The Prevalence and Associated Factors of Adverse Birth Outcomes among Deliveries at Negest Eleni Mohammed Memorial General Hospital in Hosanna Town, Hadiya Zone, SNNPR

By

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Abstract

***Background**: Adverse birth outcomes are important risk factors for neonatal morbidity and infant mortality and are a major public health issue in developing countries. Adverse birth outcomes are also significant in determining growth and cognitive development and chronic diseases later in life.*

***Objective**: The aim of this study was to assess the prevalence and associated factors of adverse birth outcomes among deliveries at Negest Eleni Mohammed memorial general Hospital in Hosanna Town, Hadiya Zone, Southern Nations Nationalities and Peoples' Region.*

***Method and materials**: A Hospital based Cross sectional study was conducted from March 1 to May 2, 2015 at Negest Eleni Mohammed memorial general hospital. Systematic sampling technique was used to select 327 study participants. Data were collected from mothers using a pretested structured interviewer administered questionnaire. Measurements of maternal (mid upper arm circumference, height and weight) and weight of the new born and client's chart were reviewed to retrieve medical information. The data were entered in to Epi-data version 3.1 and analyzed using SPSS version 20.0. Logistic regression analyses were used to identify factors associated with adverse birth outcomes.*

***Result:** A total of 327 mothers were involved in this study with response rate of 97%. About 80(24.5%) of mothers had experienced adverse birth outcomes. Lack of antenatal care follow up (AOR=2.8, 95%CI (1.3, 6.1), hemoglobin level less than 10g/dl (AOR=2.5, 95%CI (1.3, 5.0), malaria during pregnancy (AOR=5.0, 95%CI (1.8, 13.8), pregnancy complication (AOR=5.8, 95%CI (2.9, 11.5) were factors associated with adverse birth outcome.*

***Conclusions and recommendation**: Prevalence of adverse birth outcomes was high in the study area. This study indicates that malaria during pregnancy, and lack of antenatal care follow up, hemoglobin level less than 10gm/dl, pregnancy complication were found to be associated with adverse birth outcomes. Prevalence of adverse birth outcome can be reduced by timely and effective treatment of malaria, comprehensive antenatal care and early detection and management of labor and pregnancy complication.*

***Key terms**: Adverse birth outcomes, preterm birth, low birth weight, still birth.*

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Acronym

AOR	Adjusted odd ratio
APH	Ante Partum Hemorrhage
BPI	Birth to Pregnancy Interval
CI	Confidence Interval
COR	Crude odd ratio
CS	Cesarean Section
EDHS	Ethiopian Demographic and Health Survey
GTP	Growth and transformation plan
HSDP	Health sector development program
IRB	Institutional Review Board)
JU	Jimma University
LBW	Low Birth Weight
NEMMGH	Negest Elene Mohammed Memorial General Hospital
OCP	Oral Contraceptive Pills
PIH	Pregnancy Induced Hypertension
PMR	Perinatal Mortality Rate
PROM	Premature Rupture Of Membrane
PTB	Preterm Birth
SPSS	Statistical Package for Social Science
SVD `	Spontaneous Vaginal Delivery

Chapter one: Introduction

1.1. Background

Birth outcomes defined as a results of conception and ensuing pregnancy, such as live birth, congenital malformations, lower birth weight, preterm delivery or stillbirth(1). Birth outcomes are a category of measures that describe health at birth (2). Each year, throughout the world, approximately 210 million women become pregnant and over 135 million of them deliver live born infants. While remaining 75 million pregnancies end in stillbirth, or spontaneous or induced abortion (3). Among birth outcomes stillbirth, preterm birth, low birth weight, and congenital abnormalities are common adverse birth outcomes, but Low birth weight and preterm births are most important adverse outcomes of pregnancy as they are both significant in determining neonatal morbidity and mortality, inhibited growth and cognitive development, and chronic diseases later in life (4).

According to world health organization(WHO), stillbirth is the birth of a dead baby with a birth weight of 500 g or more, 22 or more completed weeks of gestation, or a body length of 25 cm or more, who died before or during labour and birth. For international comparisons, WHO recommends reporting of stillbirths with birth weight of 1000 g or more, 28 weeks' gestation or more, or a body length of 35 cm or more (5).

Low birth weight (LBW) is defined as a birth weight of a live born infant of less than 2,500 g (5 pounds 8 ounces) regardless of gestational age. Also it categorized into very low birth weight (VLBW), which is less than 1500 g (3 pounds 5 ounces), and extremely low birth weight (ELBW), which is less than 1000 g (2 pounds 3 ounces). Normal weight at term delivery is 2500–4200 g (5 pounds 8 ounces – 9 pounds 4 ounces).Preterm or premature births are used to define live born neonates delivered before 37 weeks from the 1st day last menstrual period (6). Weight at birth is a good indicator not only of the mother's health and nutritional status but also of the newborn's chances for survival, growth, long term health and psychosocial development. Low birth weight is closely associated with fetal and perinatal mortality and morbidity, inhibited growth and cognitive development, and chronic diseases later in life (7). Preterm birth is also the single most common causes of perinatal mortality (8).

Ethiopia is one of the Sub-Saharan African countries with high population growth rate of 2.7% and the total fertility rate is 4.9. The crude birth rate in Ethiopia is 28 births per 1,000 population and national perinatal mortality rate is 46 per 1,000 pregnancies of seven or more months of gestation. It is highest in Sub-Saharan countries. In addition nearly 3 million babies are born every year in Ethiopia and 10% of them are born prematurely or with low birth weight (9).

Ethiopia government formulated a number of strategies and have been implementing these strategies to reduce undesirable birth outcomes and its effect like accelerated training of midwives and emergency surgeons, equip health center with basic obstetrics and new born care, equip all Hospitals to provide comprehensive obstetrics and new born care , improving antenatal care and institutional delivery coverage, improve availability of pharmaceutical supplies, improving referral system and improve the health care financing (9, 10).

1.2. Statements of the problem

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 (11). 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 (12).

Ethiopia has met the MDG 4 goal by cutting under-five mortality from 204 per 1,000 live births in 1990 to 68 per 1,000 live births three years before the deadline of 2015. However, still perinatal mortality rate of Ethiopia is among the highest in Sub Saharan Africa (13). Both hospital based and community based studies did not show a reduction in perinatal mortality. The trend of perinatal mortality rate has been stable between 90 and 40 per 1000 total births in the hospital and community setting, respectively (14). Also, preterm birth or/and low birth is/are highest contributors for the perinatal mortality in Ethiopia (9).

Low birth weight (LBW) babies are significantly at risk of death, contributing to the high perinatal morbidity and mortality. Every year it is estimated that 18 million LBW babies are born globally making up nearly 14% of all live births (15). More than 95% of the low birth weight babies are born in developing countries. The estimated level of LBW in developing countries (16.5%) is two-fold higher than the level observed in developed countries 7% (16). LBW contributes to 60% to 80% of all neonatal deaths worldwide. Low birth weight infants also run the risk of developing many complications includes respiratory distress, sleep apnea, heart problems, jaundice, anemia, chronic lung disorders, and infections are just some of the obstacles that low birth weight babies may face. In addition, place financial and emotional burdens on families and communities as whole (17).

Every year 15 million babies are born too soon, more than 1in 10 babies are born preterm, affecting families all around the world. Over 60% of preterm births occur in Africa and South Asia. In the poorest countries, on average, 12%of babies are born to soon compare with 9% in higher-income countries (18). 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 1 month to 5 years (8). In addition, preterm birth 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 (19). Furthermore, it increases risk of disability, which exacts a heavy load on families and health systems. The risk of a neonatal death due to complications of preterm birth is at least 12 times higher for an African baby than for a European baby (8).

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 (20). The stillbirth rate for developed countries is estimated between 4.2 and 6.8 per 1000 births, whereas for the developing world, the estimate ranges from 20 to 32 per 1000 births. Two thirds of all stillbirths occur in just two regions: South-East Asia and Africa (21). In Ethiopia preterm birth or with low birth weight contributes to 42% of under-five mortality (9). Also, one of the ten countries account for 66% of the world's stillbirths (22).

These adverse pregnancy outcomes are found to be associated with no ANC care, pregnancy complication, labor complication, chronic medical condition like chronic hypertension, diabetes mellitus, Tuberculosis and HIV, and malaria attack during pregnancy, anemia, short inter-pregnancy spacing, maternal education, maternal age, maternal height and weight, and low socioeconomic status (11).

To the best of the principal investigator knowledge, however, there was no such study carried out in this study area. Hence, this study aimed to assess the prevalence and associated factors of adverse birth outcomes among deliveries at Negest Eleni Mohammed memorial general Hospital in Hossana Town, Hadiya Zone, SNNPR.

Chapter two: Literature review

A cross-sectional study conducted in Brazil to evaluate the association between inter-pregnancy interval and the occurrence of adverse maternal and perinatal outcomes, the findings showed that the inter-pregnancy intervals of <6 months are associated with an increased risk for adverse birth outcomes and long intervals were also a greater adverse birth outcomes (23).

A cross sectional study conducted in India to study the prevalence of anemia in pregnant women admitted to the tertiary care hospital for delivery, types of anemia observed and study outcome after delivery, the findings showed that all the still births occurred amongst anemic women only. Furthermore, fifty seven percent of women amongst the anemic mother had low birth weight babies(24). Similarly, a cross-sectional study conducted in India to compare obstetrical complications in two groups, primi-para and multipara and further to determine the association between parity status and neonatal outcomes, the findings showed that the adverse birth outcomes was significantly associated with primi-parity (25).

On the other hand, a study conducted in china revealed that adverse birth outcomes 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 pregnancy comorbidities and complications, such as hypertensive disorders during pregnancy, height of mother, anemia, oligohydramnios, premature rupture of membranes, and gestational diabetes (26). similarly, cross sectional study conducted in Iran to determine prevalence and risk factors associated with preterm birth, the findings revealed that the pregnancy complications, anemia factors associated for adverse birth outcomes such as preterm birth (27).

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 had higher risk of having low birth weight, preterm births and still birth (28). Similarly, a study conducted in Pakistan to determine the obstetric causes for stillbirth in low socio-economic settings, the findings showed obstetric factors which were significantly associated with stillbirth were obstructed labour, hypertensive disorders, abruptio placentae, placenta previa, and preterm labour (29).

Study conducted in Tanzania, to determine risk factors for adverse birth outcome and their population attributable fractions, findings revealed that the prevalence of adverse birth outcome

was 18% among deliveries and independently associated with maternal malaria and anemia (30). Another cross sectional study conducted in Ghana, on pregnant women in Kumasi to investigate factors influencing antenatal care utilization and its association with adverse pregnancy outcomes, the findings showed that the prevalence of adverse birth outcome was 19%, and having more than five births was independently associated with adverse birth outcomes (31).

A study conducted in Sudan, revealed that maternal sociodemographic characteristics were not associated with stillbirth, while a history of maternal malaria in the index pregnancy was the main risk factor for adverse birth outcomes and another study conducted in Zambia to estimate the rates and determinants of stillbirth in an urban African obstetric population, the findings show that maternal age 35 and above, pregnancy complications and labor complication were significantly associated with adverse birth outcomes such as still birth(32, 33). Similarly, study carried out in Zimbabe, revealed that malaria and HIV infections were associated with increased risk of adverse birth outcomes (34).

According to a study conducted in Kenya to examine factors associated with premature deliveries, the odds of unfavourable birth outcomes are significantly associated with first births and lack of antenatal care were found to have an association with the occurrence of adverse birth outcomes such as premature births (35). Similar study conducted in Nigeria to determine the prevalence and determinants of pre-term deliveries, showed that the prevalence of pre-term delivery was 12% and low socio-economic class, pregnancy complication and induced labor were found to be significantly associated with pre-term delivery (36).

Another cross-sectional study carried out in Nigeria to find out the epidemiological factors associated with low birth weight (LBW) among institutional deliveries, the findings showed that 40.0% mothers delivered LBW babies which was significantly associated with preterm birth, maternal age less than 20 years, lack of antenatal care follow up, anemia, and tobacco smoking, birth interval of less than 24 months (37). Another study conducted in Tanzania to determine factors associated with LBW, revealed that unmarried mothers, and complication during pregnancy (PIH, PROM, and APH), height of mother, anemia, malaria, lack of antenatal care and HIV positive pregnant women were significantly associated with adverse birth outcomes such as low birth weight (38).

A cross sectional study conducted in Gambia to determine the association between adverse birth outcomes and maternal demographic characteristics and obstetric complications, showed that antepartum haemorrhage, PIH, rural residence and primiparity were also associated with these adverse birth outcomes (39). In addition, study conducted in Bangladesh to see the association between adverse birth outcomes, socio demographic variables and maternal anthropometry, revealed that the maternal age less than 20years and older than 35years, the lower income group, illiterate and MUAC less than 23cm were significantly associated with adverse birth outcomes(40).

A cross-sectional study done in Ethiopia to determine the prevalence of adverse birth outcomes and associated factors among women who delivered in health facilities, the findings revealed that 27.5% of the mothers had adverse birth outcome and these are independently associated with occupation and being HIV positive, women who were illiterate, primary school completed non-antenatal care visited and rular residence (41). Another cross-sectional study conducted in Ethiopia showed that 23% of women had adverse birth outcomes. Women having history of either preterm delivery or small baby were more likely to have preterm births and low birth weight, and ante partum haemorrhage, hypertension, history of perinatal death and lack of antenatal care follow up were significantly associated with still birth(42). Additionally, a study to determine prevalence and associated factors of adverse birth come such as low birth weight, revealed that pregnancy complication(PIH) and malaria attack during pregnancy were found to be significantly associated with adverse birth outcomes such as low birth weight (43).

Generally, number of studies addressed the association between various forms of variables and birth outcomes, and indicated that lack of ANC follow up, socio demographic variables including marital status, educational status, occupational, income, maternal age and malarial attack during pregnancy, anemia, being HIV positive, perinatal outcome of preceding pregnancy, maternal MUAC, pregnancy interval less than 24 months, tobacco smoking, and first birth were associated with adverse birth outcomes. But as studies indicated, the prevalence of adverse outcome varies from place to place and birth outcomes are affected by several factors. In addition, few studies have addressed this topic among women in the developing world. It is a goal of the present studyto overcome these shortcomings and to identify the main risk factors of adverse outcomes in study area.

2.2. Conceptual frame work

Conceptual frame work for this study developed after review of relevant literatures (24-43) and adapted. The box used to separate independent variables and the direction of arrow shows the relation between independent and outcome variables. The relationship between the independent variables in this study is not the interest of the investigator **(figure 1).**

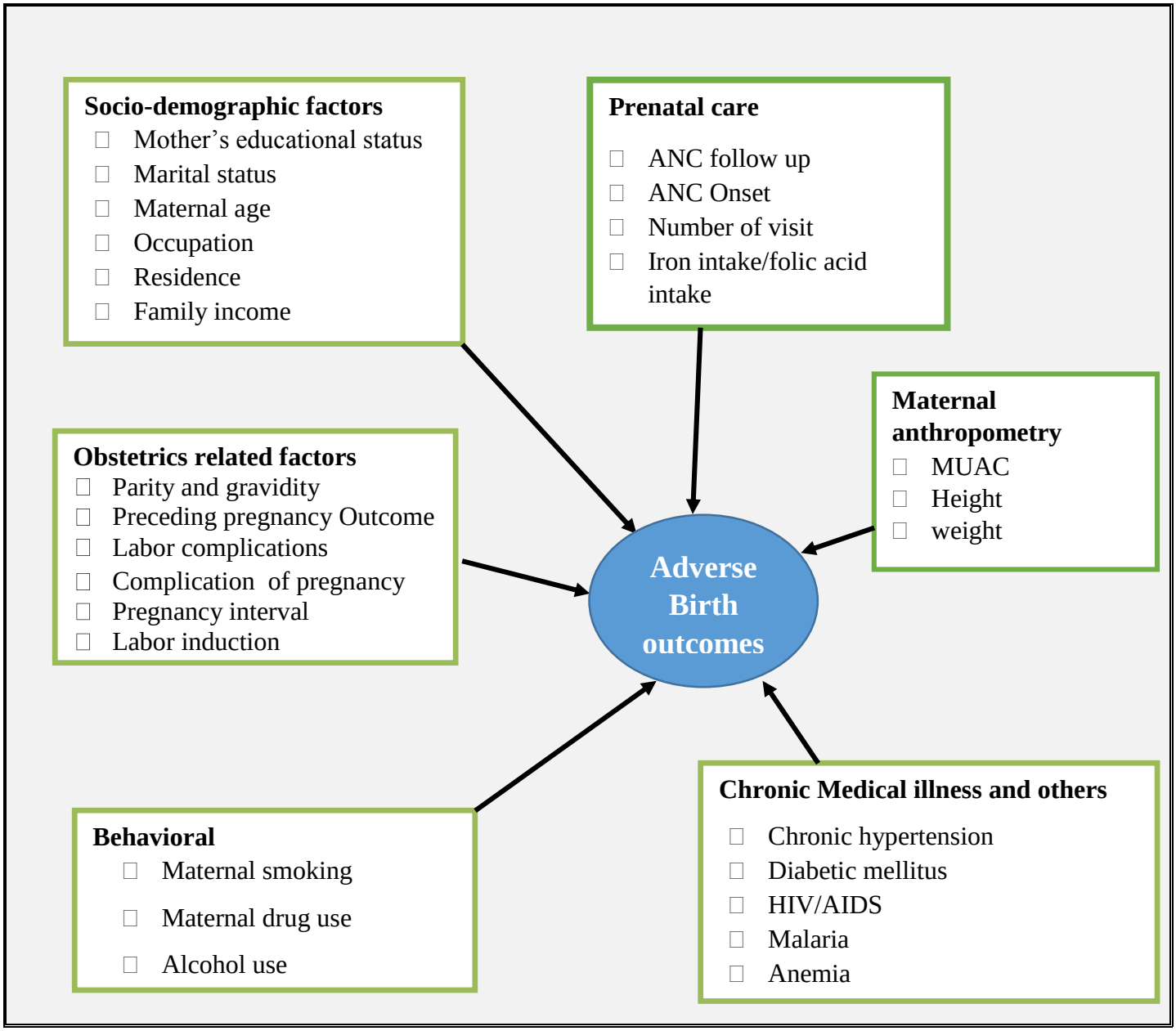

Figure 1: conceptual framework on the prevalence and associated factors of adverse birth out comes developed by investigator after reviewing various literature.

2.3. Significance of the study

For the better understanding of the main factors associated with adverse birth outcomes in study area and to alleviate or reduce identified factors the need to determine the factors affecting birth outcomes remains important.

Knowing the factors association with adverse birth outcomes will help the primary prevention employed against it to be easy, safe and cost effective. Furthermore, the findings of this study will help policy makers and health planners to design strategies for improvement of maternal and neonatal health outcomes. The findings of the study can also help as a secondary data for further study in same area of inquiry. Additionally, it can add knew knowledge to the nursing profession in such a way that the evidences can be used in rendering nursing care to avoid risk factors that can contribute to adverse birth outcomes.

Chapter three: Objectives

3.1. General objective

- To assess the prevalence and associated factors of adverse birth outcomes among deliveries at Negest Eleni Mohammed Memorial General Hospital in Hossana Town, Hadiya zone, SNNPR, 2015.

3.2. Specific objectives

3.2.1. To determine the prevalence of adverse birth outcomes among deliveries at Negest Eleni Memorial Mohammed General Hospital in Hossana Town, Hadiya zone, SNNPR.

3.2.2. To identify associated factors of adverse birth outcomes among deliveries at Negest Eleni Mohammed Memorial General Hospital in Hossana Town, Hadiya zone, SNNPR.

Chapter Four: Method and Materials

4.1. Study Area and period

The study was carried out at Negest Eleni Mohammed Memorial General Hospital of Hadiya zone. Hadiya is one of the zones found in SNNPR, 194 Km away from Hawassa and 230 Km away from Addis Ababa the capital city of the country. The Zone shares common borders with Gurage zone in the north, with Silte and Oromia in the east, with Kambata, Wolayta, & Alaba in the south and with Oromia, Yem special woreda and Omo River in the west. It has an estimated area of 3542.66 sq. km. The zone is divided into 10 Woredas and 1 town administration with a total of 305 Kebeles and 24 Urban Kebeles. Based on population projection the total population size of the zone in 2013/14 is estimated to be 1,547,846. From the total population, 49.47% were male and 50.53% percent were females. Reproductive age women accounted for about 23.3% percent. The zone has one zonal hospital, and 63 public health centers and 305 health post, and 81 private clinics. The potential health care coverage of the zone was 103 %.

The study was carried out at the maternity ward of Negest Eleni memorial general Hospital in Hossana Town. Negest Elene Mohammed memorial general Hospital is the only tertiary (zonal) Hospital found in the Hossana town, town of Hadiya Zone. It serves for over one million people residing in urban and rural parts of south west Ethiopia. On average, there are about 12 deliveries every day in this Hospital. According to 2014/15 report the still birth in the hospital was 58/1000 live births (44). The study was conduct from March 1 to May 2, 2015.

4.2. Study design

A Hospital based cross sectional study was employed.

4.3. Population

4.3.1. Source population

All mothers who gave birth during the study period at Negest Elene Mohammed memorial general Hospital.

4.3.2. Study population

All sampled mothers who gave birth during the study period.

4.4. Inclusion and exclusion criteria

4.4.1. Inclusion criteria

All mothers who gave give birth at Negest Eleni memorial general Hospital during data collection period.

4.5. Sample size estimation and sampling technique

4.5.1. Sample size estimation

Sample size was calculated using the single population proportion formula as follows.

$$n = (Z\alpha/2)^2 \frac{p(1-p)}{d^2}$$

$$n = \frac{1.96^2 * .275(1 - .275)}{0.05^2} = \frac{3.8416 * .275 * .725}{.0025}$$

$$\cong 306$$

Where

n=desired sample size

P= Expected prevalence of adverse outcome - 27.5 % (41).

z- Confidence interval – 95%

d- Desired precision (%) – 5 %

Considering 10 %(31) non-response rate, the total sample size was 337 mothers.

4.5.2. Sampling technique

Systematic sampling technique was employed to select study participants from maternity ward of Negest Elene Mohammed memorial general hospital. By considering average numbers of clients who deliver daily during data collection period were estimated based on the previous daily client flow of the units was obtained by referring client registration book/ record for a month prior to data collection. Average birth per day of the ward was 12(720 per two months).

Accordingly ,mothers who are eligible to the study was include in the study by using the interval(k-value) two until the data collection period was completed. The first number was selected by using lottory method on the first day of data collection.

4.6. Study Variables

4.6.1. Dependent variables

- Adverse Birth outcomes

4.6.3. Independent variables

- Socio-demographic variable (Residence, Age of mother, Marital status, Education level, Occupation, and Family income)
- Obstetrics related factors (gravidity, outcomes previous pregnancy, labor status, labor duration, current Pregnancy and labour complication (Ante partum hemorrhage, pregnancy induced hypertension, pre rupture of membrane, multiple pregnancy, and amniotic fluid problem), previos and current mode delivery and pregnancy interval.
- Medical illness(chronic hypertension, diabetic mellitus, anemia during pregnancy, malaria during pregnancy and HIV/AIDS status)
- Maternal anthropometry (MUAC, height and weight)
- Prenatal care (ANC flow up, onset and folic acid and/or iron supplementation)
- Behavioral factors (Smoking, alcohol use, drug use)

4.7. Operational definitions and Definition of terms

Adverse birth outcomes: a mother who gave as- low birth weight, preterm or/and stillbirth.

Birth to pregnancy interval: The time period between the start of the index pregnancy (as evidenced by last menstrual period) and the preceding live birth. In this study birth interval is classified as <24months, between 24- 59 months and >=60 months (45).

Anemia: Classified based on hemoglobin level (46).

- Normal: Hgb>=10g/dl
- Anemic: Hemoglobin levels than 10 g/dL

MUAC is a good indicator of the protein reserves of a body, and a thinner arm reflects wasted lean mass, i.e. malnutrition. The MUAC values below which most adverse effects were identified were <23 cm. A conservative cut-off of <23 cm is recommended to include most pregnant women at risk of LBW for their infants in the African and Asian contexts (47). So, in this study maternal MUAC was grouped in to two group: MUAC<23cm and >=23cm.

Family income was determined by asking monthly income of households (herself and husband) if they were employed or sacks of grains or Teff harvested during their last harvesting season and multiplying it by the average local market cost plus any additional incomes.

Analyzed based on tertiary classification was used on spss; <600ETB (low), 601-1400ETB (medium) and >=1401ETB (high).

Measurements

MUAC=Mid-upper arm circumference was taken from the mothers' left extended & relaxed arm just at the mid-point of the tip of shoulder girdle and elbow using Shakir strip tape.

Baby weight: The weight of a naked neonate was taken right after birth using calibrated baby weight scale.

Last normal menstrual period (LNMP) was confirmed both from her chart, and through interview. Gestational age was estimated based on her LNMP, using Ultrasound report from chart review.

4.8. Procedure for data collection and Instruments

Data were collected using a combination of a pre-tested structured interviewer administered questionnaire, actual measurements of maternal anthropometric (MUAC, height and weight) and weight of the new born, and client's chart were reviewed to retrieve medical information and mother's test results that could not be captured by the interview.

The questionnaire was developed based on instruments that were applied in other related studies (30, 31, 41). The questionnaire was structured into three sections (socio demographic characteristics, obstetrics related factors, maternal anthropometry, maternal medical condition and mother's behavioral factors and birth outcomes assessment.

Data collectors were midwives working in the Hospitals were selected for the study and given a one day training on the content of the questionnaire and how to collect the data. Data was collected throughout the day (including night). The total data collection period was two months from March 1 to May 2, 2015. Six midwives (speaking both Amharic and local language) were assigned in the Hospitals and supervisor was recruited from Hossana health Science College who took the same training with data collectors. Interview, Chart review, and anthropometric measurements were taken after delivery. The filled questionnaire was collected and signed by supervisor after it was checked for any missing items and correctness.

4.9. Procedure for data processing and analysis

Data were entered using Epi data version 3.1 and exported to SPSS version 20.0 for analysis.
After cleaning data for inconsistencies and missing value in SPSS descriptive statistics was done such as percentages, frequency distributions and mean and measures of dispersion (SD) were used for describing data.

Logistic regression analyses were used to identify factors associated with adverse birth outcomes. Simple logistic regression was carried out to select candidate for multivariable logistic regression analysis. Variables with p value less than 0.25 in simple logistic regression selected for multivariable logistic regression. Multivariable logistic regression was done for variables that have p-value <0.25 during the simple logistic regression analyses to identify factor associated with adverse birth outcomes and to control for potential confounders. The degree of association between independent and dependent variables was assessed using odds ratio with 95% confidence interval.

P-value <0.05 was considered as statistically significant. The Hosmer -Lemeshow goodness-of-fit statistic was used to check if the necessary assumptions for multivariable logistic regressions were fulfilled and the model had p-value >0.05 which proved the model was good.

4.10. Data management and quality control

Data quality assurance was maintained by performing the following:-

- The English version of the questionnaire was translated in to local language for better understanding by both data collectors and respondents. Consistency was checked by re-translating Hadiyissa version back to English by another individual who is expertise in both languages.
- The data collectors and supervisors were trained for one days by the investigators prior to the data collection time.
- Pretest was done on 5% of the sample before one week the actual day of data collection at Lichamba and Belesa health centers. Based on the pretest, questions were revised, edited, and those found to be unclear or confusing were removed or modified by investigator.
- Supervisor and the principal investigator were closely followed the day-to-day data collection process both during the actual study.

4.11. Ethical consideration

Ethical clearance was obtained from the Institutional Review Board (IRB) of Jimma University-College of health sciences. Permission letter was obtained from Hadiya zone Health department and head of Negest Eleni Mohammed memorial general Hospital after the objectives of the study was explained. Verbal consent was sought from selected participant to confirm willingness to participate in the study before the interview. Privacy and confidentiality were ensured throughout the process of the study. The study participants also were ensured that refusal to consent or withdrawal from the study would not alter or put at risk their access to care.

4.12. Dissemination plan

The final report will be disseminated to the department of nursing and midwifery, College of health sciences, Jimma University. Also the study findings will be disseminated to the Negest Eleni Mohammed memorial general Hospital and other relevant bodies. Attempts will be made to publish the findings in scientific Journal.

Chapter five: Result

5.1. Socio-demographic Characteristics of Respondents

A total of 327 mothers were involved in this study making the response rate 97%. Out of the total respondents, 135(41.3%) were rural residents. About 85.1 % mothers were aged 20-34 years, the range between 17 - 40 years with a mean (±SD) 27.05 (±4.7) years.

Majority of mothers were 322(98.5%) married, (85.4%) Hadiya ethnics, and 280(85.6%) house wife. Regarding their educational status, 74(22.6%) were unable to write and read. Nearly three quarters of mothers were (74.1%) followers of Protestants. Ninety mothers (30.5%) of mothers family monthly income was less than 500.00 Eth Birr. The mean (± SD) family size of the mothers was 3.79±1.461 (table 1).

5.2. Obstetric Characteristics of the study subject

Regarding their gravidity, 133(40.7%) mothers were primigravida. Of the multiparous (n=194) mothers, 178 (91.8%) delivered alive in preceding birth. One hundred sixty four (92.1%) mothers were remember the birth date of the preceding birth. Of those, forty eight (29.2%) mothers had a birth interval of less than 24 months.

Majority (83.8%) of mothers had history of ANC follow up and 43.4% had started their follow up during the first trimester of pregnancy, of which 181 (59.1%) had at least four visits during the current pregnancy. Two hundred twenty six (69.1%) of the pregnant women were supplemented with Iron/Folic acid during the current pregnancy. Of those, more than half (67.3%) mothers were supplemented for less than three months (table 2).

The study showed that Sixty three (19.3%) mothers encountered complications during index pregnancy among which the leading cause was PIH 20 (31.7%) followed by APH 17(27 %) and PROM 16(25.4%). Among all deliveries attended, 68 (20.8%) had experienced complications, prolonged labor accounting 32(47.1%), followed by malposition/ malpresentation 22(32.4%).

Of the 327 deliveries about 250 (76.5%) were spontaneous vaginal deliveries and 46(14.1%) by caesarian section and the rest 31(9.5%) were assisted deliveries for example by vacuum and forceps. Two hundred thirty (70.3%) of the mothers knew their LNMP or had it recorded on their follow up chart. For the rest 94(29.7%) the ultrasound estimate was taken from their follow up charts (table 3).

Table 1: socio-demographic characteristics of women who gave birth at Negest Eleni Mohammed memorial general Hospital in Hossana Town, Hadiya Zone, SNNPR, 2015

Variable		Frequency(N=327)	Percent
Age group	<20	18	5.5
	20-34	279	85.1
	35^{+}	31	9.5
Residence	Urban	192	58.7
	Rural	135	41.3
Marital status	Married	322	98.5
	Single	5	1.5
Religion	Orthodox	41	12.5
	Muslim	34	10.4
	Protestant	181	74.1
	Catholic	11	3.0
Ethnicity	Hadiya	280	85.4
	Kambata	20	6.1
	Silte	13	4.0
	Others*	15	4.6
Educational status	unable to read and write	74	22.6
	Primary	165	50.5
	secondary and higher	88	26.9
Occupation	House wife	281	85.6
	Merchant	18	5.5
	Government employed	16	4.9
	Private employed	13	4.0
Average family income/month ** (n=294)	<=500	90	30.6
	501-1400	92	31.3
	>=1401	113	38.1

**Tertiary classification was used *others include Gurage, Tigre and Amhara.

Table 2: Obstetric related characteristics of mothers who gave birth at Negest Eleni Mohammed memorial general Hospital in Hossana Town, Hadiya Zone, SNNPR, 2015

Variables		Frequency	Percent
Gravidity(n=327)	Primigravida	133	40.5.
	Multigravida	194	59.5
IPI(n=164)	<24	48	29.3
	24-59	100	61.0
	>=60	16	9.8
ANC follow up(n=327)	Yes	274	83.8
	No	53	16.2
Onset of first ANC visit(n=274)	First Trimester	119	43.4
	Second Trimester	115	42.0
	Third Trimester	40	14.6
Number of ANC visits (n=274)	<4	112	40.9
	>=4	162	59.1
Iron/Folic acid supplementation(n=327)	Yes	226	69.1
	No	101	30.9
Duration of Iron/Folic acid supplementation(n=226)	<3months	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	SVD	168	88.0
	caesarean section	13	6.8
	others**	10	5.2

♣Neonatal death and infant death. **Destructive delivery and instrumental delivery.

IPI classified based on WHO recommendation.

Table 3: Pregnancy and labour situation of women who gave birth at Negest Eleni Mohammed memorial general Hospital in Hossana Town, Hadiya Zone, SNNPR, 2015

Variables		Frequency	Percent
Current pregnancy complications	No	264	80.7
	Yes	63	19.3
Types of complication(N=63)	PIH	20	31.7
	PROM	16	25.4
	APH	17	27
	Others*	10	15.9
Complications of labor(n=327)	No	259	79.2
	Yes	68	20.8
Type of labor complication(n=68)	Prolonged Labor	32	47.1
	Malposition	22	32.4
	Obstructed Labor	14	20.6
Status of labor(n=327)	Spontaneous	308	94.2
	Induced	19	5.8

**Others include hyperemesis gravidarum, multiple pregnancy, olio and polyhydramnios, and cervical incompetence.*

5.3. Medical, Anthropometric and behavioral factors among women who gave birth at Negest Eleni Mohammed memorial general Hospital in Hossana Town, Hadiya Zone, SNNPR, 2015

Twenty one (6.4%) mothers coming for delivery report that they have chronic medical problem. Among it, HIV 9 (42.9%), hypertension 6 (28.6%) and Tuberculosis 4 (19%). Regarding maternal MUAC, two hundred sixty eight (82%) mothers had MUAC greater than or above 23cm and 59(18%) mother's MUAC was below 23 cm. historically, 30(6.7%) of mothers reported they were treated for malaria during current pregnancy and in 58 (22.3%) of mothers, the hemoglobin level was less than 10gm/dl.

About 70% mothers had reported that they drink caffeine every day and 17 (5.2%) mothers report that they drink alcohol occasionally **(table 4).**

Table 4: Medical, Anthropometric and behavioral factors among women who gave birth at Negest Eleni Mohammed memorial general Hospital in Hossana Town, Hadiya Zone, SNNPR, 2015

Variables		Frequency	Percent
Chronic Medical Illness(N=327)	No	306	936
	Yes	21	6.4
Type of chronic Medical Illness(N=21)	Chronic hypertension	6	28.6
	HIV	9	42.9
	Others*	6	28.6
History of Malaria During Pregnancy(N=327)	No	297	90.8
	Yes	30	9.2
Hgb level (N=260)	Anemic(Hgb<10gm/dl)	58	22.3
	Normal(Hgb>=10gm/dl)	202	77.7
Caffeine uses**(N=327)	Never	28	8.6
	Daily	229	70.0
	Weekly	27	8.3
	Occasionally	43	13.1
Alcohol use(N=327)	Never	311	94.8
	Occasionally	17	5.2

***Tuberculosis, DM and hepatitis virus **coca or/and coffee.**

5.4. Prevalence of adverse Birth outcomes

A total of 299(91.4%) of the neonates born alive and 28 born being dead in utero making the rate of still birth 8.6%. From the total births, 80 (24.5%) mothers had experienced adverse birth outcomes among which 32 (10.7%) live birth were LBW and 28(9.4%) preterm birth, and 6 babies were with visible birth defect (figure 2). The mean birth weight of the neonates was 3170(±522) grams. The mean gestational age was 38.38(±2) months with 95%. Six (1.8%) neonates were born with different types of congenital malformations like anencephaly, spinal bifida….out of the five congenital malformations seen four were stillbirths (table 5).

Table 5: Current birth outcomes of mothers who gave birth at Negest Eleni Mohammed memorial general Hospital in Hossana Town, Hadiya Zone, SNNPR, 2015.

Variables		Frequency	Percent
Status of neonate at birth	Still Birth	28	8.6
	Live Birth	299	91.4
Birth weight of live birth baby (n=299)	Normal (2500-4200gm)	267	89.3
	Low (<2500gm)	32	10.7
Gestational age (n=299)	Term (37-42weeks)	292	89.3
	Preterm (<37weeks)	35	10.7
Visible birth defect (n=327)	No	321	98.2
	Yes	6	1.8
Adverse birth outcome(n=327)	No	247	75.5
	Yes	80	24.5

5.5. Factors associated with the adverse birth outcomes

As shown (table 6), lack of ANC visit, current pregnancy complication, history of malaria during pregnancy and hemoglobin level less than 10g/dl were found to be significantly associated with adverse birth outcomes in multivariable logistic regress analysis model. Mothers who didn't have ANC follow up were nearly 3 times more likely to have adverse birth outcome than mothers who had ANC follow up (AOR = 2.8, 95% CI (1.3, 6.1)). The presence of any form of pregnancy complications current pregnancy were 5.8 times more likely to have adverse birth outcomes than their counterparts (AOR = 5.8, 95% CI (2.9, 11.5)).

Similarly, Mothers whose hemoglobin was less than 10g/dl were 2 or more times more likely to encounter adverse birth outcomes compared to Hgb greater than or equal to 10g/dl(AOR=2.5, 95%CI (1.3, 5.0)). In addition, those mothers who had history of malaria during pregnancy were 5 times (AOR=5.0, 95%CI (1.8, 13.8)) more likely to experienced adverse birth outcomes than their counterparts.

Table 6: Simple and multivariable logistic regression of selected variables in relation to adverse birth outcomes among deliveries at Negest Eleni Mohammed memorial general Hospital in Hossana Town, Hadiya Zone, SNNPR, 2015

	Variables	Adverse birth outcomes		COR(95%CI)	AOR (95%CI)
		No	Yes		
Educational status	Unable to read and write	47	27	**2.1(1.1,4.2)***	1.4(.6,3.5)
	Primary	131	34	.9(.5,1.7)	.7(.3,1.6)
	Secondary and higher(ref.)	69	19	1	1
ANC follow up	Yes (ref)	219	55	1	1
	No	28	25	**3.5 (1.9, 6.6) ***	**2.8(1.3, 6.1) ***
Gravida	Primigravida(ref.)	100	33	1	1
	Multigravida	147	47	1.6(.9, 2.7)	.7(.4, 1.4)
Pregnancy complications	No(ref.)	220	44	1	1
	Yes	27	36	**6.7(3.8, 12.1) ***	**5.8(2.9, 11.5)***
Malaria	No(ref.)	230	67	1	1
	Yes	17	13	**2.6 (1.16, 5.8) ***	**5.0(1.8, 13.8)***
Hgb	<10g/dl	32	26	**2.4(1.5, 4.4) ***	**2.5(1.3 ,5.0) ***
	>=10g/dl(ref.)	151	51	1	1
Labor complication	No (ref.)	201	58	1	1
	Yes	46	22	1.7 (.95, 3.2)	1.2(.6, 2.4)

p <0.05, Hgb=hemoglobin level

5.6. Factors associated with still birth

As (table 7), shown the variables labor and pregnancy complications found to be significantly associated with still birth in multivariable logistic regression analysis. The proportion of deliveries that happen from mothers who have complications of labor had highest still birth (17%). The presence of any form of labor complication to current labor were 4 .4 times more likely to have adverse birth outcome than their counterparts (AOR = 4.4, 95% CI (2.0, 10.0). Also mothers who were encountered pregnancy complication during current pregnancy were nearly 3 time more likely to deliver still birth compare to their counterparts (AOR=2.9, 95%CI (1.2, 6.9).

Table 7: Simple and multivariable regression of selected variables in relation to still birth among deliveries at Negest Eleni Mohammed memorial general Hospital in Hossana Town, Hadiya Zone, SNNPR, 2015

Variables		Still birth		COR (95% CI)	AOR (95% CI)
		No	Yes		
Residence	Urban(ref.)	179	13	1	1
	Rural	120	15	1.7(.79,3.7)	1.3 (.5, 3.0)
ANC Follow Up	Yes(Ref.)	253	21	1	1
	No	46	7	1.8(.7, 4.5)	1.4 (.5, 4.0
Maternal MUAC	<23cm	50	8	2.0(.8, 5.2)	1.7(.7, 4.4)
	>=23cm(ref.)	249	20	1	1
Pregnancy Complication	No(ref.)	247	17	1	1
	Yes	52	11	**3.1(1.4, 7.0)***	**2.9(1.2, 6.9)***
Labor Complication	No(ref.)	245	14	**1**	**1**
	Yes	54	14	**4.5(2.0, 10.0)***	**4.4 (2.0, 10) ***
Educational status	Unable to read and write	65	9	2.9(.8,10)	2.1(.5,7.8)
	Primary school	150	15	2.1(.7,6.5)	2.1(.6, 6.8)
	2nd and higher(ref.)	84	4	1	1

**p<0.05*

5.8. Factor associated with low birth weight

As shown (table 8), hemoglobin level less than 10gm/dl and current pregnancy complication were found to be significantly associated with low birth weight in multivariable logistic regress analysis model. Also mothers who were encountered pregnancy complication during current pregnancy were slightly more than 3 time more likely to deliver LBW compare to their counterparts (AOR=3.1, 95%CI (1.4, 7.4)). Those women with hemoglobin level less than 10gm/dl were 2.7 times more likely to deliver low birth weight baby than those women with hemoglobin level greater than or equal to 10gm/dl(AOR=2.7, 95%CI(1.2, 6.2)).

Table 8: Simple and multiple logistic regression of selected variables in relation to low birth weight among women who gave birth at Negest Eleni Mohammed memorial general Hospital Hossana Town, Hadiya Zone, SNNPR, 2015.

Variables		LBW		COR(95% CI)	AOR(95% CI)
		No	Yes		
Residence	Urban(ref.)	163	16	1	1
	Rural	104	16	1.6 (.7, .3.3)	1.3(.6, 3.0)
Educational Status	Illiterate(ref.)	54	11	1.4(.5,3.3)	1.4(.4,4.0)
	Primary	140	10	.5(.2, 1.2)	.5(.2.0,1.3)
	Secondary and higher	73	11	1	1
Pregnancy complication	No(ref.)	228	19	1	1
	Yes	39	13	**4.0 (1.8, 8.8)***	**3.1(1.4, 7.4) ***
Gravida	Primigravida	105	16	1.5(.7,3.2)	2.0(.8,4.7)
	Multigravida(ref.)	162	16	1	1
Hgb level	>=10g/dl	37	14	1	1
	>=10g/dl(ref.)	165	18	**3.4(1.6, 7.6)***	**2.7 (1.2, 6.2)***

p<0.05

Chapter 6: Discussion

This study aimed to assess the prevalence and associated factors of adverse birth outcomes among deliveries at Negest Eleni Mohammed memorial general Hospital in Hossana town. The study results revealed that the prevalence of adverse birth outcomes was 24.5%. The prevalence of adverse birth outcome found in the present study is relatively similar to that reported in the Hospital based study conducted at Gondor referral Hospital (23%) (42). However, this study found out a lower prevalence of adverse birth outcomes compared to other health facility based study in northern Ethiopia (27.7%) this difference may be explained by the difference in study setting and methodology (41). This study was included zonal and district hospitals, and health centers unlike the current study which was limited to zonal Hospital. The previous study was used consecutive sampling technique while the current study was used systematic sampling.

This finding was high as compared with the research done in Tanzania and Gahanna where 18% and 19% respectively (30, 31). The difference might be due to the fact that, mothers in these countries have better disease screening and prevention and also there might be gate better nutrient before and after conception. In addition the prevalence of adverse birth outcomes may vary between and within geographical regions (15, 18).

As revealed by the present study, lack of ANC follow up was one of the risk factors for adverse birth outcomes. This may be attributed to the beneficial impact of ANC on pregnancy outcome, either through the detecting and treatment of complications or by contributing to the reduction of modifiable maternal risk factors by providing available medical, nutritional and educational interventions which might be intended to reduce the risk of adverse pregnancy outcomes. Similar findings was also reported from the study done in Nigeria which revealed that mothers who didn't attend were more likely to experience adverse birth outcome compared with those mothers who had ANC visited (37).

This is again supported by a research done in Tanzania which mothers who didn't attend were more likely risk to face adverse birth outcome compared with those mothers who had ANC visited (38). This findings is also in line with a studies conducted in Ethiopia (41, 42).

Adverse birth outcome was also found to be associated with pregnancy complication in this study. This might be related to termination of pregnancy due preeclampsia and major placenta previa which may lead to LBW and preterm delivery and PIH causes resistance of uterine vessels and reduction in uterine blood circulation leading to intrauterine growth restriction (46). This finding was almost found to be a universal fact and has been revealed in many studies (26, 27, 29, 33, 36, 37, 38).

The study showed that mothers with history of malarial attack during pregnancy were found to be more risk for adverse birth outcomes than those without history of malaria during pregnancy and this finding was similar to previous studies done in Sudan, Zambia, Tanzania and Ethiopia (32,34,38, 43). Which indicated that mothers with malaria during pregnancy were more likely to experience adverse birth outcomes than without malaria. But it is both preventable and treatable, and effective preventive and curative tools have been developed (48). This might be due to the fact that parasite have affinity for decidual vessel and transmit through placenta and destruct fetus red blood cells which decreases nutrient and oxygen transmission to the fetus (46). Malaria infections in the pregnancy also increase the risk of anaemia and infections occurring in the third trimester (49).

The present study also revealed that anemia (Hgb< 10mg/dl) is another factor found to be significantly associated with adverse birth outcomes. Since only post-delivery Hb was taken in this study, it would have been most ideal to follow the pattern of Hgb from antenatal period to delivery as that would give a more scientific picture of the possible association between maternal Hgb and adverse birth outcomes. It is possible to early identify mothers with anemia in their ANC follow up and take appropriate measures. Which is in line with a study conducted in India (24). Similar finding was also reported from the study done in Pakistan (28) which revealed that mothers whose Hgb less than 10gm/dl were more likely to have adverse birth outcomes as compared with those mothers hemoglobin level greater or equal to 10gm/dl. This is again supported by a research done in Nigeria and Tanzania (30, 37, 38). This may be due to insufficient RBC to carry adequate oxygen and nutrients to the fetus in uterus.

In present study, labour complication and pregnancy complication were significantly associated with adverse birth outcome such as still births. This finding was almost found to be a universal fact and has been revealed in many studies and texts (26, 27, 40, 46). Also the same variable pregnancy complication and hemoglobin level less than 10gldl were an independent risk factors for adverse birth outcomes outcome such as LBW.

The prevalence of adverse birth outcome in the study area was high. History of malaria during pregnancy, hemoglobin level less than 10gm/dl, pregnancy complication and lack of ANC follow up found to be risk factors, however, implementing a number of activities in collaboration with other related organizations to improve birth outcomes and its effect like accelerated training of midwives and emergency surgeons, equip Health Center with Basic Obstetrics and Newborn Care, equip all Hospitals including district Hospital to provide comprehensive obstetrics and new born care, improving ANC and institutional delivery coverage, improve availability of pharmaceutical supplies and improving referral system (10).

Adverse birth outcomes are not caused by just one factor; multiple interrelated factors have been linked to adverse birth outcomes. Therefore improving birth outcomes within communities will require comprehensive approaches. The following domains are very important for improving birth outcomes and should be strengthening in developing countries include implement health promotion efforts, ensure quality of care for all women and infants, improve maternal risk screening for all women of reproductive age, enhance service integration for all women and infants, improve access to health care for women, before, during and after pregnancy, develop data systems to understand and inform efforts (i.e., infrastructure development) and promote social equity (50).

This study clearly shares the limitations of cross-sectional studies and hence, does not show seasonal variations of adverse birth outcomes. Additionally, this study did not consider some potential risk factors for adverse birth outcomes such as placental factors and intra uterine infections. Height and weight of mothers were not included in the analysis of this study where there were 87.8% missing but they were believed to be the known confounder in association of findings.

Chapter 7: Conclusion and recommendation

7.1. Conclusion

The prevalence of adverse birth outcomes in the study area was high. Findings indicate that lack of ANC follow up, Hgb less than 10gm/dl, current pregnancy complication and history of malaria during pregnancy are significantly associated with adverse birth outcomes. In general, similarity of results of this study to earlier studies shows ineffectiveness of existing national programs for improving the prenatal care. Adverse pregnancy outcomes is the result of a multiplicity of factors and cannot be corrected by a narrow pharmaceutical shortcut. It calls for overall improvement in antenatal care. So it is essential to provide the necessary facilities for prenatal health care.

7.2. Recommendation

Based on the above findings, the following recommendations are forwarded:-

- The regional health bureau and Zonal health department should strengthen the newly focused ANC service utilization by pregnant women as it can improve birth out comes.
- Intensive community awareness raising and demand creation activities should be done at the grass root level through sustained community involvement by the district "health offices and their respective health facilities to alleviate malaria attack during pregnancies.
- Zonal health department, wereda health office and health professionals should implement health education programs and improving health care quality delivered to pregnant mothers to control these risk factors and consequently promote public health in the study area.
- It is recommended that all efforts should be made to increase the Hgb level by regular supplementation of iron and also by dietary modification.
- Health professionals should screen all pregnant mothers for the important risk factors of adverse birth outcomes such pregnancy and labor complication and provide effective and early treatments.

Further future researches

For further research on adverse birth outcomes in this country, it is recommended that other factors should be considered like, violence, Rh-factors, placenta factors and intra uterine infections and other strong study design like case control or cohort study is also recommended.

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Annexes

Annex 1.Questionnaire (English)

A Questionnaire prepared to collect data on prevalence and associated factors of adverse birth outcomes among women delivered at Negest Elene Mohammed memorial general Hospital in Hosanna town, south west of Ethiopia.

Questionnaire Number_____

Hello! Good morning/ evening?

I am _____ I am working in this health institution. I am a research team member of Jimma University and carrying out a study on a title the prevalence and associated factors of adverse birth outcomes among women delivered at Negest Elene Mohammed memorial general hospital in hosanna town, south west of Ethiopia. This research topic is aimed to assess the prevalence and associated factors of adverse birth outcomes among women delivered at Negest Elene Mohammed memorial general hospital in hosanna town, south west of Ethiopia this is situation that need to address. The result of this study will produce information that will be useful in implementing. The study will involve you completing the questionnaire that is enclosed with this data and it will not take more than 20 minute to complete. Confidentiality and anonymity is fully assured, as your name is not required on the questionnaire and only the research team will have access to the result. It will not affect you in any way, Should you not take part in this study. Therefore, you are kindly requested to respond genuinely and voluntarily with patience.

Do you have any question? Are you willing to participate in the interview?

[ ] Yes, Go to the next page [ ] No, Thank them and interrupt the interview

Name and Sign of the consenting interviewer_____

Result of the interview:

1. Completed 2. Partially completed 3.The interviewee refused

Supervisor's name_____ sign _____

Date of interview _____ Time interview started _____ Time interview Finished_____

Part one – Questions related to socio- demographic characteristics and Maternal Anthropometry of the study participants

No	Questions	Response	Skip
001	Age of the mother in years	[_____]	
002	Residence	1.rular 2.urban	
03	Educational status	1. Unable to read and write 2. Read and write only 3. Elementary 4. Secondary 5. College and above	
04	Marital status	0. Married 1. single 2. divorced 3. widowed	
05	Family size	_____	
006	Religion	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Other (specify)	
007	Ethnicity	1. Hadiya 2. Kambata 3. Silte 4. Amhara 5. Gurage 1. Others(specify) _____	
008	Occupation	1. Farmer 2. House wife 3. Merchant 4. Gov't employee 5. Working in private 6. Student 7. Daily laborer 8. Others(specify)_____	
009	Average family income per month (Ethiopian Birr}	1. Mother_____Birr/month 2. Father _____ birr/month 3. Additional income_____birr/month Total_____	

Part two – Questions related to obstetric, medical history, behavioral factors of the study participants

No.	Question	Response	Skip
010	The first day of the Last menstrual period	[_____]dd/m/yy	
011	Gestational age in weeks	[_____] in weeks	
012	Date of live birth given preceding to this pregnancy	_____ dd/m/y	
013	Inter pregnancy interval in months	[_____] months	
014	Gravidity	[_____]pregnancy	
015	Parity	[_____]	
016	Does the mother has ANC follow up?	0. No 1.Yes	No to.q019
017	If yes for q108, when did the mother start ANC follow up?	0. first trimester 1. second trimester 2. third trimester	
018	If yes for q108, Number of ANC follow up?	_____	
019	Does the mother took iron/folic acid during index pregnancy?	0.No 1.yes	No to.q021
020	If yes for q020,for how many month(s)	---------month(s)	
021	What did the perinatal outcome of preceding pregnancy? (Multiple responses are possible)?		
		No / Yes	
		1. Live birth: 0 / 1	
		2. Still birth: 0 / 1	
		3. Pre term birth1: 0 / 1	
		4. C/S: 0 / 1	
		5. PPH: 0 / 1	
		6. SVD: 0 / 1	
		7. Others(specify)_____	
022	Did the index pregnancy has the problems/complication?	0.No 1.Yes	No to.q024
023		No / Yes	

**Coffee and /or coca

	If yes for q022, which of the following? (multiple responses are possible)	G. hypertension[1]	0	1	
		Preeclampsia	0	1	
		Eclampsia	0	1	
		PROM	0	1	
		P. Previa [2]	0	1	
		A Placenta[3]	0	1	
		Polyhydraminios	0	1	
		O. Hydramnios [4]	0	1	
		H. gravidarum[5]	0	1	
		Others(specify)----------			
024	Does the current labor have any problem or complication?	0. No 1. Yes			No to. q026
025	If yes , what type	1. Prolonged labor 2. Malposition or malpresentation 3. Obstructed labor 99. Other (specify)----------			
026	Status of labor	0. Spontaneous 1. Induced			
027	Mode of delivery	0. SVD 1. SVD+Episiotomy 2. C/s 3. Forceps delivery 4. Vacuum delivery 5. others(specify)			

Chronic Medical illness and others

[1] Gestational hypertension
[2] Placenta previa
[3] Placenta previa
[4] oligohydraminos
[5] Hyperemesis gravidarum

028	Does the mother have history of chronic medical illness?	0. No 1. Yes	No to. q030
029	If yes, what are the problems? (multiple responses are possible)	1. Chronic hypertension 2. DM 3. HIV 4. Others(specify)_____	
030	Hgb level of the mother	_____mg/dl	
031	Does the mother treated for malaria during index pregnancy?	0. No 1. Yes	
Maternal anthropometry			
32	MUAC _____cm		
33	Height _____cm	Weight _____kg	
Behavioral factors of mother			
034	Did the mother has history of drug use? (cocaine,	0. No 1. Yes	No to.q038
035	Is she still using?	0. No 1.Yes	No to. q037
036	If yes, for how long?	[_____]	
037	If No, how many years since she stops	[_____]	
038	Did the mother used Caffeine during index pregnancy?*	0. Never 1. Daily 2. Weekly 3. occasionally	
039	Did the mother use alcohol during index pregnancy?	4. Never 5. Daily 6. Weekly 7. occasionally	
040	Did the mother Has history of cigarette smoking?	0. No 1. Yes	No to.q045
041	If Yes, Is she still using?	0. No 1. Yes	No to. Q044
042	If Yes, For how long?	[__ __]	
043	If Yes, how many cigarettes per day?	[__ __]	
044	If No, how many years since she stops	[__ __]	

Part Three – Questions related to perinatal Birth out comes			
045	Is the child born alive?	0. No 1. Yes	
046	Weight of baby in Gram	[__ __ __ __]gram	For live birth only
047	Gestational age in weeks	----------wks.	For live birth only
048	Does the newborn baby have congenital abnormalities?	0. No 1. Yes	

Signature of supervisor _____Date_____

Annex 2: Hadiyyissa version

Hadiyyi Su'um Xammicha

Jimmi Yunversite'ene Minadaphi Faya'om Lossa'in Collega

Maaterniitii'i Lossa'in Baxancha

Woro'in Gir Gich Gas Qoxo'one Hadiyi Zo'in Nigist Eleni Mohammad Memoorial General Hospitaala'n Qarammo Cilluwwi Hassisoo Bee'ii Misha Ixoo Eboo Luwwa La'immina
Issakammi Xammichuwa

Xamichchi illage eyyatto cakkishi forma

Summ----------yamamommoJimmi yunversite'ene minadaphi faya'ommi lossani kollejanne issaku'iyyi yommake'i sarayinna sawwitte wixxa'anchho/tte .Ka srrayikki horror woshishi Negest Eleni Mohammad Memoorial General Hospitaala'n Qaramoo Cilluwwi Hassisoo Bee'ii Mishaa, Ixoo Eboo Luwwa annani issakk'aLa'immina:: Ka xa"imich worqatane ki"in sum te"im ki"in bikina caakisoo luww mahim kitaabamoyo. Odim ki"in kutakam wosha hundam iininsee ki"ineesee mul man maceesoobee"isa man bee bagana xa"imomo.oddim kaa sarayyimane baxamittit bee'arem mah hawim affoyo. Xamichoma xa"imena xanomok ki"ine xa"immommisinna itatakkolassi xale"ete dabacha uwima hasakobe"I ayy xa"imichinam oo xa"imich gatona yimm xansiisooko. Odim ayy amanenem ihaako uulise yim xansiisooko::Ka xammichuwwa xamimmina masso amani 20daqqiqqi affeb'e yoo ammani ihenna xannokko

Xa'mmito Xamichchi yalas?

Xa'ammiccha xammiminna ittanittakkamonihee eyya_____ ittammomoyyo_____

Dabachi eyya ihullassi gallaxxommo, awonno idonne hige

Dabachi ittammomoyyo ihullassi awonno manchho xamme

Xamo manichi suma ----------Firima'a----------

Xammichi misha

1 hunda 2 kollo 3 dabachcha uwwukkoyoo

Xamako balla ..... xamiccha asherakko'I ammanne----------xamiccha gullakko ammanne-----

Do'anichch summa ---------- balla----------Firim'a----------

Lule’i Xamich Dabaranch Bikina Kuro Luwa/Meraja’a

Xigo	Xa’immichcha	Dabachcha	Hige
001	Am umur hiinchinne	(_____)	
002	Gandis	1 haxi uulla 2 beero’o	
003	Los’inni duuha’i	----------	
004	Min issimmi duuh’i	1 min issito’ookkotane 2 min issitobee’etane 3 buubbeesaanchchotte 4 mi’nni annichchi lehaakkookkotane	
005	Abaroosi xigi	_____	
006	Amma’nnat	1 ortodoksa 2 islaanchchotte 3 pheentekkichchotte 4 kaatolikichchotte 5 mullek yoolas_____	
007	Giichchi	1. hadiyyichcho 2. kambaatta 3. Siltee 4. amaara 5. guraage’e 6. mullek yoolas_____	
008	Baxi	1 mi’nni amatte 2 daddaraanchchotte 3 adi’lli baxaanchchotte 4 gaqqi baxo baxaanchchotte 5 Mulleki yoolas	
009	Abaroosi Lambe’aanchi aga’nni siixxo’i(Toppe’I birinne)	Min annik_____bira Kii gaqek_____birr	

		Mullek yoolas_____ Hundim _____bira	
Baxancha Lamo: illageen hee'ukki amo'i fayya'oo'mmi duuha'a saarayyimmina gudaakkokki xa'mmichchuwwa			
010	Lasa anchchi aga'nni xura moo'llo'I ayyaam	_____balla/agana/hiincho	
011	Lam fooroo'mmi amman saantinne	_____saanta	
012	Ka lamfooroo'mmiinse illagee'nneka fooraam cilia qattitti hiinchi	_____balla/agana/hiincho	
013	Ooso qoodakka'a qarimmina yookki amman aganinne	_____agana	
014	Mee'I kore lam foori ikkaa	_____kore	
015	Mee'I ooso foorinne qattaa	_____	
016	Ama lam foori ammo'i fayya'oo'mmi duuha'a laseessa'a?	0. laseesso'oyyo 1. Eeyya laseesso'ookko	**0 ihulas xam.019 hige**
017	Dabachchi eeyya ihulas,laseesimma asheetto'oki hinka ammane	0. luxxi sas aganinne 1. sas aga'nni lasonne 2. loh aga'nni lasonne	
018	Dabachchi eeyya ihulas, mee'i kore laseessa'a	0. soor korii hoffi ammane 1. soor koree eekkannii lophphookkokaa	
019	Ka lamfooroo'mmiinse ammanenne iron awwaaxxitaa	0. massummoyyo 1. Eeyya massaammo	**0 ihulas 021 hige**
020	Massitaattoolas mee'i aganina	_____ agana	
021	Kanniinsi illagenne hee'ukki lam fooroomii qaramu ciil	A. Ciil fooraamo 0. fooraamoyyo 1.eeyya B. Ciil lehaakkoohane 0.fooraamoyyo 1.eeyya 3. Amman afubee'I cilia 0. amman afaakkoohane 1. eeyya	

		4. Oppireshiininne qaramaakkoohane 0.oppireeshiininneyyo 1. eeyya 5. Ciil qaramukkoki maraa'mmi orachchinnette 0. Maaraa'mmi orachchinneyyo 1. Eeyya. 6. Mulleki yoolas caakkissehe_____			
022	Kaba qaramu ciilanne fayya'oo'mmi hawwi	0. bee'e 1. eeyya yookko			**0 ihulas 024 hige**
023	Dabachchi eeyya ihulas awwonoo keennii hinkane(matii hanaan dabachcha doo'llimmi xanamookko		eeyya	Bee'e	
		Lamfoo'mmi xiiqqi gafechchi jabbi	0	1	
		Pri-ekilampshiya'a	0	1	
		Ekilaampishiya'a	0	1	
		Amman ofoo'nni shu'mmi waat xooqimma	0	1	
		Xiiga ciil gunguu'llimma	0	1	
		Aa'm gasaa waari'maa	0	1	
		Aa'm amann afoon fatakim	0	1	
		Lobakati data godabonne iyyimma	0	1	
		Hofiqaxi daata godabonne iyyimma	0	1	
		Mulleki yoolas caakkise	_____		
024	Kabad xuuchchanne hawwi qooccamaakko?	0. Eeyya qooccamaakko 1. bee'e			**0 ihulas 026 hige**
025	Dabachchi eeyya ihulas hinkido hawwi?	1. xuuchchanne dasimmi 2. Egeramoobee'I duuha'anne afuurimmi			

		3. Maaqaqqimma 4. Mulleki yoolas caakkise	
026	Xuuchchi duuha'i	0. ixxi ammanennem 1. hakiimi qaraarinne	
027	Ciili qaramukkoki	0. qa'll ma'nninee(Bissa) 1. Episetome'inne 2. Opireeshiininne 3. Foorsepsinne 4. Vaakuuminne 5. Mulleki yoolas caakkise	
028	Ciilichchimanne garu jabbi yoo?	0. bee'e 1. eeyya yookko	**0 ihulas 030 hige**
029	Dabachchi eeyya ihulas,hee'ukki hawwi?matii hanaan dabachchi xanamookko	1.Bashil ammanina afuuraakkoo xiiqqi gafechchi jabbo 2.Sukka'lli jabbo 3.Mulleki yoolas caakkise	
030	Amaki Hgb qaxoom	_____mg/dl	
031	Amaki (MUAC)	_____cm	
032	Amaki ulich _____cm	_____kg	
033	Kabd lamfoomanne shekkere'I jabbina qaraare awwaaxxitaa	0. Awwaaxxito'oyyo 1. Eeyya	
034	Sussa eboo karaare awwaxxita laqo?	0. Awwaaxxito'oyyo 1. .eeyya	**0.ihulas 038 hige**
035	Kabadem awwaaxxitamonnihe	0. awwaaxxitamoyyo 1. eeyya	**0.ihulas 037 hige**
036	Eeyya ihulas hinkaa'nni doolliinse	_____	
037	Uulliso'oohaa'lleensi hinkaa'n doolle ihaa	_____	

038	Ama lamfooroomanne kaffeena yakkam awwaaxxitam he'lloi'nniyye?	0. Horem awwaaxxito'oyyo 1. Ballina ballina 2. Saantinne mat balla 3. Higaa higaa	
059	Ama Ka lam fooroomanne dimbisoo agga agga'a?	0. Horem awwaaxxito'oyyo 1. ballina ballina 2. Saantanne mat balla 3. Higaa higaa	
040	Ama Ka lam fooroomanne sigaara wiriisita'a	0. wiriissito'oyyo 1. Eeyya	**0.ihulas 045 hige**
041	Eeyya ihulas kabadem wiriissitamonnihe?	0. wiriissito'oyyo 1. eeyya	**0.ihulas 044 hige**
042	Eeyya ihulas hinkaa'ni doolli'na	_____	
043	Eeyya ihulas hinkaa'nni mat ballane	_____	
044	Uulliso'oohaa'lleensi hinkaa'n doolle ihaa?	_____	

Baxxanchi saso: qaramchchanne amaxxamaakkoo hawwi duuha'a

045	Qaramu ciil fooraamonnihe	0. lehaakkoohane 1. eeyya fooramo	0 ihulas 048 hige
046	Ciilichchi kee'mmati giraaminne	_____graama	
047	Lamfooro'm umuri saantinne	_____saanta	
048	Qaramukkuuyyi qaramchinne amaxxamaakkookki hawwi	0. bee'e 1. eeyya yookko	

Do'anichch summa _____ Firima'a_____

Declaration

I, Ritbano Ahmed Abdo hereby declare that this research report entitled prevalence and associated factors of adverse birth outcomes among deliveries at Negest Eleni Mohammed Memorial General Hospital in Hossana town, Hadiya zone, SNNPR has been prepared and submitted in fulfillment of the requirements of the MSc degree in Maternity nursing Program. This is my original work and that all sources that have been referred to and quoted have been fully indicated and acknowledged with complete references, and the research has not been presented for a degree in any other university.

Name: Ritbano Ahmed (BSc-midwife)

Sign_____ Date_____

Name of the institution: Jimma University

Date of admission _____

This thesis has been submitted for examination with my approval as university advisor

First Advisor: Professor Tefera Belachew (MD, MSc, PhD)

Sign_____ Date_____

Second Advisor: Mr. Fekadu Yadessa (BScN, MSc)

Sign _____Date_____