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Research article

Pregnancy Outcomes of Reduced Fetal Movement and its Determinant Factors: A Case Control Study

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ABSTRACT

Background: Maternal perception of fetal movements is a self-screening method for assessing fetal well-being. There was limited evidence on pregnancy outcomes of reduced fetal movement in Ethiopia.

Objectives: The aim of this study was to assess pregnancy outcome of reduced fetal movement and its determinant factors.

Methods: Unmatched case control study design was conducted. All mothers were recruited from delivery ward in Injibara General Hospital, from 1st February to May 30th 2019. Cases were mothers who were presented with reduced fetal movement and controls were mothers who were not perceived reduced fetal movement. Bivariate and multivariate logistic regressions model were fitted to identify factors associated with reduced fetal movement. An adjusted odds ratio with 95 % confidence interval (CI) was computed to determine the level of significant.

Results: A total of 285 participants (95 cases and 190 controls) were included giving for a response rate of 100%. Impending preterm labor [AOR: 3.18, 95% CI :(1.48-6.84)], preeclampsia /eclampsia [AOR: 5.98, 95%CI : (2.99-11.99)], oligohaydraminous [AOR: 4.13, 95%CI: (1.64-10.44)], post term pregnancy [AOR: 5.61, 95%CI: (2.59-12.14)] increases the risk of reduced fetal movement.

Conclusion : Women presenting with reduced fetal movement are at increased risk of poor pregnancy outcomes including still birth, preterm birth, low appearance, pulse, grimace, activity and respiration (APGAR) score and increased rate of cesarean section .Impending preterm labor, preeclampsia /eclampsia, oligohaydraminous and post term pregnancy are the predicting factors for reduced fetal movement. Closely follow up and immediate intervention needed to reduced adverse birth outcomes related with decrease fetal movement.

Keywords: Ethiopia, pregnancy outcome, reduced fetal movement

ABBREVIATIONS

CI: Confidence Interval; AOR: Adjusted Odds Ratio; COR: Crude Odds Rati; RFM: Reduced Fetal Movement; SPSS: Statistical Package for Social Science

INTRODUCTION

Reduced fetal movement(RFM) affects 5-15% of pregnancies and is a frequently occurring antenatal presentation and associated with poor prenatal outcomes [1]. Maternal perception of fetal movement is one of the first sign of fetal life ,this is a manifestation of fetal wellbeing [2].

Fetal movement is a subjective measure , mainly assessed by maternal perception ,this counting allows the clinician to make appropriate interventions in right time to improve prenatal outcomes [3].

Fetal movement counting is when a pregnant woman counts and records her baby's movements in order to monitor the baby's health and defined as maternal sensation of any discrete kick,

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flutter, swish or roll and first perceived by the mother between 18 and 20 weeks of gestation [4] .

There is no agreed objective definition of reduced fetal movement due to nature of the movements can change as pregnancy advances , the a subjective perception of a decreases fetal movement being the most significant definition clinically [5].

Pregnant women become aware of fetal movement from 18-20 weeks and fetal movements are varying with a wide range in the number of movements per hour [6]. Fetal movement normally absent during sleep and occur regularly throughout the day and night, normally lasting 20-40 minute [7].

Fetal death is often indicated by maternal concerns about a reduction in fetal movements. Women who are concerned about decrease fetal movement should not wait until the next day for assessment [8]. The change may be short-term or may occurred over a longer period in response to diminished oxygen supply [9] .

Maternal perception of reduced fetal movements is associated with poor perinatal outcomes [10, 11]. Women who had experienced a stillbirth were more likely to indicate reduction in strength and frequency of fetal movement in the weeks preceding the fetal loss [12].

Different studies shows that there is a correlation of more than 50% between maternal perception and ultrasound in relation with reduced fetal movement [4, 13]. Reduced fetal movement increased burden of care like increased neonatal unit admission rates and induction rates [14].

Having reduced fetal movement and its recurrent episodes are common but as it is explained from a retrospective cohort study done on the outcomes of pregnancy with reduced fetal movement in the United Kingdom, there is no evidence to suggest that recurrent episodes of reduced fetal movement increase pregnancy risk [15].

Most of the time adverse prenatal outcome after having reduced fetal movement is closely related to factors which are connected to both structural and functional placental dysfunction [16, 17].

MATERIALS AND METHODS

Study design and setting

Unmatched case control study was conducted among 95 cases and 190 controls at Injibara General Hospital, Awi Zone, Amhara Region, Northwest Ethiopia from February 1, 2019 to May 30, 2019.Injibara town is the capital of the administrative center of Awi Zone. It is located about 447 km away from the capital city of Ethiopia, Addis Ababa and 118km from Bahir Dar a city of Amhara National Regional State. Injibara General Hospital provides health service to more than 1.2 million populations and in its catchment area there are 46 health centers and 5 district hospitals. The hospital has different departments that provide outpatient service, inpatient service and operative theatre department [18].

Population

All mothers delivered at Injibara General Hospital were the source population and all mothers delivered at Injibara General Hospital during the study period and fulfil the inclusion criteria were study population.

Inclusion and exclusion criteria

We included mothers with gestational age greater than 37 weeks and delivered in Injibara General Hospital during the study period. Exclusion criteria were mothers with multiple delivery and pregnancy with congenital anomalous. Simple random sampling technique was used to get all study units.

Sampling techniques

Controls were selected using simple random sampling technique among women who did not perceive reduced fetal movement and cases were selected using simple random sampling technique among women who perceive reduced fetal movement. Data was collected until the desired amounts of samples were obtained.

Data collection procedures and quality assurance

The questionnaire used in the study was developed from reviewing related literatures [6, 13, 19]. The data was collected by using pre tested interviewer-administered structured questionnaire and using chart review. Data collection tool (questionnaire) was prepared first in English and then translated to a local language Amharic and then re-translated back to English to verify the consistency and content of the questionnaire. Training was given for data collectors and supervisors. Pre-test was conducted for 10% of sample size and throughout the course of the data collection, interviewers was supervised and regular meetings was held between the data collectors, supervisor and the principal investigator together in which problematic issues arising from interviews was discussed and addressed. The collected data was reviewed and checked for completeness before data entry.

Statistical analysis

All collected questionnaires were checked manually for completeness and then coded and entered in to Epi-data version 3.5, then exported in to SPSS (statistical packages for social science) version 20 for analysis. Bivariate analysis was done for all explanatory variables in relation to maternal perception of reduced fetal movement. Variables having p-value < 0.20 in the bivariate analysis was selected for the multivariate logistic regression model for adjustment of confounding effect between explanatory variables. Adjusted odds ratio with 95 % confidence interval (CI) was computed and variables having P-value less than 0.05 in the multivariate logistic regression model was considered as statistically significant.

Guideline Statement

We assured that all methods were carried out after standardized guideline were reviewed and also by considering journal requirement regulations.

RESULTS

This study included 95 cases and 190 controls. The main age of cases was 29.58 (± 6.50) years and mean age of controls was 28.75(± 6.50) years. Fifty eight percent of cases and 48% of controls were rural dwellers. More than 90 % of cases and controls were orthodox religious follower. Almost 99% of both the case and controls were Amhara ethnic group. Regarding to occupation, 54(56.8%) of cases and 99(52%) of controls were housewife. And also 29.5% of cases and 32.6% of controls were not able to read and write.

Pregnancy outcomes

Pregnancy outcomes of women with reduced fetal movement were still birth 38%, preterm birth 33.7%, 5 minutes Apgar score < 7, 48.42% and cesarean section rate 29.47 %. Of 190 control groups; stillbirth accounts 10%, preterm birth 10.53%, 5 minutes Apgar score < 7, 14.21% and cesarean section rate 8.42% (Table 1).

Table 1: Pregnancy outcomes of reduced fetal movement (cases) and control group.

Pregnancy outcomes	Case(n=95)	Control(n=190)
Still birth	36(38%)	19(10%)
Preterm birth	32(33.7%)	20(10.53%)
5 minutes APGAR score < 7	46(48.42%)	27(14.21%)
Cesarean section rate	28(29.47 %)	16(8.42%)

Factors associated with reduced fetal movement

Multivariate logistic regressions revealed that impending preterm labor, preeclampsia /eclampsia, oligohaydraminous and post term pregnancy (gestational age > 42weeks) were significantly associated with reduced fetal movement.

The odds of reduced fetal movement was 3.18 times higher with impending preterm labor [AOR: 3.18, 95% CI :(1.48-6.84)]. Women with preeclampsia /eclampsia increased the odds of reduced fetal movement almost 6 times [AOR: 5.98, 95%CI : (2.99-11.99)].The odds of reduced fetal movement was 4.13 times increases with oligohaydraminous [AOR: 4.13, 95%CI: (1.64-10.44)].Post term pregnancy (gestational age >42weeks) increases the risk of reduced fetal movement by 5.61 times [AOR: 5.61, 95%CI: (2.59-12.14)] (Table 2).

Table 2: Determinants of reduced fetal movement in third trimester pregnancy among mothers delivered at Injibara General Hospital, Awi Zone ,Northwest Ethiopia,2019 (n=285).

Variable	Case	Control	COR (95%CI)	AOR (95%CI)	P- value
Maternal occupation					
Housewife	48	78	1	1	
Merchant	28	62	0.62(0.33-1.17)	0.49(0.23-1.05)	0.065
Employed	19	50	0.84(0.42-1.68)	0.84(0.42-1.68)	0.674
Fetal presentation					
Vertex presentation	75	163	1	1	
Non-vertex presentation	20	27	1.16(0.85-3.05)	1.72(0.76-3.89)	192
Impending preterm labor					
Yes	36	20	5.19(2.79-9.66)	3.18(1.48-6.84)*	0.003
No	59	170	1	1	
Preeclampsia/Eclampsia					
Yes	37	20	5.42(2.92-10.08)	5.98(2.99-11.99)*	0.001

No	58	170	1	1	
Oligohaydraminous					
Yes	28	10	7,52(3.57-16.32)	4.13(1.64-10.44)*	0.001
No	67	180	1	1	
Gestational age in weeks					
37-42weeks	65	174	1	1	
>=42 weeks	30	16	5.02(2.57-9.81)	5.61(2.59-12.14)*	0.001

*The italicized value indicated that a statistically significant association at 95% Confidence interval (CI) that did not include 1 in the interval.

1=reference category Hosmer and Lemeshow test for multivariable logistic regression= 0.99

DISCUSSION

Overall, in this study, women who were perceived reduced fetal movement had more adverse birth outcomes as compared to mothers who were not perceived reduced fetal movement. This study shows that pregnancy outcomes of reduced fetal movement were still birth, preterm birth, low Apgar score and increased rate of cesarean section. This finding consistent with findings of different studies [1, 20, 21]

The finding of this study revealed that the odds of reduced fetal movement was 3.18 time higher in mothers with impending preterm labor [(AOR: 3.18, 95% CI :(1.48-6.84)]. This might be related with the growth and maturation of the fetus in the preterm period [22]

Women with preeclampsia /eclampsia increases almost 6 times the odds of reduced fetal movement as compared to their counter parts [AOR: 5.98, 95%CI :(2.99-11.99)]. This is might be due to the effect of utero-placental insufficiency secondary to placental dysfunction in preeclampsia/eclampsia patients. Supported findings revealed that placental blood flow perfusion in patients with pre-eclampsia/eclampsia had a lower placental vasculature secondary to reduced surface area of placenta, villous hypoplasia, villous necrosis and decidual arterial hypertrophy as compared to non-preeclampsia women [23, 24].

Women with oligohaydraminous were 4.13 times increase the odds of reduced fetal movement as compared to women with normal amniotic fluid volume [AOR: 4.13, 95%CI: (1.64-10.44)]. This is might be due to the effect of oligohaydraminous on cord compression, fetal acidosis, meconium stained amniotic fluid and hinders free movement of the fetus. Similar finding shows that fetal movements are directly related with the reduction of amniotic fluid volume [25, 26].

The odds of reduced fetal movement in post term pregnancy was 5.61 times higher than term pregnancy [AOR: 5.61, 95%CI: (2.59-12.14)].Similar study revealed that the post term pregnancy is associated with an increase in utero-placental insufficiency , meconium aspiration and intrauterine infection ;this affects the integrity of the central nervous and musculoskeletal system[27].

Clinical implications

It is hypothesized that the finding used as a base line data for policy makers, practitioners. The finding also implies that maternal perception of reduced fetal movement is the first indicator for fetal wellbeing abnormalities. Early identification of decrease fetal movement with the aid of scientific measures and immediate intervention could reduce neonatal morbidity and mortality.

Research implications

The finding of this study could be used for researchers as a base line data to investigate additional information including objective data and also point researchers to focus on this area especially in resource poor countries.

LIMITATION

Since this study is facility based it may lacks generalization about all pregnant mothers who gave birth at home and outcome variables depend on the study participant's memory.

CONCLUSION

Every mother who presents with concern about reduced fetal movements should be taken seriously. Still birth, preterm birth, birth asphyxia and increase rate of cesarean section were poor prenatal outcomes of educed fetal movement. There are various factors which predict the occurrence of reduced fetal movement mainly impending preterm labor, preeclampsia /eclampsia, oligohaydraminous and post term pregnancy.

DECLARATION

Ethical approval and consent to participate

The Ethical clearance was obtained from the ethical review board of the Bahirdar University and supporting letter was written to Injibara General Hospital. Written informed consent was obtained from each study participants after explained the purpose and objective of the study.

Consent for publication

Written informed consent was obtained from clients for publication of the finding and any accompanying images.

Availability of Data and materials

The data used to support the findings of this study are available from the corresponding author upon formal request.

Competing interests

We declared that we did not have competing interest.

Authors' contributions

HG was conceiving the research idea and wrote the proposal, involved in supervising of data collection process, performing the statistical analysis, preparation of the final document and writing the manuscript. AT and AM had been involved in supervising the data collection process, data analysis and interpretation of the data and reviewing the manuscript. All authors read and approved the manuscript

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