ORIGINAL ARTICLE

PERINATAL OUTCOME IN WOMEN PRESENTING WITH REDUCED FOETAL MOVEMENT AT TERM

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Background: foetal movements are one straightforward indicator of foetal health. The evidence, however, is still insufficient to warrant the inclusion of reduced foetal movements in national recommendations as part of a more comprehensive evaluation**.** The study objective was to determine perinatal outcome in women presenting with reduced foetal movement at term gestation. **Methods:** A prospective, observational study was conducted in Hamdard University Hospital Karachi during January 2021 to June 2021, 216 pregnant women with reduced foetal movement at term were recruited from outpatient clinics, wards and labour room triage. Data was collected regarding demographic and clinical features of mothers. Neonatal outcomes were also investigated. **Results:** Findings of the study revealed that 60.6% women had one episode and 39.4% women had two episodes of reduced foetal movements. 1/4th of the neonates were low birth weight, 1/5th of the babies had Apgar score less than 7 in five minutes, 9.3% neonates had cord around the neck and 1/3rd of the neonates were admitted to the NICU. Chi square test of association revealed that maternal factors such as maternal age, BMI, gravidity were significantly associated with reduced foetal movements. foetal outcomes such as NICU admission and presence of meconium were significantly associated. **Conclusion:** The present study analyzed that Episodes of RFM were significantly associated with age, BMI, gravidity of mother. RFM episodes was associated with increased risk of cord around neck among neonates of mother with repeated RFM episodes whereas NICU likelihood was higher among neonates of mother with single RFM episode.

Keywords: Reduced foetal movements (RFM); Body mass index (BMI); Neonatal intensive care unit (NICU)

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INTRODUCTION

Significant national and international efforts continue to be directed toward reducing the tragedy of the estimated 2 million foetal deaths that occur during the antenatal and intrapartum period[1]. Nearly one in two stillbirths in low- and middle-income nations happen during childbirth. Most stillbirths in high-income nations occur in the prenatal stage[2], reportedly there are around 2,500 stillbirths per year in the UK[2], associated with an estimated annual cost to health and social services of £13.6 m in 2018[3]. Complete avoidance of stillbirth is difficult due to the poorly understood causal pathways that lead to foetal demise. Due to this challenge, the majority of stillbirth mitigation efforts include a mix of prenatal care, education, and risk factor interventions.[4] Foetal movements are one straightforward indicator of foetal health. Normal foetal movements during that entire stage of pregnancy are typically perceived as a sign of a healthy central nervous system and sufficient oxygenation[5]. Despite the fact that decreased foetal movements (RFM) are linked to infants having SGA, stillbirth, higher rates of induction of labour (IOL), emergency caesarean delivery, congenital and karyotype anomalies and poor neonatal outcomes[6,7], the value of RFM in predicting poor obstetric and perinatal outcomes is debatable because the majority of women who report RFM in the third trimester have complications-free outcomes[8]. Furthermore, there is no accepted description of how a mother perceives foetal movements, which makes it very subjective.[9] Many international standards emphasize RFM as a crucial warning sign linked to the foetus's risk of stillbirth, and mothers are advised to keep an eye on their baby's movements and consult their clinicians if they have any concerns[10,11]. The evidence, however, is still insufficient to warrant the inclusion of RFM in national recommendations and as part of a more comprehensive stillbirth reduction strategy.[12,13] Therefore the aim of this study was to assess the perinatal outcome of women presenting with perception of reduced foetal movement in our population, and to see any associated adverse outcome so that appropriate counselling of patients can be done and timely interventions can be planned.

MATERIAL AND METHODS

A longitudinal follow-up study was conducted in Hamdard University Hospital Karachi during January 2021 to June

2021 with the ethical approval of hospital ethics committee (Ref: HCM&D/1695//2021). Patients with 37 gestational weeks from were recruited from outpatient clinics, ward or labour room triage to collect data regarding feto-maternal outcome. All women having single foetus and term gestation according to LMP (last menstrual period) or early scan (if LMP was unsure) with maternal perception of reduced foetal movements of less than 10 in 2hrs were included. However, women with congenital anomalies, intra uterine growth restriction/small for gestation and oligohydramnios / polyhydramnios were excluded from the study. Patients were enlisted using non-probability consecutive sampling technique. Previously conducted similar study reported that 10.6% neonates required NICU.[14] At 95% confidence interval and 5% margin of error, a sample size of 146 patients was required. Sample size calculation was performed on Open-Epi sample size calculator. Data were collected regarding demographic details, pregnancy related features (gravidity, gestational age), antenatal presentations (including CTG category, placental position), delivery details (like mode of delivery, induction of labour and APGAR score) and foetal outcomes (such as cord around the neck, NICU admission, stillbirth/ IUFD, presence of meconium and early neonatal death). CTG was classified as normal, suspicious and pathologic according to NICE guidelines. In normal CTG all features were reassuring. In suspicious CTG there was one non reassuring feature. In pathological CTG, there were either 2 non-reassuring or 1 abnormal feature. Early neonatal death was defined as mortality within 7 days of birth. All of the foetal outcomes were recording after performing intervention for reduced foetal movements. Data was collected on a pre-formed *proforma*.

Data was analyzed using SPSS version 26. Frequencies and percentages were computed for categorical variables. Numerical variables were presented as mean ± standard deviation after assessing the assumption of normality with Shapiro-Wilk test. Association of patients' features and perinatal outcomes with RFM episodes was determined using Chi-square or Fisher exact test. P-value less than or equal to 0.05 was taken as statistically significant.

RESULTS

Total 235 patients with RFM were identified during data collection. 11 of them did not deliver in hospital and 8 had multiple pregnancy and they were excluded. Finally, 216 patients analyzed. Median age was patients was 30.1 (20.3-35.4) years. Mean gravidity and parity was 2.4±0.08 and 2.1±0.5 respectively. There was no any still birth or intrauterine foetal death reported in this study, however, 6% early neonatal deaths were reported. Table 1 displays summary of demographics and clinical features of patients and neonates. Figure-1 displays frequency of single and dual RFM episodes among patients. Maternal age, BMI, gravidity and duration of RFM were significantly different among patients with single and dual RFM episodes (Table 2). foetal outcomes such as NICU admission, cord around the neck, presence of meconium were significantly associated (Table 3).

Table-1: Summary of demographics and clinical features of patients and neonates

Age groups	**Frequency**	**%**
15-20 years	19	8.8
21-25 years	83	38.4
26-30 years	88	40.7
31-35 years	22	10.2
36 or more years	4	1.9
BMI of Mother		
17 or less	4	1.9
18-25	153	70.8
26-30	49	22.7
31-35	10	4.6
Gestational Age		
37 weeks	23	10.6
38 weeks	71	32.9
39 weeks	65	30.1
40 weeks	57	26.4
Gravidity		
Primigravida	113	52.3
2 to 4	83	38.4
5 and above	20	9.3
Duration of Reduced foetal Movement		
12 hours or less	11	5.1
For 24 hours	135	62.5
For 48 hours or more	70	32.4
CTG on Admission		
Normal	54	25.0
Suspicious	143	66.2
Pathologic	19	8.8
CTG Before Delivery		
Normal	91	42.1
Suspicious	96	44.4
Pathological	29	13.4
Placental Position		
anterior and upper	23	10.6
posterior and upper	193	89.4
Mode of Delivery		
Normal vaginal delivery	107	49.5
Instrumental vaginal delivery	44	20.4
C Section	65	30.1
Induction of Labor		0.0
Yes	44	20.4
No	172	79.6
Weight of Baby (Kg)		
2.5kg or less	55	25.5
more than 2.5 kg	161	74.5
APGAR Score of babies		
Less than 7 in 5 minutes	43	19.9
More than 7 in 5 minutes	173	80.1
Cord Around Neck		
Yes	20	9.3
No	196	90.7
NICU Admission		
Yes	72	33.3
No	144	66.7
Presence of Meconium		
Yes	37	17.1
No	179	82.9
Early Neonate Death		
Yes	13	6.0
No	94	43.5

Table-2: Maternal characteristics associated with reduced foetal movements

Characteristics	Episodes of RFM		*p*-value
	Dual episode n(%)	Single episode n(%)	
Maternal age			
15-20 years	8(42.1)	11(57.9)	
21-25 years	27(32.5)	56(67.5)	
26-30 years	45(51.1)	43(48.9)	*0.018
31-35	5(22.7)	17(77.3)	
36 or more	0(0)	4(100)	
BMI of Mother			
17 or less	4(100)	0(0)	
18-25	68(44.4)	85(55.6)	**<0.001
26-30	8(16.3)	41(83.7)	
31-35	5(50)	5(50)	
Gestational Age of Patient in Weeks			
37 weeks	13(56.5)	10(43.5)	
38 weeks	28(39.4)	43(60.6)	0.331
39 weeks	23(35.4)	42(64.6)	
40 weeks	21(36.8)	36(63.2)	
Gravidity			
primigravida	26(23)	87(77)	
2 to 4	47(56.6)	36(43.4)	**<0.001
5 and above	12(60)	8(40)	
Duration of Reduced foetal Movement			
12 hours or less	2(18.2)	9(81.8)	
For 24 hours	67(49.6)	68(50.4)	**<0.001
For 48 hours or more	16(22.9)	54(77.1)	
CTG of Patient on Admission			
Normal	18(33.3)	36(66.7)	
Suspicious	58(40.6)	85(59.4)	0.492
Pathologic	9(47.4)	10(52.6)	
CTG Before Delivery			
Normal	32(35.2)	59(64.8)	
Suspicious	38(39.6)	58(60.4)	0.282
Pathological	15(51.7)	14(48.3)	
Placental Position			
anterior and upper	7(30.4)	16(69.6)	0.244
posterior and upper	78(40.4)	115(59.6)	
Mode of Delivery			
Normal vaginal delivery	40(37.4)	67(62.6)	
Instrumental vaginal delivery	15(34.1)	29(65.9)	0.378
C Section	30(46.2)	35(53.8)	
Induction of Labor			
Yes	17(38.6)	27(61.4)	0.528
No	68(39.5)	104(60.5)	

*****Significant at $p<0.05$, **Significant at $p<0.01$

Table-3: Neonatal characteristics associated with reduced foetal movements

Variables	Dual episode n(%)	Single episode n(%)	*p*-value
Weight of Baby (Kg)			
2.5kg or less	19(34.5)	36(65.5)	0.248
more than 2.5 kg	66(41)	95(59)	
APGAR Score of babies			
Less than 7 in 5 mins	12(27.9)	31(72.1)	0.062
More than 7 in 5 mins	73(42.2)	100(57.8)	
Cord Around Neck			
Yes	15(75)	5(25)	**<0.001
No	70(35.7)	126(64.3)	
NICU admission			
Yes	20(27.8)	52(72.2)	**0.010
No	65(45.1)	79(54.9)	
Presence of Meconium			
Yes	6(16.2)	31(83.8)	**0.001
No	79(44.1)	100(55.9)	
Early Neonate Death			
Yes	3(23.1)	10(76.9)	0.256
No	82(40.4)	121(59.6)	

**Significant at $p<0.01$

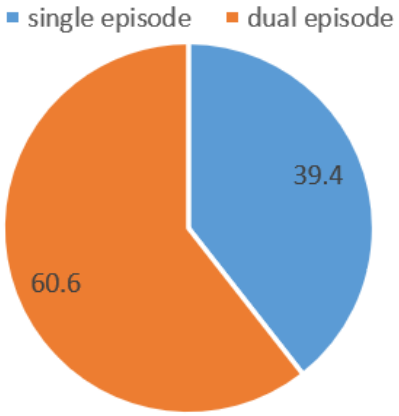

Figure-1: Frequency of reduced fatal movements episodes among patients

DISCUSSION

Our study has observed that 60.6% women had one episode and 39.4% women had 2 episodes of reduced foetal movements. Visibly a significant number of women have experienced the RFM for twice, which is in line with the reported research that, about 40% of women would wait until they had noticed no movement for 24 hours before seeking medical attention[15].

In our study, majority of mothers (52.3%) were primigravida. Mc clarithy *et al*[14] also illustrates that presentations with RFM tend to be associated with being a primigravida. This might be possible that primigravida women are usually less experienced towards the perception of reduced foetal movements therefore they don't usually notice it at once. In this study we observed that all of the females with BMI ≤17 Kg/m^2 had dual episodes of RFM whereas female with BMI 31–35 had equal 50% frequency of single and dual episode. Bradford and coworkers analyzed in their study that RFM were not influenced by BMI[16]. A finding from systematic analysis also stated that there was limited evidence to conclude women with increasing BMI are more likely to have decreased foetal movements.[17] All of the pregnant females included in this study were full term and there was no association of RFM episodes with gestational weeks. Another similar research by Scala et al[18] also reported that there was no significant association of gestational age with RFM episodes. There have been previous reports that women reporting RFM have altered placental structure and function.[18,19] However, in our study we did not find association of placental position with RFM. Moreover, in this study we did not find significant difference in terms of CTG, delivery mode and labour induction. However, many similar articles did not associate these three features with RFM episodes.[18-20] Similar research conducted by Bhatia *et al* reported that abnormal CTG, and caesarean section were not associated with RFM episodes. She found significant associated was induction of labour with higher risk among patients with dual RFM episodes.[21]

In this study, we found that cord around neck, NICU admission and meconium were significantly association. Huang C, in contrast to our findings, has observed that there was no correlation between decreased foetal activity and the incidence of umbilical cord around the neck[22]. NICU admission was not found to be significantly associated in a study of Bhatia *et al*.[21] While meconium was not reported as perinatal outcome among pregnant females with RFM in many of the researches.[16-21]

In this study we observed that BMI was higher in neonates of mothers with dual RFM episodes and APGAR score of those neonates born to mothers with two episodes of RFM was relatively low but it did not show statistical significance. Non-significant association of birth weight, low APGAR score was also reported in a study of Bhatia et al[21]. However, Scala el at[18] in her study reported a significant association of birth weight and APGAR score at 5 minutes with RFM episodes. Sample size in our and Bahtia *et al*[21] study was not very large where Scala et al[18] studied a sample of 1234. Thus, it is mostly likely that higher sample size had enough power to detect these associations. In this study, there was also no association of early mortality with RFM episodes. Moreover, our study did not report any still birth nor did any intrauterine foetal death, however, a study conducted in UK tertiary maternity unit studied 301 pregnant women and among them 142 had absent or reduced foetal movement and it was report that out of 142 females with absent or reduced foetal movement 47.2% had still births.

The present study has some serious limitations such as it was conducted on a limited sample size and share a single institution experience from Karachi. Further, we did not study impact of other pregnancy complications and gestational age at first RFM episode and estimated foetal weight at first RFM episodes. Because these limitations in a present study, we suggest to replicate this study with a larger sample size for addressing the gap of current study. Future studies should also emphasize on placental histopathology and insertion of cord along with correlation of umbilical artery, Doppler and amniotic fluid index needed to be done to evaluate the pathophysiology of RFM among low-risk women.

CONCLUSION

The present study analyzed that episodes of RFM were significantly associated with age, BMI, gravidity of mother. RFM episodes was associated with increased risk of cord around neck among neonates of mother with repeated RFM episodes whereas NICU

likelihood was higher among neonates of mother with single RFM episode.

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AUTHORS' CONTRIBUTION

SG: Concept, Drafting and revisiting critically. SH: Data collection and analysis. FA: Result analysis and interpretation. SN: Literature review.

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