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Fetomaternal Outcome and its Associated Factors in Patients with Decreased Fetal Movements

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ABSTRACT

Objective: To determine the fetomaternal outcome of antenatal patients with reduced fetal movements and its association with different maternal parameters.

Study Design And Setting: Prospective case control study Gynae Department of Khyber Teaching Hospital, Peshawar.

Methodology: This study was conducted from 1st February 2022 to 31st July 2022.80 antenatal women at >34 weeks, reporting less fetal movements were included. Exclusion criteria was multiple pregnancies, refused consent, IUFD, congenital malformations, and <34 weeks gestation. Sampling technique was consecutive non probability sampling. After detailed history and examination, 20-minute non-stress test, Color Doppler and Ultrasonography (AFI)was assessed and recorded. NICU admission, perinatal morbidity, meconium stained liquor and APGAR score < 7 were recorded. Control group of 80 pregnant women, not reporting any reduction in fetal movements, at similar gestation, delivering within 48 hours of admission, was constituted. Descriptive statistics and Chi-square test were applied.

Results: 58 (73%) patients were 21-30 years old.63 (79%) were primiparous.57 (72%) were at term pregnancy. AFI was < 5 cm in 19(23.7%),15 had spontaneous labor, whereas 56 (67%) were induced. 54 (67%) had NVD, 9 (11.5%)instrumental delivery, and 17 (20%) Caesaraen section.16 (20%) with an AFI < 5 cm had NVD. Mean birth weight was 2.67+0.46 kg.68 had > 7 and 12 had < 7 APGAR, no perinatal mortality among the 14(20%) newborns admitted to NICU.

Conclusion: Reduced fetal movenets are reliable method of assessing fetal well being. Primigravidae and term pregnancy are risk factors for RFM. Modalities like non-stress testing, ultrasound, and color Doppler studies are useful in diagnosis.

Key Words: Colour Doppler, Gestational age, Meconium Stained Liquor, Neontatal Intensive Care, Nonstress test, Perinatal Morbidity.

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INTRODUCTION:

Visits to the prenatal clinic or delivery room are frequently prompted by mother's concerns about their sense of diminished fetal movements. Reduced or ceased fetal movements have been linked to higher risks of major perinatal morbidity and death as well as a poor pregnancy outcome, according to several studies.[1] Pregnant women have traditionally been advised to count fetal movements as a screening method for compromised placental function.[2]

The theory is that a fetus will lessen its gross movements in response to decreased uteroplacental blood supply and fetal hypoxia. Reduced fetal movement has been linked to a variety of unfavorable pregnancy outcomes, such as fetal growth limitation and mortality, as well as placental diseases.[3]. Adverse consequences may be avoided if reduced fetal movements is identified early and treated effectively. Fetal movement counting by mothers is a simple, affordable, and effective screening method for fetal health that strengthens the link between mother and fetus. One potentially significant symptom that may precede stillbirth is a rapid shift in the fetal movements or a reduction in them (RCOG, 2011). Although there are several ways to measure reduced fetal movements, daily fetal movement counts are a dependable and efficient way to measure fetal health.[4] Any woman presenting with reduced fetal movements who has an abnormal cardiotocography, a prolonged maternal impression of reduced fetal movements, or if there is suspected intrauterine growth restriction should have an ultrasound examination and color Doppler study conducted.[5]

One straightforward indicator of foetal health is movement. Acute or chronic placental malfunction linked to foetal hypoxia causes the peripheral chemoreflex to be activated, cardiac output to be centralised to important organs, and foetal movements to decrease, which limits oxygen and energy consumption.[6] The usefulness of DFM in predicting poor obstetric and perinatal outcomes is debatable, as the majority of women who report DFM in the third trimester have favourable outcomes, despite the fact that DFM is linked to infants born SGA, stillbirth, higher rates of induction of labour , emergency caesarean delivery, and adverse neonatal outcomes.[7]

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Up to 15% of pregnancies result in a presentation at antenatal clinics due to concerns about reduced foetal movements; this presentation is linked to later negative pregnancy outcomes, such as stillbirth and foetal growth restriction. [8]Several investigations have shown connections between DFM and placental disease, and case control studies have shown a correlation between DFM and stillbirth after 28 weeks of gestation. These associations support a causal relationship between DFM and adverse outcome. [9]

There is no widely accepted definition of foetal movements, and the way mothers perceive them is also very subjective. Nowadays, a lot of international guidelines highlight DFM as a significant warning sign linked to the fetus's risk of stillbirth, and they advise women to keep an eye on their baby's movements and notify their doctors if they do.[10]However, the evidence supporting the incorporation of DFM into national guidelines and as part of a broader stillbirth reduction strategy remains limited. In order to reduce perinatal mortality by alerting health providers, counting fetal movements is a straightforward method that can be used to determine foetal well-being through the quantification and qualification of the number and type of movements that a woman perceives. [11]However, this method can also increase maternal anxiety or lead to unnecessary interventions, such as induction of labour or caesarean section, which also increases antenatal hospitalizations and prematurity. In addition to the quantitative method, the qualitative one includes an increased strength and number of movements in the semi-sitting position of women, or during the evening, after walking or in response to noise and palpation of the abdomen.[12]

The rationale of this study was to ascertain the relationship between reducing daily counts of fetal movements, nonstress test, ultrasound, Color Doppler, and the outcomes for the mother and the fetus. Different modalities like AFI on ultrasound. Color Doppler, nonstress test gives a clear indication of fetal condition in case of reduced fetal movements and has effect of timing and mode of delivery. This study will give a deep insight to the young doctors how to evaluate antenatal women who present with decreased fetal movements.

METHODOLOGY:

This prospective case control study was conducted in Gynae Department of Khyber Teaching Hospital, Peshawar from 1st February 2022 to 31st July 2022 and a total of 80 antenatal women who met the requirements for admission were selected. We included pregnant women who gave consent and who were over 34 weeks gestation and who reported having less fetal movements during a singleton pregnancy. Exclusion criteria included multiple pregnancies, patients who refused to provide permission, those with diagnosed intrauterine fetal death or congenital malformations, and pregnancies lasting less than 34 weeks gestation Sampling technique was consecutive non probability sampling. Expected prevalence of antenatal women with reduced fetal movements is 13.5%, estimated from results in previous studies in our population. Detectable changes were estimated to be a 10% increase of identification of these high risk pregnancies, which gave an estimated sample of 80 in each arm of the trial with 80% power and a significance level of 0.05. Informed consent was taken from all women who were included in the study. A control group consisted of 80 pregnant women who did not report any reduction in fetal movements, and who were matched in terms of age, parity, and delivery within 48 hours of admission, was included in our study. The institutional ethical committee approved the study (38/ERC/KTH)

A comprehensive record was made, documenting several prenatal risk factors such as gestational diabetes mellitus, hypertension, obstetric cholestasis, anemia, and history of smoking, alcohol use, and sedative intake. Additionally, information on the duration of decreased fetal movements, as well as the specific pattern of reduced movement in terms of frequency and intensity, was noted. Comprehensive physical and obstetrical evaluations were conducted. Women who reported a reduction in fetal movements were instructed to record the fetal movement for the following two hours while resting in a left lateral decubitus position. Cardiotocography was conducted for a minimum of 20 minutes within a 2-hour timeframe, and the findings were analyzed based on the criteria provided by the National Institute for Health and Care Excellence. Women who exhibited nonreassuring cardiotocography results were promptly delivered. Additional individuals had investigations for a comprehensive blood count, oral glucose tolerance test, liver function test, thyroid stimulating hormone analysis, and regular urine assessment. An extensive ultrasonography with Doppler examination is performed to document the amniotic fluid index, position and quality of the placenta, assess the precise gestational age and estimated fetal weight, evaluate the biophysical profile, and measure the umbilical artery systolic to diastolic ratio. If all indicators were within acceptable ranges and the maternal record of fetal movements for a duration of 2 hours was 10 fetal movements, the women were discharged and follow-up was conducted during delivery. The study investigated the method of delivery and its impact on newborn outcomes, including birth weight, Apgar scores, and the need for admission to the neonatal intensive care unit.

The following parameters were used to evaluate the pregnancy's outcome: Neonatal intensive care unit hospitalization, perinatal morbidity, and liquor stained with meconium with an APGAR score less than 7. The data were analyzed using SPSS 22.0. Demographic and clinical characteristics were summarized by the mean+ SD for continuous variables and as frequency counts (percentages) for categorical variables. Effect size was analyzed using chi square.

RESULTS:

The research involved the recruitment of 80 antenatal women between February 2022 and July 2022. 11 (12%) belonged to the less than 20 years age group.58 (73%) of the total patients were 21-30 years old.17(21%)were multiparous, and 63 (79%) were primiparous. 23(28%) were between 34 and 37 weeks of gestation, while 57 (72%) had more than 37 weeks period of gestation.

Out of the total patients, 23(27.81%) complained of reduced fetal activity within 12 hours, and 59 (71.5%) had a reactive non-stress test. Amniotic Fluid Index was less than 5 cm in 19(23.7%) of the patients. A normal color Doppler examination was obtained for each subject. 15 were permitted to proceed into spontaneous labor, whereas 56 (67%) were induced owing to oligohydramnios. Weekly non-stress tests were performed on ten individuals who had premature labor and sufficient amniotic fluid. 54 (67%) were vaginally delivered, 9 (11.5%) had instrumental delivery, and 17 (20%) had Cesarean section.16 (20%) patients with an Amniotic Fluid Index of less than 5 cm had vaginal births. 10 (12.5%) of the remaining 63 patients with normal Amniotic Fluid Index had Caesarean section, and 54 (67.5%) had vaginal births.

Mean birth weight was 2.67+0.46kg whereas.10 newborns are between 1.5 and 2.5 kg in weight, whereas 70 babies weigh more than 2.5 kg. In terms of APGAR scores, at the time of delivery, 68 had more than 7 and 12 had less than 7. There were no perinatal or intrapartum deaths among the 14(20%) newborns admitted to the NICU. Every infant was discharged.

DISCUSSION:

One of the crucial markers of fetal health is reduced fetal movements. When a patient exhibits diminished fetal activity, prompt intervention can identify a fetus in danger and preserve its life. The majority of the patients in our research were in the 21–30 years age range. The results of this investigation were supported by those of Damhuis SE et al. (57.26%),and Housseine N et al. (62.86%).[12,13] The majority of patients in this research (87.95%) were primiparous, with gestations between 38 and 40 weeks. In studies by Radestad I et al., 46.67% of patients reported reduced fetal movements at full term gestation,and in Akselsson A et al., 46.07%.[14,15]

In the current investigation, the nonstress test was non-reactive in 23 (27.71%) patients and reactive in 60 (72.29%) cases. Reactive nonstress test was found in 78.2% of cases in studies by Nama N et al. and 84.29% of cases by Monari

Table 1: Features Of Cases and Controls (N=160**)**

Characteristic	Study Group (n=80)		Control Group (n=80)		P-Value
	Frequency	Percentage	Frequency	Percentage	
AGE					**0.902**
Less than 20 years	11	12%	6	8%	
21-30 years	58	73%	66	82%	
>30 years	11	15%	8	10%	
Gravidity					**0.005**
Primigravida	63	79%	51	64%	
Multigravida	17	21%	29	36%	
Residence					**0.161**
Urban	28	33%	13	14%	
Rural	52	67%	67	86%	
Period Of Gestation					**0.003**
34-37 weeks	23	28%	26	67%	
>37 weeks	57	72%	54	33%	

Table 2: Distribution of Cases and Controls According to Perinatal Outcome (N=80)

Characteristic	Study Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
Normal BPP	66	82.5%	75	93.75%
Low Birth Weight	14	17.5%	7	8.75%
NICU Admission	7	8.75%	3	3.75%
APGAR score >7	68	85%	72	90%
<7	12	15%	8	10%
Mortality	0		0	

F et al. These numbers are similar to the 72.56% of patients in our research that had reactive nonstress test.[16,17] Twenty instances (24.10%) had an amniotic fluid index of less than 5 cm, whereas 63 patients (74.9%) had an index of greater than 5 cm. AFI<5 cm was found in 13.9% of cases in other studies by Bradford BF et al., [18] To rule out prenatal growth limitation, all patients who had lower fetal movements were also assessed for liquor volume. color Doppler studies were performed. Color Doppler study points to normal circulation in the uterus and placenta.

80.73% of the births in our research were vaginal, Thompson JMD et al. had the greatest percentage of vaginal deliveries i.e., 84%[17] Bashir S, on the other hand, had 67.4% vaginal births. [18] which is comparable to the results of studies by Habib F et al.[19] Studies by Turner JM et al. and Winje et al. reported caesrean section rates of 32.6% and 24.1%, respectively.[20,21]The LSCS rate in this research was 19.27%, in line with the findings of Bekiou A et al. [22] Of all the infants in the current research, 73.49% were healthy, maintained at room temperature, and encouraged to breastfeed at an early age. Meconium aspiration syndrome, birth asphyxia, respiratory distress syndrome, and other conditions account for 26.5% of newborns admitted to the NICU. 8.9% of births were premature. At delivery, 18.08% of babies had an APGAR score of less than 7. 50% of infants born to Camacho EM et al. had an APGAR score of greater than 7, compared to 73.49% in the current research.[23] Similar to the findings of Bashir S et al., where 18% of infants had an APGAR score of less than seven at birth and 18% were admitted to the NICU, the current study found that 18.08% of babies had an APGAR score of less than seven at delivery and 26.5% of babies were hospitalized.[18] Our study's 8.9% preterm birth rate was similar to those of studies by Damhuis SE et al. and Housseine N et al., which found preterm birth rates of 9% and 4.4%, respectively.[11,12] There were no stillbirths in our research or the study by Bekiou A et al,[23] but stillbirth rates were 0.2% by Turner et al, 1% by Camacho et al, and 1.4% by Monari F et al.[21,22,24]

Research is underway to develop wearable devices that can monitor fetal movements. These devices may use piezoelectric diaphragms or optical fibers to detect movement. The use of piezoelectric diaphragms to detect fetal movements is still in the early stages of research and development. Optical fibers have shown promise in detecting fetal movements with high sensitivity to motion artifacts, but further research is needed to validate their accuracy.

There were few limitations in this study. More multicentric research with bigger samples are needed to develop a definite approach. We were unable to find a patient's incidence of reduced fetal movements in our setup. The neonates born to those mothers by any mode of delivery who complained of reduced fetal movements, were only followed till their stay in hospital. Given that most of the patients were beyond 38 weeks gestational age and that just a single daily fetal movement count, nonstress test, and ultrasound were conducted in these few cases, it was challenging to determine whether fetal kick count monitoring would be successful in continuing the pregnancy or ending it.

CONCLUSION:

One common prenatal manifestation that is linked to worse perinatal outcomes is decreased fetal movements. Fetal movement counts on a daily basis are a very reliable, affordable, and practical way to identify fetal impairment. Techniques like non-stress testing, ultrasound, and color Doppler studies are useful in diagnosing at-risk fetuses and ensuring prompt delivery. They also aid in determining the causes of decreasing fetal movements in patients and in managing them..Our study also concluded that primigravidas and term pregnancies are also risk factors for reduced fetal movements. The daily count of fetal movements appeared to enhance the capability of mothers to identify significant alterations in fetal activity. Improved perinatal outcomes and early detection of at-risk fetuses have been achieved without increasing the need for obstetric procedures. Significant women with aberrant biophysical profiles have favorable perinatal outcomes as a result of their early hospital admission and prompt management.

Authors Contribution:
Maimoona Qadir: Data collection, analysis, compiling

REFERENCES:

1. 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. Eur J Obstet Gynecol Reprod Biol. 2020;248:128-132. doi: 10.1016/j.ejogrb .2020. 03.040.
2. Das R, Jana N, Arora N, Sengupta S. Ultrasound assessment of fetal hearing response to vibroacoustic stimulation. J Matern Fetal Neonatal Med. 2020; 33(14):2326-2332. doi: 10.1080/14767058. 2018. 1548600.
3. Bellussi F, Po' G, Livi A, Saccone G, De Vivo V, Oliver EA, Berghella V. Fetal Movement Counting and Perinatal Mortality: A Systematic Review and Meta-analysis. Obstet Gynecol. 2020;135(2):453-462. doi: 10.1097/AOG. 0000000000003645.
4. 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 Obstet Gynecol Scand. 2020;99(8): 1014-1021. doi: 10.1111/aogs.
5. Bradford B, Cronin R, McKinlay C, Thompson J, McCowan L. Maternally perceived fetal movement patterns: The influence of body mass index. Early Hum Dev. 2020 ;140:104922. doi: 10.1016/j.earlhumdev. 2019.104922.
6. Bekiou A, Gourounti K. Reduced Fetal Movements and Perinatal Mortality. Mater Sociomed. 2020;32(3):227-234. doi: 10.5455/msm.2020.32.227-234.
7. AlAmri N, Smith V. The effect of formal fetal movement counting on maternal psychological outcomes: A systematic review and meta-analysis. Eur J Midwifery. 2021 ;6:10. doi: 10.18332/ejm/145789.

8. Hantoushzadeh S, Gargari OK, Jamali M, Farrokh F, Eshraghi N, Asadi F, Mirzamoradi M, Razavi SJ, Ghaemi M, Aski SK, Panhi Z, Habibi GR. The association between increased fetal movements in the third trimester and perinatal outcomes; a systematic review and meta-analysis. BMC Pregnancy Childbirth. 2024;24(1):365. doi: 10.1186/s12884-024-06547-3.

9. Maeda T, Kobayashi O, Eto E, Inoue M, Sekiguchi K, Ihara K. An Algorithm for the Detection of General Movements of Preterm Infants Based on the Instantaneous Heart Rate. Children (Basel). 2022;10(1) :69. doi: 10.3390/ children1 0010069.

10. Moniod L, Hovine A, Trombert B, Rancon F, Zufferey P, Chauveau L, Chauleur C, Raia-Barjat T. Fetal Movement Counting in Prolonged Pregnancies: The COMPTAMAF Prospective Randomized Trial. Healthcare (Basel). 2022;10(12):2569. doi: 10.3390/ healthcare10122569.

11. Hui L, Marzan MB, Rolnik DL, Potenza S, Pritchard N, Said JM, Palmer KR, Whitehead CL, Sheehan PM, Ford J, Mol BW, Walker SP. Reductions in stillbirths and preterm birth in COVID-19-vaccinated women: a multicenter cohort study of vaccination uptake and perinatal outcomes. Am J Obstet Gynecol. 2023 May;228(5):585.e1-585.e16. doi: 10.1016/j.ajog .2022.10.040.

12. Damhuis SE, Ganzevoort W, Duijnhoven RG, Groen H, Kumar S, Heazell AEP, Khalil A, Gordijn SJ. The CErebro Placental RAtio as indicator for delivery following perception of reduced fetal movements, protocol for an international cluster randomised clinical trial; the CEPRA study. BMC Pregnancy Childbirth. 2021;21(1):285. doi: 10.1186/s12884-021-03760-2.

13. Housseine N, Browne J, Maaløe N, Dmello BS, Ali S, Abeid M, Meguid T, Rijken MJ, Kidanto H. Fetal movement trials: Where is the evidence in settings with a high burden of stillbirths? BJOG. 2023;130(3):241-243. doi: 10.1111/1471-0528.17249.

14. Radestad I, Pettersson K, Lindgren H, Skokic V, Akselsson A. Country of birth, educational level and other predictors of seeking care due to decreased fetal movements: an observational study in Sweden using data from a cluster-randomised controlled trial. BMJ Open. 2021;11(6):e050621. doi: 10.1136/bmjopen-2021-050621.

15. Akselsson A, Lindgren H, Georgsson S, Pettersson K, Steineck G, Skokic V, Rådestad I. Mindfetalness to increase women's awareness of fetal movements and pregnancy outcomes: a cluster-randomised controlled trial including 39 865 women. BJOG. 2020;127(7):829-837. doi: 10.1111/1471-0528.16104.

16. Nama, N. ., Ramzan, S. ., Umer Arain, S. ., Kasi, N. ., Bala, M. ., & Mahar, T. . (2022). Maternal and Neonatal Outcome of Women Having Decreased Fetal Movements in The Third Trimester of Pregnancy: A Cross-Sectional Study: Maternal and Neonatal Outcome of Women Having Decreased Fetal Movements. Pakistan Journal of Health Sciences 2024;3(05):137–141. https://doi.org/10.54393/pjhs.v3i05.201

17. Monari F, Menichini D, Salerno C, Gei V, Facchinetti F, Neri I. Women's perception of fetal movements and perinatal outcomes: results of a prospective cohort study. J Matern Fetal Neonatal Med. 2023;36(1):2193664. doi: 10.1080/14767058.2023.2193664.

18. Bradford BF, Cronin RS, Warland J, Akselsson A, Rådestad I, Heazell AE, McKinlay CJD, Stacey T, Thompson JMD, McCowan LME. Fetal movements: A framework for antenatal conversations. Women Birth. 2023;36(3):238-246. doi: 10.1016/j.wombi.2022.09.003.

19. Thompson JMD, Heazell AEP, Cronin RS, Wilson J, Li M, Gordon A, Askie LM, O'Brien LM, Raynes-Greenow C, Stacey T, Mitchell EA, McCowan LME, Bradford BF. Does fetal size affect maternal perception of fetal movements? Evidence from an individual participant data meta-analysis. Acta Obstet Gynecol Scand. 2023;102(11):1586-1592. doi: 10.1111/aogs. 14652.

20. Bashir S, Haq Aqsa IU, Niazi Q, Sadiq N, Khalil AK.Perinatal Outcome in Women at Term with Reduced Fetal Movements.J Soc Obstet Gynaecol Pak. 2022; 12(2):83-86

21. Habib F, Aslam M, Sadiq H, Sohail I, Asim M, Habib M. Role of Abnormal Intrapartum CTG in Predicting Adverse Fetal Outcome. J Soc Obstet Gynaecol Pak. 2023; 13(2):78-81.

22. Turner JM, Flenady V, Ellwood D, Coory M, Kumar S. Evaluation of pregnancy outcomes among women with decreased fetal movements. JAMA. 2021;4(4):e215071. doi: 10.1001/jamanetworkopen. 2021. 5071.

23. Bekiou A, Gourounti K. Reduced Fetal Movements and Perinatal Mortality. Mater Sociomed. 2020;32(3):227-234. doi: 10.5455/msm.2020.32.227-234.

24. Camacho EM, Whyte S, Stock SJ, Weir CJ, Norman JE, Heazell AEP. Awareness of fetal movements and care package to reduce fetal mortality (AFFIRM): a trial-based and model-based cost-effectiveness analysis from a stepped wedge, cluster-randomized trial. BMC Pregnancy Childbirth. 2022;22(1):235. doi: 10.1186/s 12884-022-04563-9.