patients enrolled were followed up till delivery of the baby and the perinatal outcome was recorded till seven days after birth. The study was conducted after obtaining scientific committee and ethical committee clearance. Data was entered in MS Excel, coding, refining and recording done. Descriptive statistics were expressed as mean and standard deviation and by proportion for categorical variables. Chi square test and Fisher's exact test were used to compare the significance of study parameter (DFM) between two groups.

Table 1: Distribution of study participants based on demographics

Demographic parameters	Cases n (%)	Controls n (%)
Age in years		
18-19 years	3 (3.9%)	3 (3.9%)
20-29 years	63 (81.8%)	63 (81.8%)
>30 years	11 (14.3%)	11 (14.3%)
Education status		
Primary	43 (55.8%)	42 (54.5%)
Secondary	8 (10.4%)	11 (14.3%)
Graduate	26 (33.8%)	24 (31.2%)
Occupation		
Housewife	66 (85.7%)	68 (88.3%)
Employed	11 (14.3%)	9 (11.7%)
BMI		
18.5 – 24.9 (Normal)	40 (51.9%)	51 (66.2%)
25 – 29.9 (Overweight)	25 (32.5%)	14 (18.2%)
>30 (Obesity)	5(6.5%)	6 (7.8%)
<18.4 (Underweight)	7 (9%)	6 (7.8%)

Table 2: Distribution of study participants based on morbidity pattern

Morbidity pattern	Cases n (%)	Controls n (%)
Anaemia		
No anemia (Hb> 11.1 g/dl)	62 (80.5%)	63 (81.8%)
Mild (Hb: 9.1-11g/dl)	10 (12.9%)	11 (14.3%)
Moderate (Hb: 7.1-9 g/dl)	04 (5.2%)	03 (3.9%)
Severe (Hb: < 7 g/dl)	01 (1.3%)	0
Complications		
Hypothyroidism	13 (14.3%)	3 (3.9%)
Gestational hypertension	15 (19.5%)	10 (13%)
Pre-eclampsia	1 (1.3%)	-
Gestational diabetes	6 (7.8%)	7 (9.1%)
Overt diabetes mellitus	3 (3.9%)	3 (3.9%)
Others	9(10.5%)	3 (3.9)
No complications	29 (37.6%)	62 (80.5%)
Aminotic fluid status		
Normal (8 - 25)	60 (77.9%)	72 (93.5%)
Borderline oligohydramnios (5 - 8)	08 (10.4%)	03 (3.9%)
Oligohydramnios (<5)	07 (9.1%)	02 (2.6%)
Hydraminos	02 (2.6%)	0 (0.0)

Table 3: Association between decreased fetal movements and nature of delivery

Nature of delivery	Cases n (%)	Controls n (%)	P value
Spontaneous vaginal delivery	11 (14.3%)	37 (48%)	0.001
IOL + VD	31 (40.3%)	24 (31.2%)	0.001
IOL + FORCEPS	02 (2.6%)	0	
IOL + LSCS	27 (35.0%)	08 (10.4%)	

Direct Caesarean Section (CS)	06 (7.8%)	08 (10.4%)	0.7858
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Table 4: Association between decreased fetal movements and newborn morbidity pattern

Newborn demographics	Cases n (%)	Controls n (%)	P value
Gender			
Male	30 (39%)	41 (53.2%)	0.07
Female	47 (61%)	36 (46.8%)	
Appropriate for age (AGA)	69 (89.6%)	70 (91%)	0.14
Small for gestational age (SGA)	6 (7.8%)	5 (6.5%)	0.09
Large for gestational age (LGA)	2 (2.6%)	2 (2.6%)	0.99
Birth weight (in gms)	3.00±4.2	3.01±0.42	0.88
NICU Admission			
Yes	6 (7.9%)	03 (3.9%)	0.32
APGAR SCORE at 1 min			
>7	72 (93.5%)	74 (96.1%)	0.12
5 – 7	2 (2.6%)	2 (2.6%)	
< 5	3 (3.9%)	1 (1.3%)	
APGAR SCORE at 5 min			
>7	74 (96.1%)	75 (97.4%)	0.99
5 – 7	0	1 (1.3%)	
< 5	3 (3.9%)	1 (3.3%)	
Meconium stained liquor and perinatal outcome			
Good	07 (87.5%)	0	0.99
Poor	01 (12.5%)	04 (100%)	
	Mean (S.D)	Mean (S.D)	
Birth weight (in gms)	3.00±4.2	3.01±0.42	0.88
Duration of hospital stay	6.73±3.04	4.52±2.64	0.001

3. Results

Age ranged from minimum of 18 years and maximum of 35 years. The age-wise distribution of the subjects in both case and control groups as described in the Table 1. Other demographics such as gender, education, occupation and BMI were also shown in Table 1. Almost all the variables were evenly distributed. In Table 2 the morbidity profiling of the subjects was done, mean Hb in the cases and controls were 11.84 ± 1.54 and 11.51 ± 1.47 g/dl respectively. There was one woman with severe anemia in the cases. Among cases, only 37.6% were without any complications whereas 80.5% were without any complications in controls. 19.5% of the cases had oligohydramnios whereas in controls only 6.5% of subjects had oligohydramnios. And only among cases there were prevalence of hydramnios which was 2.6% of cases.

Induction of labor was done in 77.9% cases and 41.6% controls. Direct cesarean section was done in 7.8% and 10.4% of cases and controls respectively. The total caesarean section rate (post induction and direct) among cases was 42.8% and controls was 20.8%. This difference was statistically significant for spontaneous vaginal delivery and Induction of labor (Table 3).

The mean birth weight and AGA/SGA/LGA distribution were similar between cases and controls as the p value was <0.05 but the duration of hospital stay alone was higher among cases when compared to controls (Table 4).

4. Discussion

The present study was a prospective observational study done to evaluate the pregnancy outcomes in women presenting with perception of decreased fetal movements (PDFM). 154 women were enrolled out of which 77 were cases (with PDFM) and 77 were controls (without PDFM). We compared the obstetric and perinatal outcomes of women with PDFM and age matched antenatal women with no PDFM. The baseline characteristics were similar between the two groups. The mean age of the study participants was 25.58 ± 3.746 years and 25.39 ± 3.753 years among cases and controls respectively. In our study most of them were between 20 – 29 years of age. 39% of the cases were overweight or obese, as compared with 20% among controls, which supports the fact that obesity is a factor for reduced perception of fetal movements. Similar results were seen in other studies where a high BMI was reported more frequently among those who had DFM (Decreased fetal movements). Overweight and obese pregnant women can have adverse pregnancy outcomes. Whether decreased fetal

movement in these women is due to decreased fetal activity or reduced awareness due to excess abdominal fat is difficult to interpret.(6) In the present study, the majority of the patients who presented with DFM were multigravida. This is contradictory to the study by Poojari et al on 210 pregnant women 75.2% were mostly primiparous.(4) During the study period, 77 antenatal women were enrolled with complaints of reduced fetal movement out of which one (1.3%) was diagnosed with intrauterine fetal demise which is consensus with studies done by Mc Carthy et al, and contrary to study done by Poojari et al which showed a prevalence of 5%.(4,7) When we analysed the amniotic fluid volume, 19.5% of the cases as compared to 6.5% in controls had oligohydramnios (both borderline oligo and oligohydramnios), which required admission and induction of labour. Our study findings was contrary to other study findings done by Mc Carthy et al, Shekh M et al and Poojari et al as the prevalence of oligohydramnios was 13.2%, 1.7% and 7.4% respectively.(4,7,8) On analysing distribution of color of liquor, 15.5% cases and 9.1% of controls had meconium stained liquor. One (1.3%) woman with perception of DFM had blood stained liquor due to abruptio placenta. The studies done by Syeda R M et al and Aviram et al showed that the prevalence of oligohydramnios among DFM subjects was 10% and 13.7% respectively.(9,10)

In the present study preliminary investigations for those women with reduced fetal movements included non-stress test (NST), Doppler study and Bio-Physical Profile (BPP).(11,12) NST was non-reactive in 9.1% and Doppler was abnormal in 7.8% among cases whereas in other studies done by Syeda et al, NorAzlin et al and Habiba et al showed the Non-reassuring NST as 4%, 0.5 and 1.6% respectively.(13,14) BPP was recorded abnormal in 16.9%. On correlating with neonatal outcomes, we found that there is higher chance of poor neonatal outcome in women presenting with DFM and having low BPP score. Hameed 2013 studied 200 patients with reduced fetal movements and revealed in 4 patients with 4/10 BPP score emergency caesarean section led to the delivery of neonates with low APGAR score and majority of patients with normal biophysical profile score of 8-10/10 had good APGAR score. Induction of labor was done in 78% cases and 41.6% controls was noticed in this study. Nearly 44.1% among cases and 20.8% among controls underwent caesarean section. And the most common indication for caesarean section was CPD. Similar results were found in a randomized controlled trial by Heazell AE. in 2013.(15) However, in their study there were no controls enrolled . Whereas study conducted by Nor Azlin M.I. et al had higher caesarean section rates (31.4%) among the induced patients.(13) Women with RFM should be counselled on the risk of failed induction and possible morbidity resulting from operative interventions.

SGA babies contributed to 7.8% and 6.5% of the cases and controls respectively. This observation is higher than the study by Nor Azlin et al.(13) Though our NICU admission rates and APGAR score <7 at 5 min was higher than other study conducted by we did not have any major neonatal morbidity and mortality.(16) There were six neonates who required NICU admission for more than 24 hours for Birth asphyxia (2 babies), Meconium aspiration syndrome (1 neonate), one with Neonatal depression, one for IUGR and one for neonatal hyperbilirubinemia. Follow up at seventh day of life was uneventful in these newborns.

We reiterate the importance of early medical attention with decreased fetal movements. We did not find any statistical significance in the difference in neonatal outcomes between the two groups. We further tried to see the neonatal outcomes based on risk categorization in antenatal complications. Among the women who had persistent DFM, fetal distress was the common indication for caesarean section. There was no statistical significance in the correlation between bio- physical profile (BPP) scores & oligohydramnios on the perinatal outcome among the women with persistent DFM. 100% of neonates had poor perinatal outcome when the women had persistent DFM along with meconium-stained liquor.

5. Conclusion

Maternal perception of fetal movement is an important screening method for fetal well-being, as decreased fetal movement is associated with a range of poor pregnancy outcomes. In view of the above findings we suggest, decreased fetal movements warrant immediate evaluation as obstetric and perinatal outcomes are poor.

6. Limitations

Study was based only on individual perception of RFM as there is no consensus on standard definition of RFM. We have included women only after 37 weeks of gestation and hence our findings cannot be extrapolated to entire third trimester of pregnancy.

References

- [1] Wróbel J, Kupka T, Horoba K, Matonia A, Roj D, Jeżewski J. Automated detection of fetal movements in Doppler ultrasound signals versus maternal perception. *Journal of Medical Informatics & Technologies* [Internet]. 2014 [cited 2021 Sep 29];Vol. 23. Available from: <http://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-07857762-c9b3-48b8-8793-91bca3045a2a>
- [2] Holm Tveit JV, Saastad E, Stray-Pedersen B, Børdahl PE, Frøen JF. Maternal characteristics and pregnancy outcomes in women presenting with decreased fetal movements in late pregnancy. *Acta Obstetrica et Gynecologica Scandinavica*. 2009;88(12):1345–51.
- [3] Mari E. Decreased Fetal Movements are an Important Red Flag in Second Half of Pregnancy: A Case Report of Baby Saved by Mother's Attention to Fetal Movements. *COGO*. 2018 Apr 17;1(1):21–7.
- [4] G Poojari V, Kumar S, Akhila V. Obstetric and neonatal outcome among women presenting with reduced fetal movements in third trimester. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2017 Nov 28;
- [5] Reduced fetal movements. Green-top Guideline No. 57 [Internet]. Royal College of Obstetricians & Gynaecologists (RCOG).; 2011. Available from: https://www.rcog.org.uk/globalassets/documents/guidelines/gtg_57.pdf
- [6] Neldam S. Fetal movements. A comparison between maternal assessment and registration by means of dynamic ultrasound. 1982;
- [7] McCarthy CM, Meaney S, O'Donoghue K. Perinatal outcomes of reduced fetal movements: a cohort study. *BMC pregnancy and childbirth*. 2016;16(1):1–6.
- [8] Sheikh M, Hantoushzadeh S, Shariat M. Maternal perception of decreased fetal movements from maternal and fetal perspectives, a cohort study. *BMC Pregnancy and Childbirth*. 2014 Aug 23;14(1):286.
- [9] Syeda RM, Shakuntala PN, Shubha RR, Sharma SK, Claudius S. Fetal outcome in pregnant women with reduced fetal movements. *Int J Health Sci Res*. 2013;3(7):18–28.
- [10] Aviram A, Shmueli A, Hiersch L, Ashwal E, Wiznitzer A, Yogev Y, et al. Pregnancy outcome in women with decreased sensation of fetal movements at term according to parity. *Birth*. 2016;43(1):42–8.
- [11] Arnold KC, Flint CJ. Antepartum Fetal Surveillance. In: Arnold KC, Flint CJ, editors. *Obstetrics Essentials: A Question-Based Review* [Internet]. Cham: Springer International Publishing; 2017 [cited 2021 Oct 1]. p. 179–85. Available from: https://doi.org/10.1007/978-3-319-57675-6_28
- [12] Manning FA, Morrison I, Lange IR, Harman CR, Chamberlain PF. Fetal assessment based on fetal biophysical profile scoring: experience in 12,620 referred high-risk pregnancies: I. Perinatal mortality by frequency and etiology. *American Journal of Obstetrics and Gynecology*. 1985;151(3):343–50.
- [13] Nor Azlin MI, Maisarah AS, Rahana AR, Shafiee MN, Aqmar Suraya S, Abdul Karim AK, et al. Pregnancy outcomes with a primary complaint of perception of reduced fetal movements. *Journal of Obstetrics and Gynaecology*. 2015;35(1):13–5.
- [14] Kapaya H, Almeida J, Karouni F, Anumba D. Management of reduced fetal movement: A comparative analysis of two audits at a tertiary care clinical service. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2020;248:128–32.
- [15] Heazell AE, Bernatavicius G, Roberts SA, Garrod A, Whitworth MK, Johnstone ED, et al. A randomised controlled trial comparing standard or intensive management of reduced fetal movements after 36 weeks gestation-a feasibility study. *BMC pregnancy and childbirth*. 2013;13(1):1–10.
- [16] Sterpu I, Pilo C, Koistinen IS, Lindqvist PG, Gemzell-Danielsson K, Itzel EW. Risk factors for poor neonatal outcome in pregnancies with decreased fetal movements. *Acta Obstetrica et Gynecologica Scandinavica*. 2020;99(8):1014–21.