

Study on Perinatal Outcome in Reduced Fetal Movements in Term Pregnancy

Radha Nimmakayala¹, Chalumuri Tejaswi^{2*}

¹Associate Professor, King George Hospital, Department of Radio Diagnosis, Visakhapatnam, India

²Managing Director, Tejaswi Scans and Diagnostics, Anakapalli, Visakhapatnam, India

*Address for Correspondence: Dr. Chalumuri Tejaswi, Managing Director, Tejaswi Scans and Diagnostics, Anakapalli, Andhra Pradesh, India

E-mail: tejaswi38parimi@gmail.com

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ABSTRACT

Background: Reduced fetal movements (RFM) is a frequent antenatal presentation with poor perinatal prognosis, such as stillbirth, low APGAR scores, higher rates of caesarean section delivery, and neonatal intensive care unit (NICU) transfer. Several conditions in the mother, including preeclampsia, oligohydramnios, umbilical cord entangling, and diabetes, are contributing factors to RFM, hence the need to identify them at an early stage and institute relevant interventions.

Methods: In this study, antenatal women with RFM were evaluated to determine maternal and fetal outcomes. Maternal demographics, obstetric history, comorbidities, fetal well-being parameters, and neonatal outcomes were obtained and analyzed. The influence of maternal conditions and fetal parameters on perinatal outcomes was statistically examined.

Results: The age of the participants ranged from 18-24 years in 67.3%, and 76% of the participants were primigravida. Most (75.3%) were delivered between 37-40 weeks of gestation, with 77.3% experiencing RFM for 1-2 days. Preeclampsia (10%), gestational diabetes (9.3%), and oligohydramnios (24%) were comorbidities. Fetal growth restriction was present in 17.3%, while abnormal biophysical profiles were seen in 11.3%. The mode of delivery was spontaneous (13.3%), induced labor (49.3%), and caesarean section (37.4%). Perinatal complications, such as NICU admissions (50.7%), intrauterine fetal demise (8.7%), and low birth weight (20%), were reported.

Conclusion: RFM is connected with severe perinatal hazards that necessitate close observation, prompt identification of high-risk patients, and fetal movement counting education to mothers. Appropriate intervention promptly can minimize the bad effects and enhance fetal and neonatal health.

Key-words: Reduced fetal movements, Perinatal outcomes, Stillbirth, Caesarean section, Fetal monitoring, Pregnancy complications

INTRODUCTION

Fetal movement is an essential indicator of fetal well-being and is perceived by the antenatal mother as kicks, flutters, swishes, or rolls ^[1]. Typically, fetal movements become noticeable between 16-20 weeks in primigravida and around 16-18 weeks in multigravida ^[2]. These movements are a sign of an intact musculoskeletal and central nervous system, with an increase in frequency

observed from 23 to 32 weeks of gestation, after which they plateau ^[3-5]. The fetus follows a circadian rhythm, demonstrating increased activity in the evening and early night, with movements peaking approximately an hour after maternal food intake ^[6].

Various methods have been proposed for monitoring fetal movements, with the Cardiff "count to ten" method and the Sadovsky method being widely used ^[7]. However, no universally accepted protocol exists for fetal movement monitoring or for defining the most reliable alarm sign indicating fetal distress. While reduced fetal movements are generally considered an ominous sign by obstetricians worldwide, they may not always indicate pathology. A temporary absence of movements may occur during fetal sleep cycles, which

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typically last between 20-40 minutes and may extend up to 90 minutes in a normal full-term fetus^[8]. Additionally, maternal perception of fetal movements can be influenced by factors such as maternal body mass index (BMI), anterior placenta, fetal weight, fetal position, maternal physical activity, and psychological factors including education, anxiety levels, and awareness during pregnancy. Reduced fetal movements are also observed when the mother lies in a supine position.

A significant concern is the association between reduced fetal movements and poor perinatal outcomes. It is estimated that 5-15% of pregnancies are affected by decreased fetal movements, and 55% of women who experience stillbirths report noticing a reduction in fetal movements before diagnosis^[9]. Several underlying conditions contribute to this phenomenon, including decreased amniotic fluid, fetal growth restriction (FGR), placental abnormalities, and fetal compromise. Additionally, maternal factors such as smoking, alcohol consumption, and drug abuse further exacerbate the risk. Studies have shown a strong correlation between reduced fetal movements and abnormal Doppler findings, leading to adverse perinatal outcomes such as intrauterine fetal demise, stillbirths, small-for-gestational-age infants, poor Apgar scores at birth, increased neonatal intensive care unit (NICU) admissions, fetal acidemia with low umbilical cord blood pH, and a higher incidence of labor induction and emergency lower segment cesarean section (LSCS) due to pathological cardiotocography (CTG) findings^[10].

This study aims to identify high-risk cases by evaluating the impact of reduced fetal movements on perinatal outcomes. Through timely intervention and maternal education regarding fetal movement counting and alarm signs, it is possible to prevent or at least minimize the risks associated with adverse perinatal outcomes.

MATERIALS AND METHODS

Study Design and Setting- The study was a prospective observational study in the Department of Obstetrics and Gynecology at Government Victoria Hospital, Andhra Medical College, Visakhapatnam. The study was undertaken for a period of fifteen months, from Aug 2023 to Oct 2024. The main aim was to assess perinatal outcomes in term pregnancies with reduced fetal movements.

Study Population- The population under study consisted of pregnant women who visited the obstetrics and gynecology antenatal clinic and emergency department during the study period. The participants consisted of term antenatal mothers who gave informed consent and were within the inclusion criteria.

Inclusion and Exclusion Criteria- Singleton pregnancies in term were selected for the study, specifically those that were of high-risk category, such as cases that had oligohydramnios or a nuchal cord loop. Pregnancies with more than one fetus, congenital malformations, or in preterm women were not selected for the study.

Sample Size and Ethical Issues- 150-term pregnant women who had been complaining of decreased fetal movements were selected for the study. Ethical clearance was obtained from the Government Victoria Hospital, Andhra Medical College, Visakhapatnam, Institutional Human Ethics Committee. All the participants were made aware of the study goals, and confidentiality of identity and data was assured. An option was provided to them to withdraw from the study at any time without any effect on medical care. Informed consent in writing was taken from every participant in English and Telugu before initiating data collection.

Data Collection and Analysis- The chief investigator took demographic information and clinical history from all the participants on a pre-designed proforma. There was a proper evaluation, with general examination, anthropometry, systemic assessment, and local obstetric examination of all the cases. Information was collected from pregnant women who attended either outpatient or emergency departments with decreased fetal movement.

Statistical Analysis- The data were documented systematically in an Excel sheet and analyzed with the help of SPSS software (Version 16). Descriptive statistics like mean, standard deviation, and proportions were computed for quantitative variables. Statistical measures such as sensitivity, specificity, positive predictive value, and negative predictive value were utilized to assess the diagnostic effectiveness. The Chi-square test was utilized to assess the significance of association, where p-value <0.05 was taken as statistically significant.

RESULTS

In this study, the majority of antenatal mothers belonged to the age group of 18-24 years, accounting for 67.3% of the total participants. The age group 25-29 years comprised 29.3%, while only 3.3% of the participants were aged 30-34 years. The mean maternal age in the study population was 23.5 years (Table 1).

Table 1: Age Distribution of Term Pregnant Women with RFM

Age Group (years)	Number of Patients (n=150)	Percentage (%)
18-24	101	67.3
25-29	44	29.3
30-34	5	3.3
Total	150	100.0

The study found that the majority of participants were primigravida (76%), while the remaining 24% were multigravida (Fig. 1).

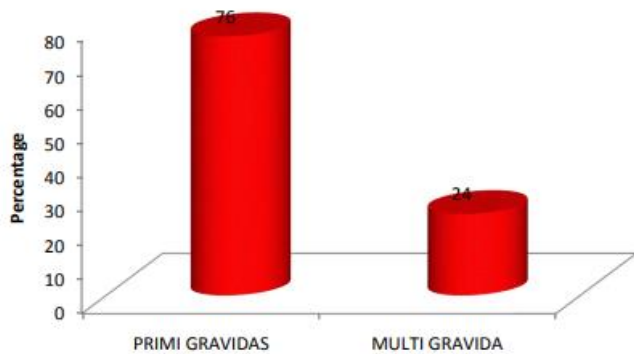


Fig. 1: Gravida Distribution in Term Pregnant Women with RFM

The gestational age at the time of enrollment revealed that a significant proportion (75.3%) of participants were between 37-40 weeks, while 24.7% had crossed 40 weeks of gestation (Table 2).

Among the studied women, 49.3% underwent induction of labor, 28.6% had an emergency LSCS, 13.3% had a spontaneous vaginal delivery, and 8.6% had an elective LSCS (Table 3).

Table 2: Gestational Age of Term Pregnant Women with RFM

Gestational Age (weeks)	Number of Patients (n=150)	Percentage (%)
37-40 Weeks	113	75.3
>40 Weeks	35	24.7
Total	150	100.0

Table 3: Mode of Delivery in Term Pregnant Women with RFM

Mode of Delivery	Number of Patients (n=150)	Percentage (%)
Spontaneous Vaginal Delivery	20	13.3
Induction of Labor	74	49.3
Emergency LSCS	43	28.6
Elective LSCS	13	8.6
Total	150	100.0

The investigation examined the distribution of birth weight in neonates, in which 74.7% of the neonates had a birth weight of 2.5-3.5 kg, 20% ≤2.5 kg, and 5.3% >3.5 kg. In addition, 81.3% of the neonates had an Apgar score of 8-10, and 8.7% had an Apgar score of 5-7. There were neonatal complications in 50.7% of the cases and NICU admissions (Fig. 2).

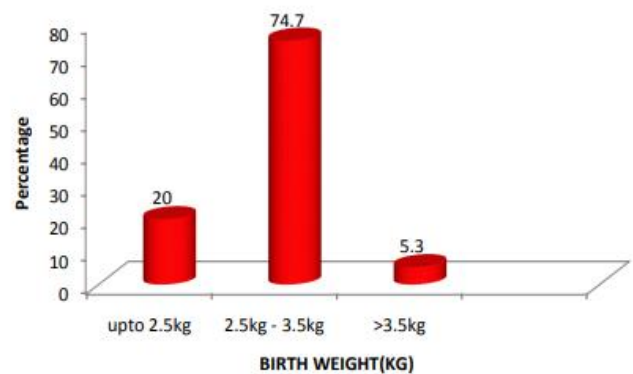


Fig. 2: Birth Weight Distribution in Term Pregnant Women with RFM

These observations highlight the significance of early detection and prompt intervention in instances of decreased fetal movements to enhance perinatal outcomes. Increased maternal vigilance, regular fetal monitoring, and proper obstetric management can go a long way in minimizing the complications of RFM, thus enhancing neonatal survival and well-being.

DISCUSSION

The findings of the study underscore the clinical relevance of decreased fetal movements (RFM) in gestation at term and their link with negative maternal and neonatal outcomes. The majority of participants were in the 18-24 years age group (67.3%), with most being primigravida cases (76%). The results are consistent with other studies that have shown that younger and first-time mothers are more likely to complain of fetal movement ^[11]. The gestational age at presentation was mostly between 37-40 weeks (75.3%), with a smaller percentage beyond 40 weeks (24.7%), reinforcing the need for close monitoring in the final weeks of pregnancy.

The duration of reduced fetal movements was predominantly 1-2 days (77.3%), followed by 3-4 days (18%) and more than 4 days (4.7%). Pregnant women with RFM for over four days had an increased rate of intrauterine fetal demise (IUD), confirming previous findings that extended RFM is an important predictor of adverse perinatal outcome ^[11]. Medical conditions of preeclampsia (10%), gestational hypertension (8.7%), gestational diabetes mellitus (9.3%), and overt diabetes mellitus (6%) were noted in the study population, the association of which with complications was stronger for preeclampsia and gestational diabetes, as reported in previous studies ^[12].

Amniotic fluid index (AFI) was the other important parameter of this study. The majority of the subjects (76%) had normal AFI, whereas 24% of them were diagnosed with oligohydramnios (AFI <6 cm). Oligohydramnios in pregnant women had a much greater rate of complications, such as emergency cesarean section, which agrees with earlier work reporting that a decreased volume of amniotic fluid heightens the risk of fetal distress and poor neonatal outcomes ^[13]. Moreover, growth restriction in the fetus was detected in 17.3% of the cases, and these pregnancies were more likely to have complications. Abnormal biophysical profile (BPP)

was found in 11.3% of cases, highlighting the importance of BPP in fetal evaluation of well-being ^[11].

Abnormalities in the cord were found in many cases, with 23.3% having one or two loops of the umbilical cord around the neck and 10% having three or four loops. These observations are of clinical importance since more than one loop of the cord around the fetal neck has been reported as a risk factor for fetal distress and operative delivery ^[11]. Meconium-stained liquor was seen in 8% of the cases, and non-reassuring CTG in 12%, both of which are recognized risk factors for fetal hypoxia and neonatal morbidity ^[13].

The analysis of the mode of delivery showed that a high percentage (49.3%) needed induction of labor, while only 13.3% delivered spontaneously. Out of the induced, 33.6% delivered normally by the vaginal route, while the rest needed emergency cesarean section for failed induction. Emergency cesarean sections were done in 28.8% of the cases for reasons like oligohydramnios, abnormal CTG, and abnormal BPP. Elective cesarean delivery represented 8.6% of births, usually in those with pre-existing comorbidities like hypertension and diabetes. This is consistent with earlier work indicating that RFM is also linked with higher labour induction rates and cesarean delivery ^[12].

Neonatal outcomes likewise attest to the clinical significance of the surveillance of RFM. The research observed one stillbirth (0.7%) and 13 intrauterine fetal deaths (8.7%), which are consistent with earlier studies showing a significant correlation between RFM and stillbirth ^[14, 15]. Also, 50.7% of the neonates needed NICU admission, illustrating the effect of RFM on neonatal morbidity. The majority of neonates (74.7%) weighed between 2.5-3.5 kg at birth, and 20% had low birth weight (<2.5 kg), as has been reported to be the case where RFM is linked with fetal growth restriction and poor neonatal outcomes ^[13].

Complications occurred in a total of 55.3% of the cases, encompassing NICU admissions, stillbirths, and neonatal deaths. Pregnant women with chronic symptoms of RFM (>4 days) had a greater chance of IUD, supporting that delayed reporting of RFM is related to poor perinatal outcomes ^[11]. Moreover, antenatal mothers with preeclampsia and gestational diabetes had greater complications compared to those with gestational hypertension and overt diabetes, suggesting that

maternal underlying conditions have an important influence on perinatal morbidity and mortality^[12].

Several studies confirm the results of this study. A study by Heazell *et al.*^[11] illustrated that RFM-complicated pregnancies are five times more likely to suffer from stillbirth, have higher rates of low Apgar scores, and increased NICU admissions. Likewise, Nor-Azlin *et al.*'s^[16] study emphasized the importance of monitoring, especially CTG and AFI evaluation, in identifying adverse pregnancy outcomes. Training interventions for enhanced maternal awareness of fetal movement have been linked with reduced NICU admissions, enhanced detection of FGR, and improved neonatal Apgar scores^[12]. These results highlight the significance of early intervention and ongoing fetal monitoring to enhance perinatal outcomes.

The research reinforces the importance of early assessment and management of RFM in pregnant women. Educational counseling on fetal movements, standard monitoring with CTG and ultrasonography, and early intervention in cases identified as high-risk can lower perinatal mortality and morbidity considerably. Strict guidelines for the diagnosis and management of RFM have to be practised to achieve improved maternal and fetal outcomes.

CONCLUSIONS

Reduced fetal movements (RFM) is a frequent antenatal issue associated with poor perinatal outcomes, such as stillbirth, low APGAR scores, and higher caesarean section rates. Any underlying maternal conditions like preeclampsia, oligohydramnios, umbilical cord looping around the fetal neck, and diabetes also increase the risk burden of RFM. Early detection of high-risk cases by routine monitoring, early intervention, and counseling pregnant women on fetal movement counting and warning signs can go a long way in reducing unfavorable outcomes. Raising awareness and providing early medical care can dramatically enhance perinatal outcomes and maternal health.

CONTRIBUTION OF AUTHORS

Research concept- Radha Nimmakayala, Chalumuri Tejaswi

Research design- Radha Nimmakayala, Chalumuri Tejaswi

Supervision- Chalumuri Tejaswi

Materials- Radha Nimmakayala, Chalumuri Tejaswi

Data collection- Radha Nimmakayala, Chalumuri Tejaswi

Data analysis and Interpretation- Chalumuri Tejaswi

Literature search- Radha Nimmakayala, Chalumuri Tejaswi

Writing article- Radha Nimmakayala, Chalumuri Tejaswi

Critical review- Chalumuri Tejaswi

Article editing- Radha Nimmakayala, Chalumuri Tejaswi

Final approval- Chalumuri Tejaswi

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