Does Hypertensive Disorder and Obstetric Factors Associate with Still Birth Among Women Who Gave Birth in Selected Hospital of Southwestern, Ethiopia?

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DOES HYPERTENSIVE DISORDER AND OBSTETRIC FACTORS ASSOCIATE WITH STILL BIRTH AMONG WOMEN WHO GAVE BIRTH IN SELECTED HOSPITAL OF SOUTHWESTERN, ETHIOPIA?

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Abstract

Background: The cause of stillbirth is often unknown, but can be attributable to various causes; hypertensive disorders and obstetric factors supposed to complicate pregnancy and may cost the life of the fetus. It is the series pregnancy problem not precisely known and only available few research findings are inconsistent & not well established.

Objectives: The aim of this study is to assess the association between Stillbirth and hypertensive disorder and obstetric factors.

Methods: Facility based unmatched case-control study design was employed from January2018 to June2019, (287 cases and 574 controls) was selected using systematic random sampling methods. Double population proportions formula with 1:2 case to control ratio was used to calculate sample size with 95% confidence interval and 80% power. The data was collected from clinical records of mother's a using data collecting checklist. Epi data version 4.4.2.1 was used for data entry, and analysis was done by SPSS version 21 statistical software. Descriptive analysis such as frequency, percentage and chi-square test were done. For the inferential analysis, a multivariable analysis was done. Statically significant was used at a p-value <0.05 both for the univarible and multivariable analysis.

Result: Women who had hypertensive disorder were 1.76 times at risk to have stillbirth than no hypertensive disorder (AOR: 1.76: 95%CI :(1.06, 2.9). In addition, women who had first antenatal care at third trimester were 4 times at higher risk to have still birth than women, who had first antenatal care at first trimesters (AOR: 4, 95%CI: (1.54, 11). Women who had more than four children were 2.6 times at higher risk of having still birth compared with women one child (AOR: 2.6, 95%CI: (1.2, 5.7). Furthermore, the odds of having still birth was found to be higher in women, who had blood group O than blood group A (AOR: 1.7: 95%CI: (1.057, 2.8).

Conclusion: According to the findings of this study, we conclude that a hypertensive disorders and obstetric factors were risk factors for stillbirth. Therefore, it is significant to give special attention to women with hypertensive disorder and multipara women.

Key: Still birth, Obstetric, hypertensive, Southwester, Ethiopia

1.1. Background

The American College of Obstetricians and Gynaecologists (ACOG) defines stillbirth as delivery of fetus with no sign of life like absence of breathing, heart beats, pulsations in umbilical cord and no voluntary movement of muscle. International classification of diseases (ICD) classifies late fetal deaths (greater than 1000 g or after 28 weeks) and early fetal death 500 to 1000 g or 22–28 weeks(1). Stillbirth is varied between countries and even between studies conducted in the same country. World health organization (WHO) also recommended stillbirth greater than or equal to 28weeks of gestation or ≥1000g for international comparison(2). Ethiopia has also considered a still birth, if fetal loss is >28 weeks of gestation.

Globally stillbirth rate was 18 per1000 live births in 2015 though the rate varied significantly between countries and across country depending on their income categories. However, large proportion (98%) of the stillbirth rate concentrated among low- and middle-income countries (LMICs). Even from the LMICs, about 77% of the burden was in Sub-Saharan Africa (SSA) and South East Asian countries. In comparison, national still birth rates in Western Europe was about less than 2 per 1000 total live birth while the SSA rate was about more than 30 per 1000 total live birth, in 2015.Though we found that the magnitude of stillbirth rate was very high in SSA, the reduction remains the slowest compared with other regions (2-4).

Obstetric and Medical factors are complicated pregnancy and endanger the life of the fetus during pregnancy. Among Medical risk factors (HDP) was the most common risk factor, which has been associated with still birth. It was found in 8% of pregnancies and may affect as many as 20% of pregnancies. HDP include preeclampsia, gestational hypertension and chronic hypertension (7, 8).

Factors associated with stillbirth are not precisely known the available few research findings are inconsistent & also the effect is not well established. Finding of research done SNNPRS showed that stillbirth birth rate 85 per thousand total births, which is more than national stillbirth rate of Ethiopia(5, 8). Therefore, the aim of this study is to assess the association between stillbirth and hypertensive disorder and obstetric factors.

2. Methods and materials

2.1. Study setting and design. This study was done using data from university teaching hospital of Southwest Ethiopia. A retrospective a case control study design was used to include the participant's data from all pregnant women, who was seeking delivery services at Mizan–Tepi University Teaching Hospital from 2014 and 2018. This study included all pregnant women, who were seeking delivery services at Mizan–Tepi University Teaching Hospital in the study period. Mother Charts that didn't include the status of birth outcome, mother whose age was not the range from 15-49 years old, and baby delivered before 28 weeks of gestation were excluded from the study.

2.2. Variables and Data Collection. The association of stillbirth was assessed for women weight, women age, number of ANC, blood group, gestational age, mal-presentation, and gestational age at first antenatal care, number of antenatal cares, number of births, history of abortion, history of stillbirth, obstetric complication & iron supplementations.

The data was extracted from clinical recorded of woman using a structured data collection checklist in line with the research objectives. Important information also retrieved from charts of mother. The data was extracted by two midwives nurse (diploma) for one month and supervised by one midwives (BSc). Training was given for two days for reviewer and supervisor before actual data collection focused on objectives of the study and techniques of data collection.

2.3. Data analysis Data was entered into Epi data 4.4.2.1 and analysis was done on SPSS version 21 software. Bivariate logistic regression followed by multiple logistic regressions was done. Those variables, whose p value 0.05 or below were recruited for the multivariable logistic regression, and analysis was done to assess the effect of independent variables on dependent variable and to control the confounders. Odds Ratio and 95% Confidence Interval (CI) were used to measure the association between independent and outcome variable. Variables with P-value <0.05 were considered statistical significance. The Hosmer -Lemeshow goodness of fit test was used to check the model fitness.

2.4. Operational definitions

Stillbirth is defined as a baby born after 28 weeks of gestation age, who did not have any time after delivery, breathe or show any other sign of life (1).

Hypertensive disorders in pregnancy were multisystem disease, and which includes: Preeclampsia, Pre-existing hypertension and gestational hypertension.

Preeclampsia:-Rising of blood pressure with significant proteinuria was used to diagnose preeclampsia:- Pre-existing hypertension: is defined as hypertension that was present either pre-pregnancy or that develops at before 20 weeks gestation, The development of an elevated blood pressure during the second half of pregnancy without proteinuria was used to diagnose gestational hypertension(8, 9).

2.5. Ethical considerations Ethical clearance was obtained from the Research Ethics Committee of the School of Public Health, College of Health Sciences in Addis Ababa University. The informed written consent and ethical clearance was given to Mizan–Tepi University Teaching hospital, and concerned respective management bodies, and then data was extracted based on required information to meet the research objective from available resource on patient card.

3. Result

A total 861 respondents were included in this study with cases to control ratio of 1:2(287 cases and 574 controls). The median age of the women among cases and control were 28 and 26 years respectively. There was significant difference in weight among cases and controls, about 97(33.8%) cases had weight less than 53kg and 92(16%) control had weight less than 53 kg. About (20%) of the women on first visit and majority (70%) of the women on second and third visit, and while (10%) of women had at four visit. Approximately 17% of the women had their first visit at the first trimesters, of which 12% of birth outcome were stillbirth. Similarly, 20% of women had their first ANC at third trimesters from which 66% of their birth outcome was stillbirth. Forty-nine (6%) of women had mal-presentation, of which, 12 (24.5%) of their birth outcome were still birth. From these 29(72.5%) of the women had stillbirth history, while 11 (27.5) of them has no previous history.

The Proportion of still birth with gestational age less than 37 weeks were 358(41.8%), of which, 155 (43.3%) of their birth outcome were still birth, and 132(26%) of stillbirth were found in gestational age of greater than 37weeks. Forty-nine (53%) still births were directly related to obstetric complication, whereas 238(31%) of still birth were occurred on women, who had no

obstetric complication. About 246 (46%) of cases were supplemented iron for fewer than three months, and around 290(44%) of control women were taken iron for three or more months. Women, who were taken iron for fewer than three months, (46%) of them had experience still birth, while, (44%) of still birth were found from those, who had supplemented iron for three or more months (Table1).

Table 1: Obstetric characteristics of the respondents who attended delivery service in MizanTepi University Teaching Hospital, Bench Maji Zone, 2019(N=861)

Variables	Cases (%)	Controls(%)	Chi-square(X^2)	PV
Women weight during 1st ANC			35	.001
<53kg	97(33.80)	92(16.00)		
≥53kg	188(65.50)	480(83.60)		
Women weight during delivery			8	.005
<53kg	12(4.20)	7(1.20)		
≥53kg	274(95.80)	567(98.8)		
Number of ANC			.38	.001
1	116(40.41)	53(9.20)		
2-3	161(56.09)	443(77.20)		
≥4	10(3.5)	78(13.60)		
GA at first ANC			.46	.001
8-12weeks	19(6.62)	132(22.1)		
13-24weeks	96(33.50)	354(61.70)		
≥25weeks	17 (59.6)	87(15.20)		
Presentation			.046	.17
Cephalic	275(95.82)	537(93.56)		
Non-cephalic	12(4.18)	37(6.44)		
History of stillbirth			28	.001
Yes	29(72.50)	11(27.50)		
No	258(31.40)	563(68.60)		
GA age			27	.001
≤37weeks	155 (43.30)	203 (56.70)		
>37weeks	132 (26.20)	371 (73.80)		
Obstetric complication			17.6	.001
Yes	49(52.70)	44(47.30)		
No	238(31.00)	530(69.00)		

ANC: antenatal care, **GA:** gestational age, **kg**: kilogram

Multiple logistic regression analysis hypertensive disorder, women age, residence, referral status, blood group, gestational age at first antenatal care, number of births, iron supplementation and parity were significantly associated with still birth as clearly depicted in(Table2). Women with hypertensive disorder were 1.76 times at risk to have stillbirth than women with no hypertensive disorder (AOR: 1.8, 95%CI: (1.06, 2.90). Women who were in age group of 25-34 were 56.5% less likely at risk for stillbirth than being in age group15-24 (AOR: 0.435, 95%CI :(.30,0.62) in contrary women whose age above 35 year were 4 times at risk to develop still birth than15-24 women age group (AOR:3.9,95%CI:(2.2, 6.7).

Residence in rural area was statistically significant risk factor for stillbirth. Multivariable analysis shows that women, who live in rural were 2.4 times more likely to have still birth than live in urban area (AOR: 2.4, 95%CI :(1.7, 3.65). And women who were referred to study hospital were found to be at higher risk to have stillbirth compared to women directly admitted to study hospital. The odds of having stillbirth was six times higher for women who referred than women directly admitted to study hospital (AOR: 5.9, 95%CI :(3.9, 9).

Blood group of the women was also found to be independently associated still birth. The odds of having still birth was found to be higher in women who had blood group O than those had blood group A (AOR: 1.7, 95%CI: (1.057, 2.8).

Likewise, multiple logistic regressions showed that the risk of having still birth was impacted by gestational age at first antenatal care. Women who had first antenatal care at third trimester were at higher risk to had still birth. Women who had first antenatal care at third trimester were 4 times at higher risk to have stillbirth compared to women who had first antenatal care at first trimesters (AOR:4.11,95%CI:(1.54, 11).

Women who had two and three children were 72% less likely to have still birth than women who had one child (AOR: .28 95%CI: .16, .49). On the other hand, women who had more than four children were at high risk of still birth. Women who had more than four children were 2.6 times at higher risk of having still birth compared to with women one child (AOR: 2.60 95%CI: 1.20, 5.75). Lastly iron supplementation was significantly associated with having stillbirth. Women who were received iron for less than three months were 1.8 times at risk of having stillbirth than women who received iron for more than three months (AOR: 1.8, 95%CI:(1.031, 3.15)(Table2).

Table 2: Multivariable logistic regression analysis on association of stillbirth and hypertensive disorder, socio-demographic and obstetric factors among women attended delivery service, Bench Maji Zone, Southwester Ethiopia 2019

Variables	Cases (%) n (%)	Controls (%)n (%)	COR (95%CI)	AOR (95%CI)
Hypertensive disorder				
Yes	31 (10.80)	37(6.50)	1.80(1.07,2.90)	1.76(1.06,2.90)**
No	256(89.2)	537(93.5)	1	1
Women age				
15-24	116 (40.40)	188(32.80)	1	1
25-34	92(32.10)	361(62.90)	.41(.29,.57)	.43(.30,.62)**
≥35	79(27.5)	25(4.40)	5(3-8.40)	3.90(2.20-6.70)
Residence				
Urban	114(39.70)	368(67.20)	1	1
Rural	173(60.30)	188(32.80)	3.10(2.30,4.10)	2.40(1.70,3.65)**
Referral				
Yes	116(40.40)	52(9.050)	6.80(4.70,9.80)	5.90(3.9,90)**
No	171(59.60)	522(90.94)	1	
Blood group				
A	50(17.40)	137(28.90)	1	1
B	54(18.80)	138(24)	1.07(.68,1.68)	1.18(.69,20
AB	46(16)	141(24.60)	.89(.56,1.40)	1.04(.60,1.8)
O	137(47.40)	158(27.50)	2.37(1.60,3.50)	1.70(1.05,2.80)**
GA at first ANC				
8-12	19(6.62)	132(22.1)	1	1
13-24	96(33.50)	354(61.70)	1.8(1.10,3.20)	1.27(.64,2.49)
≥25	171(59.6)	87(15.20)	13.6(7.9,23.5)	4.11(1.54,11)**

Parity				
1	104(36.20)	115(20)	1	1
2-3	106(36.90)	425(74)	.27(.19,.38)	.28(.16,.49)
≥4	77(26.80)	34(6)	2.48(1.5,4)	2.60(1.20,5.75)**
Duration of iron supplement				
<3months	246(85.70)	290(50.50)	2.90(1.90,4.50)	1.80(1.03,3.15)**
≥3months	41(14.30)	284(49.50)	1	1

ANC: ante natal care, **GA**: gestational age, **HD:** hypertensive disorder, **Percentage is calculated from column total

4. DISCUSSION

The study found that hypertensive disorder, age of the women, residence, being referred from other facility, women of O blood group, starting first ANC after 25 weeks of gestation, parity, iron supplementation during pregnancy were identified risk factors for stillbirth.

In the multivariable analysis result showed that women, who had hypertensive disorder were 1.76 times at risk to have stillbirth than women who hadn'thypertensive disorder. This finding is in line with research conducted before in Ghana and Pakistan (10, 11), although it was lower than study done in Ethiopia. This discrepancy might be due to study setting, that former study was done in tertiary and specialized health care centre in spite of this more of complicated case might happen in tertiary and specialized health care centre. In addition, improvement in health care service delivery health facilities and health care utilization behaviour of the Womens may have also contribution for observation of lower of stillbirth.

Age of the woman was found to be a risk factor for having of stillbirth. Women, who were in age group25-34 years were 56% less likely at risk of stillbirth compared to age group of 15-24years. However, there was increased risk of stillbirth among advanced women age, women, whose age greater than 35 years were 4times higher risk of stillbirth than being in age group15-24, this research finding is in agreement with study done in Taiwan (12). In this extrem age of uterine vasculature change , less antenatal care contact , hypertensive disorder might be the possible reson(10).

Place of residence was found to be a risk factor for having stillbirth. Multivariable analysis shows that women who live in rural were 2.4 times more likely to have still births than women who live in urban. This finding is in agreement with study done in Jimma (8) that might be due to health care system or health seeking behaviour and life style of the women who live in rural area.

Likewise,women who were referred to study hospital from another facility were found to be at higher risk to have stillbirth compared to women directly admitted to study hospital. The odds of delivering still birth was6 times higher for women who referred than women directly admitted to study hospital. This odd of still birth was higher than study done in Kampala (13). Variation may be due to the quality of health care service, the condition of road and cultural variation.

Blood group of the women was found to be risk factor for having of still birth in this research. The odds of having still birth were found to be higher among women who had blood group O than women who had blood group A. This finding is supported by studies done before (14, 15). This might be related with incompatibility of maternal and foetal blood that happened by is the transfusion of embryo red blood cells to the mother circulation could stimulate the antibodies against embryo cells and could cause mild to severe haemolytic anaemia. The foetus contains B antigen inherited from a father that is not present in the mother and the mother carry naturally occurring antibodies in her serum, anti-A or anti-B, Leak through the placental membrane of an O type mothers may be destroyed by anti-A or anti-B antibodies.

Having of still birth was also impacted by gestational age at first antenatal care. Women who had first antenatal care at third trimester were at higher risk to have of still birth. Women who had first antenatal care at third trimester were 4 times at higher risk to have of stillbirth compared to women who had first antenatal care at first trimesters .This findings was not consistent with the study done in south Africa(12) that indicated there was no effect of gestational age at first ante 33natal care visit on stillbirth outcomes .May be because of the quality of ANC care matter rather than the timing of antenatal care initiation.

Number of children a mother had was found to be risk factor for a woman to have stillbirth. Women who had twoand three children were 72% less likely to have still birth than women who had one child. In the other manner women who had more than four children were also at increased risk of having of still birth. Women who had more than four children were 2.6 times at higher risk of having still birth compared to with women one child. This result was inline research findings of Pakistan and Ethiopia(10,16).

This research finding also showed that iron supplementation has significant factor with stillbirth. Women who were supplemented iron for less than three months were1.8 times at risk of having of stillbirth than women, who received iron for more than three months. The possible association between iron supplementation and reduced risk of stillbirth specifically in the first trimesters may be due to increase in hemoglobin concentration.

5. Conclusion And Recommendations

5.1. Conclusion.

According to the findings of this study we conclude that hypertensive disorder and obstetric factors were risk factors for stillbirth. In this study age of ≥35 years, rural residence, being referred from other facility, mother of O blood group, starting ANC after 25 weeks of gestation, parity and iron supplementation were risk factors for stillbirth

5.2. Recommendation.

Factors associated with still birth in this research may be used to prevent stillbirth specifically among pregnant women with HD and obstetric problems.

For health care providers: It is very important to give special attention to women with HD, multi-Para women, timing of ANC initiation and iron supplementation

For public: women shall be encouraged to have regular followed up of ANC

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Author's contribution
Melese Tebeka contribute write up all body of research and data analysis
Sisay Ketema contribute on manuscript preparation

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