

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

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Abstract

Background: The cause of stillbirth is often unknown, still many lives are lost pre-birth globally.

Objectives: The aim of the study was to assess the determinant of Stillbirth among pregnant women.

Methods: Facility-based unmatched case-control study design was employed among pregnant women with 287 cases and 574 controls. A systematic random sampling method was used to select participants. Data were analyzed and descriptive and inferential analysis was done with significant associated at p -value < 0.05 with 95% CI.

Result: Pregnant women with the hypertensive disorder, first antenatal care attending at the third trimester, those had children four and those had blood group O was significantly associated with the risk of stillbirth.

Conclusion: According to the findings of this study, hypertensive disorders and obstetric factors were risk factors for stillbirth.

Keywords: Stillbirth, Obstetric, hypertensive, Southwester, Ethiopia

Introduction

Background

The American College of Obstetricians and Gynaecologists (ACOG) defines stillbirth as the delivery of a fetus with no sign of life like the absence of breathing, heartbeats, pulsations in the 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 28 weeks of gestation or ≥ 1000 g for international comparison [2]. Ethiopia has also considered a stillbirth if the fetal loss is > 28 weeks of gestation.

Globally stillbirth rate was 18 per 1000 live births in 2015 though the rate varied significantly between countries and across countries depending on their income categories. However, a large proportion (98%) of the stillbirth rate is concentrated among low- and mid-

dle-income countries (LMICs). Even from the LMICs, about 77% of the burden was in Sub-Saharan Africa (SSA) and Southeast Asian countries. In comparison, national stillbirth 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 the stillbirth rate was very high in SSA, the reduction remains the slowest compared with other regions [2,3]. 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 stillbirth [4,5]. It was found in 8% of pregnancies and may affect as many as 20% of pregnancies. HDP includes preeclampsia, gestational hypertension, and chronic hypertension [6,7].

Factors associated with stillbirth are not precisely known the available few research findings are inconsistent and the effect is not well established. The finding of research done by SNNPRS showed that the stillbirth birth rate was 85 per thousand total births, which is

more than the 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.

Methods and Materials

Study Setting and Design

The study was conducted in Mizan Tepi university teaching hospital Southwest Ethiopia. A retrospective case-control study design was used and included all pregnant women, who had been attended for pregnancy follow up from 2014 and 2018. Mother Charts that did not include the status of the birth outcome, age of mother other than the range of 15-49 years old, and baby delivered before 28 weeks of gestation were excluded from the study.

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 were extracted from clinical records of women using a structured data collection checklist in line with the research objectives. Important information was also retrieved from the charts of the mother. The data were extracted by two midwives nurses (diploma) for one month and supervised by one midwife (BSc). The 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.

Data Analysis

Data were entered into Epi data 4.4.2.1 and analysis was done with SPSS version 21 software. The Hosmer-Lemeshow goodness of fit test was used to check the model fitness. Bivariate logistic regression with a p-value 0.25 or below was recruited for the multivariable logistic regression and analyzed to assess the predicted variable with Odds Ratio and 95% Confidence Interval (CI) to measure the association between independent and outcome variables. Variables with P-value <0.05 were considered statistical significance.

Operational Definitions

Stillbirth

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

Hypertensive disorders

Hypertensive disorders in pregnancy were multisystem diseases,

which include Preeclampsia, Pre-existing hypertension, and gestational hypertension.

Preeclampsia

Rising 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 before 20 weeks gestation, The development of elevated blood pressure during the second half of pregnancy without proteinuria was used to diagnose gestational hypertension [8, 9].

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 were 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 the available resources on the patient card.

Result

A total of 861 respondents were included in this study with a case 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 a significant difference in weight among cases, 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 the first visit and the majority (70%) of the women on the second and third visit, and while (10%) of women had at four visits. Approximately 17% of the women had their first visit at the first trimesters, of which 12% of birth outcomes were stillbirth. Similarly, 20% of women had their first ANC at third trimesters of which 66% of their birth outcome was a stillbirth. Forty-nine (6%) of women had mal-presentation, of which, 12 (24.5%) of their birth outcomes were stillbirth. From these 29(72.5%) of the women had a stillbirth history, while 11 (27.5) of them has no previous history.

The Proportion of stillbirths with gestational age less than 37 weeks were 358(41.8%), of which, 155 (43.3%) of their birth outcome were stillbirth, and 132(26%) of stillbirth were found in gestational age of greater than 37weeks. Forty-nine (53%) stillbirths were directly related to obstetric complications, whereas 238(31%) stillbirths 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 experienced stillbirth, while, (44%) of stillbirth were found from those, who had supplemented iron for three or more months (Table 1).

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 1 st 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 stillbirth as clearly depicted in (Table 2). Women with the hypertensive disorder were 1.76 times more at risk to have a stillbirth than women with no hypertensive disorder (AOR: 1.8, 95%CI: (1.06, 2.90)). Women who were in the age group of 25-34 were 56.5% less likely at risk for stillbirth than being in age group 15-24 (AOR: 0.435, 95%CI :(.30,0.62) in contrary women whose age above 35 years were 4 times at risk to develop stillbirth than 15-24 women age group (AOR:3.9,95%CI:(2.2, 6.7)).

Residence in rural areas was a statistically significant risk factor for stillbirth. Multivariable analysis shows that women, who live in rural were 2.4 times more likely to have a stillbirth than live in urban areas (AOR: 2.4, 95%CI :(1.7, 3.65)). In addition, women who were referred to study hospitals were found to be at high-

er risk to have stillbirth compared to women directly admitted to study hospitals. The odds of having stillbirth was six times higher for women who were referred than women directly admitted to study hospital (AOR: 5.9, 95%CI :(3.9, 9)).

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

Likewise, multiple logistic regressions showed that the risk of having stillbirth was impacted by gestational age at first antenatal care. Women who had first antenatal care in the third trimester were at higher risk to had stillbirth. Women who had first antenatal care in the 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 a stillbirth 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 stillbirth. Women who had more than four children were 2.6 times at higher risk of having stillbirth compared to with women one child (AOR: 2.60 95%CI: 1.20, 5.75).

Lastly, iron supplementation was significantly associated with having a stillbirth. Women who were received iron for less than three months were 1.8 times more 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, Southwest 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

Discussion

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

The multivariable analysis result showed that women, who had hypertensive disorder, were 1.76 times more at risk to have a stillbirth than women who had the hypertensive disorder. This finding is in line with research conducted before in Ghana and Pakistan, although it was lower than the study done in Ethiopia [09,10]. This discrepancy might be due to the study setting, that the former study was done in tertiary and specialized health care centres in spite

of this more complicated case might happen in tertiary and specialized health care centres. In addition, improvement in health care service delivery health facilities and health care utilization behaviour of the Women may have also contributed to the observation of lower stillbirth.

The age of the woman was found to be a risk factor for having a stillbirth. Women, who were in the age group 25-34 years were 56% less likely at risk of stillbirth compared to the age group of 15-24 years. However, there was an increased risk of stillbirth among advanced women age, women, whose age greater than 35 years were 4 times higher risk of stillbirth than being in age group 15-24, this research finding is in agreement with the study done in Taiwan [11]. In this extreme age of uterine vasculature change, less antenatal care contact, the hypertensive disorder might be the possible reason [9].

Place of residence was found to be a risk factor for having a stillbirth. Multivariable analysis shows that women who live in rural were 2.4 times more likely to have stillbirths than women who live in urban. This finding is in agreement with a study done in Jimma that might be due to the health care system or health-seeking behaviour and lifestyle of the women who live in rural areas [7].

Likewise, women who were referred to study hospitals from another facility were found to be at higher risk to have stillbirth compared to women directly admitted to study hospitals. The odds of delivering stillbirth was 6 times higher for women who were referred than women directly admitted to study hospital. This odd of stillbirth was higher than the study done in Kampala [12]. Variation may be due to the quality of health care service, the condition of the road and cultural variation.

The blood group of the women was found to be a risk factor for having a stillbirth in this research. The odds of having stillbirth 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 [13,14]. This might be related to the 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 mother may be destroyed by anti-A or anti-B antibodies.

Having of stillbirth was also impacted by gestational age at first antenatal care. Women who had first antenatal care in the third trimester were at higher risk to have of stillbirth. Women who had first antenatal care in the third trimester were 4 times at higher risk to have stillbirth compared to women who had first antenatal care in the first trimesters. These findings were not consistent with the study done in South Africa that indicated there was no effect of gestational age at first ante 33 natal care visit on stillbirth

outcomes [11]. Maybe because of the quality of ANC care matter rather than the timing of antenatal care initiation.

A number of children a mother had were found to be a risk factor for a woman to have a stillbirth. Women who had two and three children were 72% less likely to have a stillbirth than women who had one child. In the other manner women who had, more than four children were also at increased risk of having a stillbirth. Women who had more than four children were 2.6 times at higher risk of having stillbirth compared to with women one child. This result was in line with the research findings of Pakistan and Ethiopia [10,15].

This research finding also showed that iron supplementation has a significant factor in stillbirth. Women who were supplemented with 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. The possible association between iron supplementation and reduced risk of stillbirth specifically in the first trimesters may be due to an increase in haemoglobin concentration.

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 another facility, mother of O blood group, starting ANC after 25 weeks of gestation, parity and iron supplementation were risk factors for stillbirth

Recommendation

Factors associated with stillbirth 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, the timing of ANC initiation and iron supplementation

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

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Author's contribution

Melese Tebeka and Biruktawit Solomon contribute write up all body of research and data analysis and Sisay Ketema contribute on manuscript preparation

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