



Outcome of Management of Pregnant Women with Decreased Fetal Movements in a Resource Constrained Setting in Southwest Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author OPA conceptualized and designed the study and wrote the final draft of the manuscript. Author BAO did literature searches and wrote the first draft. Author ODD managed the analysis of the study. Author TA managed the data collection and entry and read the final draft of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To evaluate pregnant women with decreased fetal movements (DFM) identifying the risk factors and perinatal outcomes of such pregnancies.

Study Design: A case-control study.

Place and Duration of Study: Department of Obstetrics and Gynecology, Ekiti State University Teaching Hospital, Ado-Ekiti, between April 1 2017 and March 31 2018.

Methodology: Women with singleton pregnancy presenting to the Department with complaint of DFM (cases) after 28 weeks of gestation were recruited and compared with women with no complaint of DFM that delivered in the facility during the study period. Sociodemographic data, obstetric characteristics. Antenatal risk factors, mode of delivery and perinatal outcomes were obtained using a semi-structured questionnaire. Data collected were analyzed with SPSS and variables were compared using student t test and chi square or Fisher exact test while p value was <0.05.

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Results: Out of 1439 women in the third trimester during the study period, 117 women had complaint of DFM with a prevalence of 12.3%. There was no statistical difference in the socio-demographic characteristics between the two groups; $P > 0.05$. The mean gestational age at presentation and delivery were significantly lower among women with DFM (31.95 ± 1.81 weeks versus 37.46 ± 2.98 weeks; $P = 0.001$ and 35.05 ± 1.47 weeks versus 37.46 ± 2.98 weeks; $P = 0.001$ respectively). More women with DFM significantly had preeclampsia and intrauterine growth restrictions ($P = 0.002$), oligohydramnios ($p = 0.016$), caesarean delivery ($P = 0.005$) and SCBU admission ($P = 0.009$). The mean birth weight and Apgar scores at 1 minute were significantly lower in women with DFM (2.64 ± 0.54 kg versus 3.25 ± 0.57 kg; $P = 0.001$ and 7.13 ± 0.68 versus 7.42 ± 0.82 ; $P = 0.003$ respectively).

Conclusion: This study showed that women with DFM are a higher risk of operative delivery and poor perinatal outcome such birth weight and Apgar score. Maternal perception of fetal movements should form part of risk assessment during routine visits.

Keywords: Fetal movement counting; maternal perception; perinatal outcomes; pregnant women.

1. INTRODUCTION

Fetal movements are considered as a sign of fetal life and well-being [1]. Maternal perception of fetal movements is an easy, inexpensive and valuable screening tool used in the assessment of the well-being of the fetus [1,2]. It is the oldest and most common method used in evaluation of fetal well-being [3]. The counting of fetal movements by the mother allows early identification, timely evaluation and intervention for fetuses at risk of adverse outcome [4]. Fetal movement counting may sometimes result in anxiety in pregnant women and may also lead to unnecessary interventions [5]. Fetal movement counting has been shown to be associated with a decrease in perinatal morbidity and mortality even though some studies argued that the use of decreased fetal movement (DFM) as a screening tool to identify women at increased risk of stillbirth is contentious due to a high failure rate [4-7]. Decreased fetal movements may occur in healthy fetuses which may not necessarily indicate fetal compromise due to fetal quiescent period, sedatives, steroids and maternal exercise [8].

Maternal perception of DFM is a commonly encountered problem in pregnancy and studies have shown that fetal movements are less frequent at term [2,9,10]. Previous studies have reported the prevalence of decreased perception of fetal movement in the third trimester as 4-15% [1,11]. It is a frequent reason for unscheduled hospital visit and self-referral for assessment by healthcare providers in pregnancy [2,11]. It has been documented that suboptimal care in relation to the complaints of DFM is a potential contributor to avoidable still birth and this has

been shown to account for about 50% of stillbirth [12,13].

The absence of perceived fetal movements may not necessarily indicate fetal compromise and/or death, however, about 55% of women who had stillbirth perceived a gradual reduction in fetal movements several days prior to occurrence. Hence, decreased perception of fetal movements by the mother in the third trimester should be a concern of obstetricians [12-15]. Maternal perception of decreased fetal movements is associated with poor perinatal outcome like fetal congenital anomalies, oligohydramnios, fetal growth restriction, fetal distress and preterm births [3,16-18].

There are disparities in the definition and management of decreased fetal movements in international guidelines and there is no supporting evidence that formal definition of DFM is superior to the subjective maternal perception in the surveillance for fetal compromise [19]. Maternal qualitative perception of a decrease in fetal movements is considered to supersede in clinical importance any quantitative definition of decreased fetal movements even though the qualitative maternal perception of fetal movements is understudied [11,18]. There is also very little consensus to inform clinical practice in the area of DFM since there are no randomized controlled trials on fetal movement counting on pregnancy outcomes [20]. However, increased perinatal mortality, increased need for emergency delivery and low neonatal Apgar scores at delivery have been reported in women with DFM from studies done in high income countries [14] while some studies have shown that fetal movement counting reduces perinatal mortality with little economic impact [21].

Most studies on reduced fetal movements are done in high income countries and there is paucity of studies from low income countries including Nigeria. This study was done to evaluate the socio-demographic characteristics, antenatal risk factors and perinatal outcomes in women who presented with decreased fetal movements in the third trimester.

2. MATERIALS AND METHODS

2.1 Research Design and Population

This was a case-control study involving all pregnant women who presented with the complaint of decreased fetal movements at the Obstetrics and Gynaecology Department of the Ekiti University Teaching Hospital, Ado-Ekiti between 1st April 2017 and 31st March 2018. Pregnant women with a singleton fetus, above the gestation of 28 weeks, presenting with perception of decreased fetal movements, delivering in our centre during the period of the study and who gave consent to participate were included in the study while women with multiple pregnancy, antenatal diagnosed congenital anomalies, intrauterine fetal deaths and who did not consent to participate in the study were excluded.

2.2 Sample Method

The sample size for patients with DFM was calculated using the single proportion formula with a prevalence of 6.6% from a previous study by Winje et al. [6], 95% confidence interval level, 5% margin of error and 10% attrition rate for non-respondents. The minimum sample size was 105 pregnant women. However, 117 pregnant women that presented with complaint of perception of decreased fetal movements from the Antenatal Clinic and Obstetric Emergency Unit of the Department were recruited consecutively into the study after meeting the inclusion criteria and giving their informed consent to participate. They served as cases and were compared with women with no complaint of decreased fetal movements (No DFM) (that delivered during the study period who met the inclusion criteria and consented to participate in the study serving as the controls in a ratio of 1:1.

In our centre, pregnant women are given regular classes on birth preparedness and complication readiness, nutrition, exercise and dangers signs in pregnancy including abnormality of perception of fetal movements by the doctors, nurses and dietician. They are taught how to recognise

abnormality of perception of fetal movements in the third trimester of pregnancy and advised to present in the facility when noticed. Women presenting with reduced fetal movements to our facility are managed until delivery using additional fetal surveillance such as repeat fetal movement counts, cardiotocography, Ultrasonography for fetal well-being and biophysical profile and umbilical artery Doppler study while the mothers are also investigated in order to identify any risk factor. The results of these investigations influence the timing and mode of delivery.

2.3 Data Collection

Data were collected from the participants using a semi-structured questionnaire. Sociodemographic data of the women (age, marital status, education, and religion), obstetric characteristics (parity, gestational age), antenatal risk factors (maternal hypertension, diabetes mellitus, smoking, alcohol or sedative intake), mode of evaluation of reduced fetal movements (fetal movement counts, cardiotocography, ultrasound for fetal biophysical profile, umbilical artery Doppler), mode of delivery, maternal and perinatal outcomes (birth-weight, Apgar scores and special care baby unit (SCBU) admission and indications were obtained.

2.4 Data Analysis

Data collected were entered into and analysed using IBM Statistical Package for Social Sciences (SPSS) Statistics version 21 (IBM Corp., Armonk, NY, USA). Categorical variables were presented in frequency and percentages while continuous variables were expressed in mean and standard deviation. Categorical data were compared using Chi square or Fischer exact test as applicable and Student t test or ANOVA was used to compare continuous data between DFM and no DFM groups. Level of significance was set at a P value of 0.05.

3. RESULTS

There were 117 pregnant women that presented with complaints of decreased fetal movements (cases) in the third trimester and this constitutes about 12.3% of pregnancies during the study period and they were compared with 117 pregnant women without complaint of DFM (control) who delivered during this period.

The mean age of the women in the case group and the control group was 26.63±4.59 years and 27.22±4.81 years respectively and were not

significantly different; $P > .05$. Majority of the women in both the case and control groups were below the age of 30 years, nulliparous, married, Yoruba, Christians, employed and with at least primary school education. There was no significant difference in the baseline characteristics of the women involved in the study with respect to age of women, marital status, ethnicity and religion; $P > .05$. The median parity was 2 and the interquartile range was 2 and these are shown in Table 1.

Table 2 shows that the mean gestational age at presentation to the hospital and mean gestational age at delivery were significantly lower among women with DFM compared to women without DFM (31.95 ± 1.81 versus 37.46 ± 2.98 weeks; $P = .001$ and 35.05 ± 1.47 versus 37.46 ± 2.98 weeks; $P = .001$ respectively) while the gestational age of booking did not differ significantly between women with DFM and those without DFM; $P > .05$.

Preeclampsia/hypertension (30/117) was the commonest antenatal risk factor associated with DFM. More women with DFM had oligohydramnios (20/117) and caesarean delivery (57/117) than women without DFM (7/117) and (33/117) which were statistically significant; $P = .02$ and $.01$ respectively.

The neonatal outcomes revealed that the mean birth weight and Apgar scores at 1 minute were significantly lower in women with DFM than women without DFM (2.64 ± 0.54 kg versus 3.25 ± 0.57 kg; $P = .001$ and 7.13 ± 0.68 versus 7.42 ± 0.82 ; $P = .003$ respectively) while there was no significant difference in the mean Apgar score at 5 minutes among the two groups of women; $P > .05$. Women with DFM had more neonates with Apgar score of less than 7 at 1 and 5 minutes though not statistically significant (20/117 versus 14/117; $P > .05$ and 7/117 versus 5/117; $P > .05$ respectively). Other neonatal outcomes are as shown in Table 3.

Table 1. Socio-demographic characteristics of the women involved in the study

Variables	DFM (n = 117)	No DFM (n = 117)	p value
Age group (years)			
20 – 24	45 (38.5%)	25 (21.4%)	0.03*
25 – 29	30 (25.6%)	33 (28.2%)	
30 - 34	25 (21.4%)	38 (32.5%)	
≥ 35	17 (14.5%)		
Parity			
0	49 (41.9%)	41 (35.0%)	0.48
1	24 (20.5%)	29 (24.8%)	
2 – 4	37 (31.62%)	43 (36.8%)	
≥ 5	7 (6.0%)	4 (3.4%)	
Marital status			
Married	99 (84.6%)	95 (81.2%)	0.78
Single	11 (9.4%)	13 (11.1%)	
Widowed	7 (6.0%)	9 (7.7%)	
Education			
No formal education	17 (14.5%)	11 (9.4%)	0.51
Primary	21 (17.9%)	17 (14.5%)	
Secondary	33 (28.2%)	36 (30.8%)	
Tertiary	46 (39.3%)	53 (45.3%)	
Ethnicity			
Yoruba	93 (79.5%)	97 (82.9%)	0.31
Igbo	19 (16.2%)	12 (10.3%)	
Hausa	5 (4.3%)	8 (6.8%)	
Religion			
Christianity	89 (76.1%)	92 (78.6%)	0.64
Islam	28 (23.9%)	25 (21.4%)	
Occupation			
Unemployed	17 (14.5%)	19 (16.2%)	0.70
Artisans	42 (35.9%)	36 (30.8%)	
Employed	58 (49.6%)	62 (53.0%)	

DFM: Decreased fetal movements; * Statistically Significant

Table 2. Obstetric characteristics of women involved in the study

Variables	DFM (n = 117)	No DFM (n = 117)	p value
†Gestational age at booking	19.30 ± 2.62	19.46 ± 2.77	0.65
†Gestational at presentation	31.95 ± 1.81	37.46 ± 2.98	0.001*
†Gestational age at delivery	35.05 ± 1.47	37.46 ± 2.98	0.001*
Gestational age at booking			
≤ 14 weeks	29 (24.8%)	25 (21.5%)	0.54
> 14 weeks	88 (75.2%)	92 (78.6%)	
Gestational age at delivery			
< 37 weeks	67 (57.3%)	40 (34.2%)	0.001*
≥ 37 weeks	50 (42.7%)	77 (65.8%)	
Antenatal risk factors			
Preeclampsia/Hypertension	30 (25.6%)	18 (15.4%)	0.002*
Intrauterine growth restriction	19 (16.2%)	9 (7.7%)	
Gestational diabetes mellitus	11 (9.4%)	5 (4.3%)	
None	57 (48.7%)	85 (72.6%)	
Placental site location			
Anterior	67 (57.3%)	60 (51.3%)	0.65
Posterior	32 (27.4%)	36 (30.8%)	
Others	18 (15.4%)	21 (17.9%)	
Amniotic fluid index			
Normal	89 (76.1%)	105 (89.7%)	0.02*
Oligohydramnios	20 (17.1%)	7 (6.0%)	
Polyhydramnios	8 (6.8%)	5 (4.3%)	
Mode of delivery			
Spontaneous vaginal delivery	47 (40.2%)	64 (54.7%)	0.01*
Operative vaginal delivery	13 (11.1%)	20 (17.1%)	
Caesarean delivery	57 (48.7%)	33 (28.2%)	

DFM: Decreased fetal movements; * Statistically Significant; † Mean ± standard deviation

Table 3. Neonatal outcomes of women involved in the study

Variables	DFM (n = 117)	No DFM (n = 117)	p value
†Birth weight (kg)	2.64 ± 0.54	3.25 ± 0.54	0.001*
†Apgar score at 1 minute	7.13 ± 0.68	7.48 ± 0.82	0.003*
†Apgar score at 5 minutes	8.67 ± 0.97	8.79 ± 0.94	0.31
Apgar score < 7			
1 minute	20 (8.5%)	14 (6.0%)	0.27
5 minutes	7 (3.0%)	5 (2.1%)	0.55
Birth weight (kg)			
< 2.5	53 (63.1%)	31 (36.9%)	0.01*
2.5- 3.9	45 (42.5%)	61 (57.5%)	
≥ 4.0	19 (43.2%)	25 (56.5%)	
SCBU admission			
Yes	49 (41.9%)	30 (25.6%)	0.01*
No	68 (58.1%)	87 (74.4%)	
Indication for SCBU admission			
Prematurity	17 (34.7%)	5 (16.7%)	0.08
Severe birth asphyxia	12 (24.5%)	6 (20.0%)	
Moderate birth asphyxia	10 (20.4%)	5 (16.7%)	
Macrosomia	10 (20.4%)	14 (46.6%)	
Outcome of SCBU admission			
Alive	41 (83.7%)	27 (90.0%)	0.52 ^a
Dead	8 (16.3%)	3 (10.0%)	

* Statistically Significant; † Mean ± standard deviation; ^a Fisher's exact test; DFM: Decreased fetal movements
SCBU: Special Care Baby Unit

4. DISCUSSION

Perception of decreased fetal movements in pregnancy is a common complaint and a frequent reason for unscheduled visit to the hospital in the third trimester [2,6]. A strong association has been established between this complaint and occurrence of stillbirth and such complaint is viewed with utmost concerns [17]. This study showed that 12.3% of our pregnant women presented with the complaint of decreased fetal movements during the study period. This finding is consistent with the overall rate of perception of DFM of 4-15% in most studies [6,9,22] and this wide range might be due to the different populations of pregnant women and methodology involved in these studies.

The perception of DFM was most commonly reported in this study by women who were of younger age groups (aged 20-29 years). This differs from findings from previous studies by Poojari et al. [5] and Saastad et al. [23] where maternal age ≥ 34 years was associated with a low awareness of fetal activity and perception of fetal movements. Also, women with low parity (primigravidae/primipara) presented mostly with complaint of DFM compared to other parity. This was similarly reported by other studies [1,5,3]. This might be as a result of the fact that women of younger age groups and lower parity represent a subset of pregnant population who are high risk, with low awareness of fetal activity, inexperienced and anxious about the outcome of their pregnancy.

About two-thirds of the women (67.5%) who complained of DFM had post-primary education and this demonstrated the understanding of good perception and adequacy of fetal movements. This is similar to the finding of Poojari et al. [5]. Studies have shown that female education is associated with better knowledge of female reproductive health, improved decision-making capabilities, engagement in beneficial health practices, and an increased use of maternal health services including the good understanding of fetal monitoring and health care seeking behaviour for DFM [24,25]. Majority of the women presented between the gestational ages of 28 to 37 weeks and this is consistent with previous findings of Nandi et al. [1] and Poojari et al. [5] in the third trimester of pregnancy. Both opined that pregnant women are routinely given health talk on fetal movements in the third trimester and are instructed to present in the

hospital whenever they perceive any abnormality of reduced or excessive fetal movements [1,5]. Therefore, Saastad et al suggested that reduction in frequency of fetal movements in the third trimester should be considered as an alarm for adverse fetal outcome [12].

Our study revealed that pregnant women with episodes of DFM also significantly had preeclampsia/hypertension, intrauterine growth restriction and gestational diabetes mellitus at presentation and oligohydramnios (amniotic fluid index less than 7) while majority of the women had anteriorly sited placenta even though not statistically significant. This is in agreement with the fetal and maternal risk factors such as anterior placenta, malpresentation, liquor abnormalities, smoking and primiparity that have been documented in literature as being associated with DFM in pregnancy [1,5,27,28]. The Royal College of Obstetricians and Gynaecologists recommended the assessment of fetal growth centiles, liquor volume and Doppler velocimetry in the evaluation of DFM as this may reveal unidentified placental insufficiency though not shown to improve perinatal mortality rate [13,26]. About one-fifths of women with DFM in this study had associated intrauterine growth restriction (16.2%) and oligohydramnios (17.1%) in line with reports from previous studies [5,27]. However, some other studies did not find any association between liquor volume, placental location and DFM and they opined that this might be due to interobserver and intraobserver variations and gestational age of examination in these studies [22].

Caesarean section (CS) was the commonest mode of delivery among the cohort of women with DFM compared to the control group accounting for almost 50%. This was also reported in a similar study by Froen et al. with a higher CS rates for fetal compromise [14] but differs from other studies that found no difference in the CS rates between the two groups [13,29]. The high CS rate in this study corroborates the opinion of McCarthy et al that women with DFM have a higher iatrogenic delivery rate and stresses the need for a clear consensus on the optimum mode of assessment and management for DFM [13]. Neonates of women with DFM significantly had lower birth weight, 1 minute Apgar score and higher admission rate into special care baby unit. This might be due to the fact these women had more fetuses with intrauterine growth restriction and

oligohydramnios which were delivered before term.

5. CONCLUSION

In conclusion, DFM is a common complaint in the third trimester of pregnancy and is associated with iatrogenic delivery, higher operative delivery, lower birth weight and 1 minute Apgar score. Preeclampsia/hypertension, gestational diabetes mellitus and anterior placenta are identifiable risk factors while intrauterine growth restriction and oligohydramnios are associated with DFM. Therefore, there is need for regular staff training in the area of DFM and this should form part of risk assessment in antenatal care while continuous awareness creation among the pregnant women during antenatal classes is advised. There should be consensus and clear guidelines on the strategies and modalities for the assessment and management of DFM through concerted future researches.

6. LIMITATION

The study is limited by the fact that there are no guidelines and protocols for the assessment and management of DFM such that patients are managed based on the discretion and experiences of the managing clinician. Also, the data on cardiotocography and umbilical artery were incomplete even though they were part of the initial assessment of women with DFM.

CONSENT

All authors declare that written informed consent was obtained from the participants and they were at liberty to withdraw from the study without any consequence on their care in the hospital.

ETHICAL APPROVAL

Ethical clearance for the study was obtained from Ethics and Research Committee of Ekiti State University Teaching Hospital, Ado-Ekiti.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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