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Prevalence and associated Factors of Adverse Birth Outcomes among Women Attended Maternity Ward at Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia

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Abstract

Background: Throughout the world, approximately 210 million women become pregnant and over 135 million of them deliverr live born infants, while 75 million pregnancies end in stillbirth, preterm or spontaneous or induced abortion. Though there are studies on the various forms of adverse birth outcomes particularly in developing countries and few parts of Ethiopia there is limited data on the adverse birth outcomes at Negest Elene Mohammed memorial general hospital in Hosanna town Sothern Ethiopia.

Objective: The aim of the study was to assess the prevalence and associated factors of adverse birth outcomes among deliveries at Negest Elene Mohammed memorial general hospital in Hosanna Town, south west of Ethiopia.

Methods: Facility based Cross sectional quantitative study was carried out from March 1 to May 2, 2015 at Negest Elene Mohammed memorial general hospital. A convenient sampling technique was used to select 327 study participants. Data was collected using a pre-tested structured interviewer administered questionnaire and measurements of weight of the new born were taken and client's chart was reviewed to retrieve medical information. The data was entered into SPSS version 20.0 statistical software for windows for analysis, then, logistic regression analysis was carried out to identify independent predictors of adverse birth outcomes at CI of 95% and significance level of P-value<0.05.

Result: The study finding showed that 80 (24.5%) of women had adverse birth outcomes. The common adverse birth outcomes were still birth, preterm, and low birth weight with the proportion of 28 (8.6%), 28(8.6%), and 32 (9.8%), respectively). Being government employee [AOR=4.5,95%CI(1.25,15.9)], lack of antenatal care [AOR=3.2,95%CI(1.27,8.06)], rural residence [AOR=3.5,95%CI(1.57,7.93)], hemoglobin<11 mg/dl [AOR=2.5,95%CI(1.1,5.45)], malarial infection [AOR=8.6,95%CI(2.6,22.62)], age<20 years [AOR=4.9,95%CI(11.29,18.6)], pregnancy complications [AOR=6.3%CI(2.8,13.9)], were associated with adverse birth outcomes.

Conclusion: Occupation, residence, age, malarial infection, lack of antenatal care, hemoglobin level, and pregnancy complications were associated with adverse birth outcomes. Increasing antenatal care uptake, prevention and treatment of malarial infection, and anemia and improvements in quality of maternal health services require strict attention.

Keywords: Adverse; Birth outcomes; Preterm birth; Birth weight; Still birth

Abbreviations: SNNPR: South Nation and Nationality People Region; SPSS: Statistical Package for Social Science; CI: Confidence Interval; AOR: Adjusted Odds Ratio; HIV: Human Immunodeficiency Virus; NEMMGH: Negest Elene Mohammed Memorial General Hospital

Introduction

Birth outcomes are measures of health at birth. Birth outcomes have improved dramatically worldwide in the past 40 years. Yet there is still a large gap between the outcomes in developing and developed countries [1]. Adverse birth outcomes such as stillbirth, low birth weight and preterm birth constituted the highest rates of all the adverse pregnancy outcomes and are common in developing countries [2].

Low birth weight infants may suffer the risk of developing many complications which includes respiratory distress, sleep apnea, heart problems, jaundice, anemia, chronic lung disorders, and infections are some of the problems associated with low birth weight babies [3].

Complications of preterm birth also outrank all other causes as the world's number one killer of young children. Complications from preterm birth caused nearly 1.1 million of the 6.3 million deaths of children under age 5 in 2013. Of those more than 3,000 children under the age of 5 die worldwide each day from preterm birth complications, making it the leading cause of death among young children. Direct complications from preterm birth caused 965,000 deaths among children up to 28 days old, and another 125,000 deaths among children aged one month to five years [4]. Preterm born infants that survive often face lifelong health problems such as breathing and respiratory difficulties, cerebral palsy, vision and hearing loss, feeding and digestive problems, and intellectual disabilities [5]. Stillbirth is also a major contributor to perinatal mortality rate. At least 2.6 million stillbirths occur every year, 98% in low-income and middle-income countries [6].

As to the factors associated with adverse birth outcomes, late or no

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antenatal care care, pregnancy and labor complications, malaria attacks during pregnancy, anemia, short interpregnancy intervals, maternal education, age, poor nutrition and low socioeconomic status etc were found to play a significant role [1].

A cross-sectional study conducted in Brazil, showed that women living in rural areas were found to be at increased risk of giving birth to a neonate with very low birth weight compared to urban dwellers [7]. Similarly, women with inter-pregnancy intervals<6 months had an increased risk of having low birth weight and preterm birth. However, equivocally, prolonged inter-pregnancy intervals also found to be associated with low birth weight and still births [8].

Similarly, a cross-sectional study conducted in India to compare obstetrical complications in two parity groups, primiparity and multiparty and further determine the association of parity status with neonatal outcomes, the findings showed that the Low Birth Weight babies was significant association with primiparity [9].

A study conducted in china revealed that LBW was found to be associated with maternal age of less than 20 years, low level of maternal education(illiterate), previous histories of adverse pregnancies, and with pregnancy comorbidities and complications, such as hypertensive disorders during pregnancy, anemia, oligohydramnios, premature rupture of membranes, and gestational diabetes [10]. Additionally, a study conducted in Iran to determine prevalence and risk factors associated with preterm birth, revealed that the prevalence rate of preterm birth was 5.1% and history of previous preterm birth, pregnancy complications (hypertension, oligohydramnios, preeclampsia, premature rupture of membrane, antepartum hemorrhage, hyperemesis gravidarum), anemia were factors associated with preterm birth [11].

A cross sectional study conducted in Pakistan to evaluate the antenatal maternal hemoglobin and find its impact on perinatal outcome, the findings revealed that the mothers with anemia have higher risk of having low birth weight, preterm births and still birth [12]. Another study in same area carried out to determine the obstetric causes for stillbirth in low socio-economic settings, showed that obstructed labor, hypertensive disorders, abruption placenta, placenta previa, and preterm labor were associated with still birth [13].

Study conducted in Tanzania to determine the risk factors for poor birth outcomes revealed that the prevalence adverse birth outcomes was 18% among which 2.7% were still birth, 12% preterm and 8% low birth weight, and adverse birth outcomes were independently associated with maternal malaria and anemia [14]. Another cross sectional study conducted in Ghana (Kumasi), to investigate factors influencing antenatal care utilization and its association with adverse pregnancy outcomes (low birth weight, stillbirth and preterm delivery) showed that the prevalence of adverse birth outcome was 19%, and women who had more than 5 births were found to be more likely to experience adverse birth outcomes [15].

A cross-sectional study carried out in Nigeria to find out the epidemiological factors associated with low birth weight low birth weight among institutional deliveries, showed that 40.0% of mothers delivered low birth weight babies, and were significantly associated with preterm birth, maternal age less than 20 years, lack of antenatal care follow up, anemia, severe physical work, tobacco smoking, and birth interval of less than 2 years [16].

A cross sectional study conducted in Gambia to determine the association between low birth weights preterm birth and maternal demographic characteristics and obstetric complications, showed that the rate of low birth weight and preterm birth were 10.5% and 10.9% respectively and were associated with antepartum hemorrhage, hypertensive pregnancy disorders, rural residence and primiparity [17]. Additionally, study conducted in Bangladesh to assess the association between birth weight, socio demographic variables and maternal anthropometry, indicated that maternal age less than 20 years and older than 35 years, the lower income group, illiterate and MUAC less than 23 cm were significantly associated with low birth weight [18].

A cross-sectional study done in north Wolo Zone (Ethiopia) to determine the prevalence of poor birth outcomes and associated factors among women gave birth in health facilities, showed that 27.5% of the laboring mothers had a poor birth outcome of which 9.8% were still birth, 7.5% preterm, and 12.8 were low birth weight, and associated with mother's occupation, educational status, non-antenatal care attendance, rural residence and being HIV positive [19].

Though there are studies on the various forms of adverse birth outcomes particularly in developing countries and few parts of Ethiopia, there is limited data on the adverse birth outcomes at Negest Elene Mohammed memorial general hospital in Hosanna town.

Therefore, this study aimed to assess the prevalence and associated factors of birth outcomes among reproductive age groups of women gave birth at Negest Elene Mohammed memorial general hospital in Hosanna town, Sothern Ethiopia.

Method and Materials

A facility based cross sectional quantitative study was carried out from April1 to May, 2015 on systematically sampled 327 study participants at maternity wards of Negest Elene memorial general hospital of Hadiya zone. Hadiya zone is found 230 Km away from Addis Ababa, the capital city of Ethiopia in south west of Ethiopia and 194 Km away from Hawassa town of SNNPR. Negest Elene memorial general hospital is the only tertiary (zonal) hospital found in the Hosanna town, capital city of Hadiya Zone. It serves over one million people residing in urban and rural parts of south west Ethiopia. On average, there were about 12 deliveries per day, which amounts to (4320) deliveries in previous 12 months in this hospital.

A systematically sampled 327 pregnant mothers who came to the hospital for delivery from April to May, 2015 were included in the study. Data was collected using a pretested structured interviewer administered questionnaire, taking weight of the baby at birth, and performing maternal chart reviews. The data collection instrument was structured into four logical sections (socio demographic characteristics (9 items), and obstetrics related factors (23 items), maternal medical conditions (3 items) and mothers' behavioral factors (12 items) and birth outcomes assessment (4 items). The instrument was pretested on 33 clients at Butajira hospital before the actual data collection date and based on the findings of the test, slight modifications were done on few of the instruments.

Before data collection, letter of ethical clearance was obtained from Institutional Review Board of Jimma University, College of health sciences to Hadiya Zonal Health office administration and then to Negest Elene memorial general hospital authorities. Furthermore, verbal consent was obtained from the study participants, confidentiality and privacy was assured, the right not to participate or withdraw from the study any time the clients feel uncomfortable and that this does not have any link with the service and care provided to them.

Data was collected by six trained midwives (who can speak both Amharic and local language) working in the hospital during the

day and night working hour shifts and one midwife supervisor was assigned from Hosanna health science college who took similar data collection training. The collected data was checked for completeness and consistency by data collection supervisor on daily basis.

The collected data was first checked for its completeness, coded and entered into SPSS version 20.0 statistical software programs for analysis. After cleaning data for inconsistencies and missing value in SPSS, descriptive statistical analysis was done to determine the proportion of adverse birth outcomes and mothers' socio-demographic characteristics.

Logistic regression analysis was carried out to identify independent predictors of adverse birth outcomes. Bivariate analysis was carried out to determine presence of significant association between each independent factor and adverse birth outcome. Variables with p value less than 0.25 selected for multiple logistic regression. Multiple logistic regression was done for variables that have p-value<0.25 during the bivariate logistic analysis to control for potential confounders and to see pure effect of individual variables in the model. The degree of association between independent and dependent variables was assessed using odds ratio with 95% confidence interval. P- Value ≤0.05 was considered statistically significant. Odds ratio was used to determine the strength of association between independent variables and adverse birth outcomes.

Result

The socio-demographic characteristics of women attended maternity ward at Negest Elene Mohammed Memorial Hospital, SNNPR, Ethiopia

A total of 327 women were involved in the study of which 259(79.2%) were in the age group of 20-34, followed by 50(15.3%) between 35-49 years with mean age of 32 years and SD of 5.54. Majority of the mothers 322(98.5%) were married, and 192(58.7%) were urban residents. Regarding educational status, majority, 165(50.5%) had elementary school education, while 88(26.9%) secondary school and above. One hundred and eighty one (55.5%) mothers were followers of Protestants and 71(21.7%) were Orthodox Christians. Ethnically, majority 229(70%) were Hadiya, 39(11.9%) Silte and 28(8.6%) Kambata. Most of the respondents 195(56.9%) were housewives (Table 1).

The obstetric characteristics of women attended maternity ward at Negest Elene Mohammed Memorial Hospital, SNNPR State, Ethiopia

Among the study participants, 194(59.3%) were multi-gravidas, 100(61%) had 24-59 months inter pregnancy interval, and 274(83.8%) of the pregnancy was wanted. 274(83.8%) had antenatal care follow up and 226(69.1%) ha iron and folic acid supplement (Table 2).

Pregnancy and labour related problems among women attended maternity ward at Negest Elene Mohammed Memorial Hospital, SNNPR, Ethiopia

Sixty three (19.3%) mothers encountered complications during recent pregnancy, comprising of PIH 20(31.7%) followed by APH 17(27%). Among all deliveries 68(20.8%) had experienced complications, among which 28(41.1%) were prolonged labor followed by malposition/ mal presentation 23(26.7%) and obstructed labor 11(16.2%). Two hundred fifty (76.5%) of current deliveries were spontaneous vaginal deliveries followed by caesarean section (CS) 46(14.1%) (Tables 3 and 4).

Variable (N=327)		Number	Percent
Age group	<20	18	5.5
	20-34	279	85.3
	35+	30	9.2
Residence	Urban	192	58.7
	Rural	135	41.3
Marital status	Married	322	98.5
	Single	5	1.5
Religion	Orthodox	101	12.5
	Muslim	34	10.4
	Protestant	181	74.1
	Catholic	11	3
Ethnicity	Hadiya	280	85.4
	Kambata	20	6.1
	Silte	13	4
	Others*	14	4.6
Educational status	Illiterate	74	22.6
	Primary	165	50.5
	secondary and higher	88	26.9
Occupation	House wife	195	59.6
	Private job	87	26.6
	Employed	45	13.8

*others include Gurage, Tigre and Amhara

Table 1: The Socio-demographic Characteristics of women attended maternity ward at Negest Elene Mohammed Memorial General Hospital, SNNPR State, Ethiopia.

Variables		Number	Percent
Gravidity (n=327)	Primi-gravida	133	40.7
	Multi-gravida	194	59.3
Inter-pregnancy interval (n=164)	<=23	48	24.7
	24-59	130	67
	>=60	16	8.3
Pregnancy status (n=327)	Wanted	265	81
	Unwanted	62	19
ANC follow up (n=327)	Yes	274	83.8
	No	53	16.2
First ANC visit (n=274)	First trimester'	119	43.4
	Second trimester	115	42
	Third trimester	40	14.6
Number of ANC visits (n=274)	<4	112	40.9
	4 and above	162	59.1
Iron/Folic acid supplementation	Yes	226	82.5
	No	48	17.5
Duration of Iron/Folic acid supplement (n=226)	<3 months	152	67.3
	>= 3 months	74	32.7
Pervious perinatal outcomes (n=194)	Live birth	178	91.8
	Still birth	6	3.1
	Abortion	3	1.5
	Others*	7	3.6
Mode of delivery in preceding Pregnancy(n=194)	SVD	178	91.8
	caesarean section	10	5.2
	Others**	6	3

*Neonatal death **Destructive delivery and instrumental delivery
IPI classified based on WHO recommendation

Table 2: Obstetric related characteristics of mothers attended maternity ward at Negest Eleni Mohammed Memorial Hospital, SNNPR, Ethiopia.

Variables		Number	Percent
Current pregnancy complications	Yes	63	19.3
	No	264	80.7
Type of complication during pregnancy (n=63)	PIH	22	34.9
	PROM	18	28.6
	APH	19	30.2
	Others	4	6.3
Complications of labor(n=327)	Yes	68	20.8
	No	259	79.2
Type of labor complications(n=68)	Prolonged Labor	30	44.1
	Malposition	21	30.9
	Obstructed Labor	13	19.1
	Others	4	5.9
Status of labor (n=327)	Spontaneous	308	94.2
	Induced	19	5.8
Mode of delivery (n=327)	SVD	250	76.5
	Caesarean section	46	14
	Instrumental delivery	31	9.5

Table 3: Pregnancy and labour related problems among women who attended maternity ward at Negest Elene Mohammed memorial Hospital, SNNPR, Ethiopia.

Variable		Number	Percent
Medical Illness	Yes	21	6.4
	No	306	93.6
Types of medical illness	Hypertension	7	33.3
	HIV	9	42.9
	TB	5	23.8
Malaria infection	Yes	30	9.2
	No	297	90.8
Hgb	<11 gm/dl	58	17.7
	>=11 gm/dl	269	82.3
Caffeine use	Never	28	8.6
	Daily	229	70
	Weekly	23	7
	Occasionally	47	14.4
Alcohol	Never	304	93
	Daily	2	0.6
	Weekly	6	1.8
	Occasionally	15	4.6

Table 4: Medical and behavioral factors among women who attended maternity ward at Negest Elene Mohammed memorial hospital, SNNPR, Ethiopia.

The adverse birth outcomes among women attended maternity ward at Negest Elene Mohammed Memorial Hospital, SNNPR, Ethiopia

The study finding showed that the prevalence of adverse birth outcome among the study participants was 80(24.5%). Out of 327 births 28(8.6%) were still birth, 32(9.8%) were LBW, 28(8.6%) preterm and 6(1.8%) were with visible birth defects. Among babies with congenital malformations four were still births. The mean plus SD birth weight of the neonates was 3171 ± 523 grams with 95% CI(3111, 3230.44). The mean gestational age was 38.38 ± 2 weeks with 95% CI(38.17, 38.60) (Table 5).

Factors associated with adverse birth outcomes among women who attended maternity ward at Negest Elene Mohammed Memorial Hospital, SNNPR, Ethiopia

The study finding showed that mothers who lived in rural area encountered adverse birth outcomes three times more than those lived in urban area, [AOR=3.5, 95% CI(1.57, 7.93)]. Mothers who didn't attend antenatal care were 3 times more likely to have adverse birth outcome when compared to those who attended antenatal care follow up, [AOR=3.2, 95% CI(1.27, 8.06)]. Similarly, mothers with hemoglobin level less than 11 mg/dl were encountered adverse birth outcomes 2 times more when compared to those with hemoglobin level greater or equal to 11 mg/dl [AOR=2.5, 95% CI(1.11, 5.45)]. Mothers whose occupation was governmental employees were found 5 times more likely to have adverse birth outcomes [AOR=4.5, 95% CI(1.25, 15.9)] when compared to house wife. The presence of any form of pregnancy complication to current pregnancy were 4 times more likely to result in adverse birth outcomes [AOR=4.5, 95% CI(1.25, 15.9)]. Furthermore, clients with malaria infection during pregnancy were eight times more likely to have adverse birth outcomes than their counterparts times [AOR=8.6, 95% CI(2.6, 22.62)] as well, maternal age less than 20 years were 5 times more likely to have adverse birth outcomes when compared to mothers with age between 20 and 34 years of age (Table 6).

Discussion

The finding of the study showed that the prevalence of adverse birth outcome was 80(24.5%) among which 28(8.6%) were still birth, 28(9.4%) preterm and 32(10.7%) were low birth weight. These figures were higher than the findings of Tanzania [14], and Ghana [15], in

Variables		Number	Percentage
Status of newborn baby at birth	Still birth	28	8.6
	Live birth	299	91.4
Birth weight of live babies	2500-4500 g	267	89.3
	<2500 g	32	10.7
Gestational age	38-42 weeks	271	90.6
	<=37 weeks	28	9.4
Visible birth defect	Yes	6	1.8
	No	321	98.2

Table 5: Adverse birth outcomes among women who attended maternity ward at Negest Elene Mohammed Memorial Hospital, SNNPR, Ethiopia.

Variables		Adverse birth outcome		COR(95% CI)	AOR (95% CI)
		Yes	No		
Residence	Urban	27	165	1	1
	Rural	53	82	4.3(2.481, 7.550)	3.5(1.57, 7.3)*
Age	<20	7	11	2.48(0.91, 6.6)	4.9 (1.29, 18.6)*
	20-34	53	226	1	1
	>=35	6	24	2.68 (1.32, 5.45)	0.99 (.3.6, 2.77)
Occupation	House wife	42	153	1	1
	Private Job	28	59	1.73 (.98, 3.04)	2.6 (1.18, 5.75)*
	Employed	10	35	1.04(.47, 2.27)	4.5(1.25, 15.9)*
Education	Illiterate	27	47	1	1
	Primary	34	131	0.47(.25, .91)	0.44 (.173, 1.12)
	>= Secondary	19	69	0.263(.24, 1.012)	0.51(.16, 1.65)
ANC	Yes	55	219	1	1
	No	25	28	3.89(2.03, 7.44)	2.5(1.1, 5.45)*
Hgb	<11 gm/dl	26	32	2.36 (1.26, 4.4)	2.5(1.1, 5.45)*
	>=11 gm/dl	51	218	1	1

*Significant at p<0.05

Table 6: Factors associated with adverse birth outcomes among women attended maternity ward at Negest Elene Mohammed Memorial Hospital, SNNPR, Ethiopia.

which 18%, 19% had experienced adverse birth outcomes respectively. The variations between the findings may be attributable to variations in quality of maternal health services, facility and logistic parameters in respective study areas.

Clients with pregnancy complications (pregnancy induced hypertension, Antepartum hemorrhage, premature rupture of fetal membranes, oligohydramnios and poly hydramnios and hyper emesis gravidarum) in recent pregnancies were found to have higher odds of experiencing adverse birth outcomes (preterm births, low birth weight and still birth) than those without the complications. This finding was consistent with the study done in china [10], India [11], Iran [12], Pakistan [13], Zambia [15], and Tanzania [18]. The link may be explained in terms of the fact that the complications that have occurred during pregnancy have affected the well-being of the fetus in the uterus.

Study participants who had malaria infection during pregnancy were found to be more likely to have adverse birth outcomes than mothers who did not have the infection and this finding was found to be consistent with previous studies done in Tanzania [17] and this could be linked to the effect of malaria infection on maternal and placental physiology. Additionally, women with hemoglobin level less than 11 mg/dl were also found to experience adverse birth outcomes when compared with those with Hgb level greater than 11 gm/dl. The finding was consistent with studies conducted in Ghana [6], Pakistan [12], Tanzania [14], and Nigeria [17]. The reason could be linked to the effect of anemia on the oxygen bearing capacity and its transportation to the placental site for the fetus.

On the other hand, mothers who had lived in rural area were found to be five times more likely to have adverse birth outcomes than urban dwellers and this was consistent with the study conducted in Ethiopia [18].

In this study, pregnancy complication also was found to be independent risk factors for adverse birth outcomes such as preterm birth which is in agreement with a study conducted Gambia [17]. This might be related to termination of pregnancy as a result of medical disorders of pregnancy like pre-eclampsia and other obstetrical problems.

Furthermore, maternal age less than 20 years was identified as risk factors for adverse birth outcomes, and this finding was in line with other studies done in China [11]. This may be due to the fact that young for the first time pregnant mothers seek antenatal care, and less aware of problems related to pregnancy to seek medical care early as much as possible.

Conclusion

The prevalence of adverse birth outcomes among the study population was 80 (24.5%). Residence, Hgb less than 11 gm/dl and lack of antenatal care follow up; index pregnancy complication, maternal age; mother's occupation and history of malaria during pregnancy are the major predictors for adverse birth outcomes. Increasing antenatal care coverage with special emphasis to its quality of care improvement and giving particular attention to adolescent pregnant mothers.

Conflict of Interest

The authors declare that they don't have any conflict of interest in any aspect of the article.

Authors' Contributions

AbdoRA-The principal investigator designed the study, collected, analyzed and interpreted the data, and also drafted the manuscript. Endalemaw TB-Participated in conceptualization of the study, design, analyses and interpretation of results as well as drafting and review of the manuscript. Tesso FY- Participated in conceptualization and design of the study, drafting and critical reviewing the manuscript. All authors read and approved the final manuscript.

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