



**PHARMA COLLEGE HAWASSA CAMPUS**

**SCHOOL OF PUBLIC HEALTH**

**STILLBIRTH AND ASSOCIATED FACTORS AMONG  
WOMEN DELIVERED AT DOREBAFANO PRIMARY  
HOSPITAL, SIDAMA REGIONAL STATE, SOUTHERN  
ETHIOPIA, 2023, FACILITY BASED CROSS SECTIONAL  
STUDY**

**MPH THESIS**

**BY: TSEGEDINGEL YIGZAW**

**AUGUST 2023**

**HAWASSA, ETHIOPIA**

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**A THESIS RESULTSUBMITTED TO PHARMA COLLEGE SCHOOL OF  
PUBLIC HEALTH IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTERS OF GENERAL  
PUBLIC HEALTH**

**AUGUST 2023**

**HAWASSA, ETHIOPIA**

## APPROVAL BY THE BOARD OF EXAMINATION

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## **STATEMENTS OF THE AUTHOR**

By my signature below, I Tsegedingel Yigzaw declare and affirm that this thesis is my own work. I have followed all ethical and technical principles in the preparation, data extraction, data analysis and compilation of this Thesis.

This Thesis is submitted in partial fulfillment of the requirements for a Master of Public Health degree at Pharma College. The Thesis is deposited in Pharma College Library and is made available to borrowers under the rules of the Library.

## **ACKNOWLEDGEMENTS**

Firstly and mostly, I would like to thank the Almighty God for helping me throughout the journey in every steps of my life.

Next I would like to thank Pharma College, department of public health for offering me the chance to proceed with my research. My gratitude also goes to Mr. Anteneh Fikrie (Assistant Professor) for his unreserved support, patience and detailed advices regarding the research.

I would also like to thank Dore-bafano Primary Hospital to permit conducting this research and staffs of Dore-bafano Primary Hospital for their cooperativeness by providing all the necessary information for this study.

Finally, I would also like toa special thankmy husband Tesfahun Assefa for his support and encouragement and my family for their encouragement.

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## LIST OF ACRONYMS AND ABBRIVIATIONS

AIDS.....	Acquired immune deficiency syndrome
ANC.....	Antenatal care
AOR.....	Adjusted odds ratio
APGAR...	Appearance, Pulse, Grimace, Activity and Respiration
APH.....	Antepartum hemorrhage
ARR.....	Adjusted relative risk
CI.....	Confidence interval
DHSs.....	Demographic and Health Surveys
DM.....	Diabetes mellitus
GA.....	Gestational age
Hb.....	Hemoglobin
HDP .....	Hypertensive disorders of pregnancy
HIV.....	Human immune virus
LMICs....	Lower and middle income countries
MDGs.....	Millennium Development Goals
MSAF.....	Meconium stained amniotic fluid
MPDSR...	Maternal and Perinatal Death Surveillance and Response
NGOs.....	Non-governmental organizations
PROM.....	Premature Rupture of membrane
SB.....	Stillbirth
SBR.....	Stillbirth rate
SDGs.....	Sustainable Development Goals
SPSS.....	Statistical package for the social sciences
SSA.....	sub-Saharan Africa
STIs.....	Sexually transmitted infections
UN.....	United Nations
UTIs.....	Urinary tract infections
WHO.....	World Health organization

## ABSTRACT

**Background:** Over 2 million babies are stillborn each year-or 1 every 16 seconds, of which 84% are in low- and middle-income countries. Globally 2/3 to 3/4 of stillbirths may occur during the antenatal period. In Ethiopia, evidences from the community and facility-based studies portrayed the stillbirth rate of 19.6–87 per 1,000 births. This research aims at narrowing the gap on understanding the magnitude and possible factors of stillbirth.

**Objectives:** To assess the magnitude of stillbirth and associated factors among women delivered at Dore-bafano primary hospital 2023.

**Methods:** Facility based cross-sectional study was conducted by reviewing medical records of 518 randomly selected births at Dore-bafano Primary Hospital from May 3 to 12, 2023. The data were extracted using a structured checklist by trained data retrievers and checked for its completeness, edited, cleaned and entered in to Epidata version 4.6 and exported to SPSS version 22. Bivariable and multivariable binary logistic regression analyses were done to identify associated factors of stillbirth. Associations were measured using both crude and adjusted odds ratios. Finally p-value <0.05 together with 95% confidence interval was used to determine statistical significance.

**Results:** The prevalence of stillbirth was 3.38% (33.8 cases/1000 live births) within the sample. Several factors were identified as independently associated with stillbirth, including gestational age less than 37 weeks [AOR=0.024 (95% CI: 0.002-0.37)], obstructed labour [AOR=30.26 (95% CI: 1.14-804.20)], duration of labour exceeding 18 hours [AOR=17 (95% CI:1.23-253.35)] and congenital anomalies [AOR=19 (95% CI: 1.33-295.02)].

**Conclusions:** The prevalence of stillbirth in this study was high as compared to the global as well as the national stillbirth rate. Factors such as gestational age less than 37 weeks, obstructed labor, duration of labor exceeding 18 hours and congenital anomalies were found to be independently associated with stillbirth. Therefore, it is crucial for healthcare providers at Dore-bafano Primary Hospital to prioritize early detection and management of these risk factors to reduce the occurrence of stillbirths.

**Keywords:** Stillbirth, Associated factors, Delivered mothers, Dore-bafano, Primary Hospital

# 1. INTRODUCTION

## 1.1. Background

According to World Health Organization (WHO), the birth of a new born after twenty-eight completed weeks of gestation weighing 1,000gm or more, with baby showing no signs of life after delivery is a still born (1-3). Stillbirths (SBs) can be classified based on either physical appearance as macerated and fresh or time to death as death before labour and death occurs during labour. Conducting a complete and careful evaluation is one of the most important ways to identify a cause for the stillbirth. Even when the cause may seem obvious, additional tests may provide information useful for counseling purposes. Many stillbirth evaluation protocols have been published, all of which include a careful medical history, a post-mortem autopsy, an evaluation of the placenta, and genetic testing (typically a chromosomal microarray) (4). Despite the advancement in diagnostic tools and autopsy, the cause of a large proportion of stillbirth is not known (5, 6). Globally two-thirds to three-quarters of stillbirths may occur during the antenatal period before labour begins, which are often associated with insults that occur in-utero during the antenatal period. These stillbirths are due to a variety of factors including bacterial infection, birth defects especially pulmonary hypoplasia, maternal diabetes, hypertensive diseases in pregnancy, maternal alcohol consumption, cigarette smoking, post term pregnancy, abruption placentae, radiation poison, physical trauma, rhesus disease, umbilical cord accidents and intra uterine growth restriction. Intra partum stillbirths are usually the result of fetal distress and or obstructed labour and often reflect poor quality of clinical care during labour and at delivery (7-9). The most significant biomedical causes of stillbirth include antepartum haemorrhage, maternal conditions affecting placental sufficiency and fetal growth (e.g., hypertension and diabetes), infections (e.g., syphilis and group B streptococcus), complications during childbirth, and genetic conditions (10). Stillbirths are often referred to as the invisible death (11). It is an adverse pregnancy outcome and tragedy, which causes a substantial psychological burden to the mother and the families (1, 2).

Over 2 million babies are stillborn each year-or 1 every 16 seconds, of which 84% are in low- and middle-income countries (LMICs), notably in south Asia and sub-Saharan Africa (SSA) . In 2019, 3 in 4 stillbirths occurred in SSA or southern Asia (2, 12). In Ethiopia, the world health statistics in 2013 revealed a stillbirth rate of 26/1000 deliveries which is the third highest in the

eastern Africa countries, next to Djibouti and Somalia (with stillbirth rates of 34 & 30 per 1000 births, respectively) and seventh among the ten countries that account for two-thirds of all third trimester stillbirths in the world (13).

Currently evidence strongly recommended 10 for implementation: Preconception folic acid fortification, insecticide-treated bed nets or intermittent preventive treatment for malaria prevention, syphilis detection and treatment, detection and management of hypertensive disease of pregnancy, detection and management of diabetes in pregnancy, detection and management of fetal growth restriction, routine induction to prevent post-term pregnancies, skilled care at birth, basic emergency obstetric care and comprehensive emergency obstetric care (14). Assessment of the burden of stillbirth and associated factors in healthcare setup is important for developing strategies to prevent or reduce stillbirths. The government of Ethiopia had been implementing different effective programs to improve maternal and child health through capacity building and strengthening the healthcare delivery system to improve the quality of service during pregnancy such as antenatal care and safe delivery practice(15). Despite the governmental and non-governmental (NGO) efforts to reduce the rate of stillbirth, prevention of stillbirth has remained largely unaddressed (16).

## **1.2. Statement of the problem**

According to World Health Organization, the birth of a new born after twenty-eight completed weeks of gestation weighing 1,000gm or more, with baby showing no signs of life after delivery is a still born (1-3). Globally, an estimated 2.0 million babies were stillbirth at 28 weeks or more of gestation, with a global stillbirth rate of 13.9 stillbirths per 1,000 total births. Stillbirth rates in 2019 varied widely across regions, from 22.8 stillbirths per 1,000 total births in the west and central Africa to 2.9 (2.7–3.0) in Western Europe. Of the 2 million stillbirths occurring every year, 98% happen in LMICs with SSA bearing an unacceptable burden of 64% of these deaths (17). In Ethiopia, evidences from the community and facility-based studies portrayed the stillbirth rate of 19.6–87 per 1,000 births(18, 19). Another studies from Ethiopia reported that the stillbirth rates ranged from 25/1000 births in Addis Ababato 85/1000 births in Amhara region (20, 21). A disproportionate burden of stillbirths in the country could be attributed to a poorly-equipped maternal health care service, poor access to and coverage of skilled attendance at birth,

late referral and long distance to referral facilities, poor transport facility and poor quality of obstetric care services(22).

Stillbirth contributes to adverse birth outcomes in both developing and developed countries. Every stillbirth is a tragedy and a potential life lost (8, 23). The etiological factors associated with stillbirth remain elusive for clinicians and researchers, the psychosocial consequences are even more obscure. In addition, many psycho-social consequences for parents, including anxiety, long-term depression, posttraumatic stress disorder and stigmatization even affecting healthcare providers (8, 11).

Stillbirths are largely absent from global indicators of health, which underestimate its extent of public health importance (17). In most settings, data that reflect the health conditions and circumstances that led to a stillbirth are limited- meaning that in many scenarios, policy makers and health practitioners do not have the information at hand to plan and implement interventions (10). Lack of quality data continues to inhibit scientists' understanding of stillbirth. A review of 114 DHS (demographic health surveys) across 70 LMICs showed substantial variation in the measurement of stillbirth (24). Another review showed that stillbirths remain uncounted in many national vital statistics systems (25).

Ethiopia has adopted a multi-faceted approach to minimize the high burden of stillbirth and neonatal mortality. Beyond establishing MPDSR, some of the strategies employed include, enhancing behavioral and nutritional intervention, prevention and treatment of medical disorders, and infection screening and monitoring during labour and delivery as well as improving intrapartum care were the major ones (26-31). However, despite all this effort, Ethiopia is still facing a significantly high burden of stillbirth and the country has failed to achieve the national target set for 2020 (32). This is attributed to the lack of coordination, notable regional variation, and absence of a robust monitoring mechanism (33, 34). Sidama region is one of the three regions with high burden stillbirth next to Oromia and Amhara region (35).

Although Ethiopia has a very high burden of stillbirth, the area has received limited attention so that there is a need to conduct as many researches as possible. Therefore, this study among others

was aimed to close the gaps on the prevalence and related risk factors of stillbirth among women who delivered at Dore-bafano Primary Hospital.

### **1.3. Significance of the study**

Stillbirths are not registered systematically and records lack consistency in low-income countries such as Ethiopia, which lead to underestimation of stillbirths (15).

Ethiopia is one of the countries that have a very high burden of stillbirth (36). Despite its high burden, there are no public health initiatives to address stillbirth prevention. Studies from some areas of Ethiopia showed that stillbirth had public health importance. However, the prevalence and associated factors of stillbirth in the southern part of the country and Sidama region (including Dore-bafano Primary Hospital) are not well studied and documented. Therefore, this study was aimed to assess the burden of stillbirth and associated factors that lead to stillbirth at Dore-bafano Primary Hospital.

The findings of this study will provide the hospital, the woreda and regional health office policy makers and NGOs with relevant information on current stillbirth rate of the facility and on related causes and determinants of stillbirth so that they can understand the magnitude of the problem and for future planning of appropriate strategies. It will also be used by program implementers and Dore-bafano Primary Hospital quality improvement team as an input for efforts directed towards improving quality of obstetric care with their ultimate goal of reducing the stillbirth rate.

## 2. LITERATURE REVIEW

### 2.1. Magnitude of stillbirth

Globally over 2 million babies are stillborn each year-or 1 every 16 seconds, of which 84% is in LMICs, notably in south Asia and SSA. In 2019, 3 in 4 stillbirths occurred in SSA or southern Asia(2, 3). The global incidence of SB ranges from 3.4/1000 total births in high-income countries to as high as 36/1000 in the Sub-Saharan and Asia regions (13, 37). Over the past two decades, the global SBR declined from 21.4 per 1,000 total births in 2000 to 13.9 in 2019. While this is a sign of modest progress, there were still an estimated 2.0 million SBs (8, 14).Globally, SBs are steadily increasing and accounts for more than 50% of perinatal mortality (38). Around the globe, one baby dies every 16 seconds before, during or soon after birth(14).

In Latin America, there are an estimated 91 000 stillbirths each year, with an estimated rate of 8.2 stillbirths per 1000 births (95% CI 7.5–9.2). The highest SBR was estimated for Haiti (24.9 per 1000 births) and the lowest for Chile (with a 3.1 stillbirth rate) (39).

In India a secondary cross sectional data analysis from the Indian Annual Health Survey (2010–2013) in nine states across the country was conducted to assess the rate of stillbirth and associated risk factors. Of the 886,505 women included in the analyses, 8429 reported a stillbirth, giving an overall rate of 10 stillbirths (95% CI 9.8 to 10.3) per 1000 total births(40).

The rates of SB in developing countries are four to ten times compared to the developed nations. However, the incidence rates are highest in SSA. Parents in SSA are 8 times more likely to experience a stillbirth(41, 42).

A ten year cross-sectional retrospective study carried out to review the cases and magnitude of SB in the period between 1<sup>st</sup> Jan, 2004 and 31<sup>st</sup> Dec, 2013 in a tertiary hospital in Niger Delta area of Nigeria. It has shown that the stillbirth rate of 48.4/1,000 total births or 4.8%. Among the stillbirths, 65.5% were macerated and 34.5% were fresh(43).

A study which was based on the most recent DHSs of 12 East African countries showed that the prevalence of SB in East Africa was 0.86% (95% CI: 0.82, 0.91) ranged from 0.39% in Kenya to 2.28% in Burundi. These findings highlighted the weak health care system of East African countries(34). Whereas another prospective cross-sectional hospital-based study conducted at Omdurman Maternity Hospital in Sudan carried out by assessing 17,389 deliveries revealed that there were 285SBs during the study period which makes the incidence of SB to be 16/1000(44).

According to Ethiopian Demographic and Health Survey the prevalence of stillbirth rate was 10.4, 16.9 and 11 per 1000 births in 2000, 2011 and 2016 respectively(45, 46). In Ethiopia, evidences from the community and facility-based studies portrayed the stillbirth rate of 19.6–87 per 1,000 births(18, 19). In a hospital based study conducted at Hiwot-fana Specialized Hospital, published in May, 2022, the prevalence of stillbirth was 14.5%(16).A descriptive retrospective study in Mekele, Ayder Comprehensive Specialized Hospital, conducted in 2019 showed (315 of 4,582) a stillbirth rate of 54.6 per 1000 deliveries(47). Another study conducted in Arba Minch town in 2018, revealed that the stillbirth was 7.6 per 1000 births occurred during home deliveries, 5.6 per 1000 births at health posts, 20.4per 1000 births at health centers and 70 per 1000 births at hospitals(48).

## **2.2. Factors associated with stillbirth**

### **2.2.1. Socio-demographic factors**

Stillbirth can be determined by several socio demographic factors like maternal age, educational level, place of residence, income(23, 40, 49-51).

A census of nearly 4 million health facility births in China between 2012 and 2014 regarding the socio-demographic and obstetrics characteristics has revealed that the stillbirth rate was particularly high for women younger than 15 years of age (59.9 stillbirths per 1000 births), the unmarried (32.5 per 1000), those with no education (26.9 per 1000)(52). A study done in Brazil showed, high and low maternal age, low socioeconomic status, and poor nutrition, and maternal obesity were proved to be significantly associated with stillbirth(53).A study done in India, Not in-paid employment mothers are 1.15 times associated with stillbirth than paid mothers. Tobacco chewing and maternal complications were important modifiable risk factors(40, 52).

In a study about factors influencing high prevalence of Fresh Still Births in Mbagathi County Hospital, Nairobi – Kenya, majority of the respondents with stillbirths were less than 20 years old, had low education level and were unemployed(54).

A cross-sectional study done in Aksum showed that maternal age 20–35 (AOR = 0.25; 95% CI (0.08, 0.80)), was the independent factor affecting the SB and both urban and rural residences are not significance association with SB(23).A facility-based cross-sectional study was conducted in public hospitals in the Wolaita zone showed that residence was independently associated factor of SB(55). A study also conducted in Ethiopia in Felgehiwot comprehensive specialized referral hospital showed that women who are illiterate had high risk of stillbirth compared to women who had tertiary education (AOR = 3.8, 95% CI= 1.4–10.2)(56).

### **2.2.2. Obstetric, Fetal and Placental factors**

A study in Japan on the causes and risk factors of singleton stillbirths in the year 2013-2014, revealed that the causes of death were unknown in 25–40% of stillbirths across gestational age. Placental abnormality accounted for the largest proportion of known causes, followed by umbilical cord abnormality. Stillbirth risk was increased among small-for-gestational-age infants (adjusted relative risk [ARR]: 3.78, 95% confidence interval [CI]: 3.31–4.32) and nulliparous women (ARR: 1.19, 95% CI: 1.05–1.35)(57).Whereas in China, a high proportion (29 319 [78.2%] of 37 514) of stillbirths occurred at gestational ages of younger than 37 weeks, and about two thirds (24 787 [66.1%] of 37 514) were in women without any maternal complication at the time of birth. Of babies born at normal gestations (37–41 weeks), maternal complications substantially increased the risk of stillbirth (odds ratio comparing antepartum or intrapartum complications with no complication 3.96 [95% CI 3.66–4.29]), but only a small proportion (1638 [4.4%] of 37 514) of stillbirths fell into this group(52).

In Nigeria, of the 937 stillbirths identified, only 582 (62.1%) case files were retrieved and were used for analyses. There were 381 (65.5%) macerated and 201(34.5%) fresh stillbirths. Stillbirth rate were higher among grand multiparous women and unbooked women. There were 309 (53.1%) male stillbirths and 273 (46.9%) female stillbirths. Male foetuses were higher among

fresh stillbirth (54.9%) while female foetuses had more macerated stillbirths (48.8%) than fresh stillbirths (45.1%)(43).

In Kenya, the biggest proportion of mothers with fresh stillbirths had preterm deliveries; PROM, had medical conditions and attended ANC less than four times. Most of these fresh stillbirths had complications and were delivered preterm(54).

A case control study on the determinants of SB in hospitals of North Shoa Zone, Oromia region, Central Ethiopia was conducted and showed that type of labor (AOR  $\frac{1}{4}$  3.79, 95%CI  $\frac{1}{4}$  1.53, 9.38), duration of labor (AOR  $\frac{1}{4}$  3.59, 95% CI  $\frac{1}{4}$  1.53, 8.33), mal-presentation (AOR  $\frac{1}{4}$  3.45, 95%CI  $\frac{1}{4}$  1.99, 9.8), preeclampsia/eclampsia (AOR  $\frac{1}{4}$  4.58, 95%CI  $\frac{1}{4}$  1.45, 14.48) and birth defect (AOR  $\frac{1}{4}$  3.05, 95%CI  $\frac{1}{4}$  1.31, 7.1) were found to be the determinants of SB(58). In addition, the other similar study at Hiwot-fana specialized hospital had indicated that low birth weight, preterm birth, PROM, APH, obstructed labor, and preeclampsia were independently associated with a SB(16). Another study done in Arba Minch Hospital showed that male sex of fetus was 1.62 times (AOR=1.62 95% CI=1.31-2.01) higher risk of experiencing SB(48).

A facility based cross-sectional study was conducted in Yirgalem General Hospital; pregnant women with obstetric complications were 18.9 times more likely to have stillbirths than pregnant women without obstetric complications. Similarly, pregnant women with at least two pregnancies were more likely to have stillbirths than pregnant women with less than two pregnancies (AOR: 4.39, 95% CI 1.21–15.85(22).

A facility-based unmatched case-control study was conducted at Hawassa University Comprehensive Specialized Hospital showed that number of antenatal care visit [AOR = 0.38, 95% CI (0.15, 0.95)], lack of partograph utilization [AOR = 4.1 95% CI (2.04, 10.5)], prolonged labor [AOR = 6.5, 95% CI (2.9, 14.4)], obstructed labor [AOR = 3.5, 95% CI (1.5, 9.4)] and congenital defect [AOR = 9.7, 95% CI (4.08, 23.0)] were significantly associated with SB(59).

### 2.3. Conceptual framework

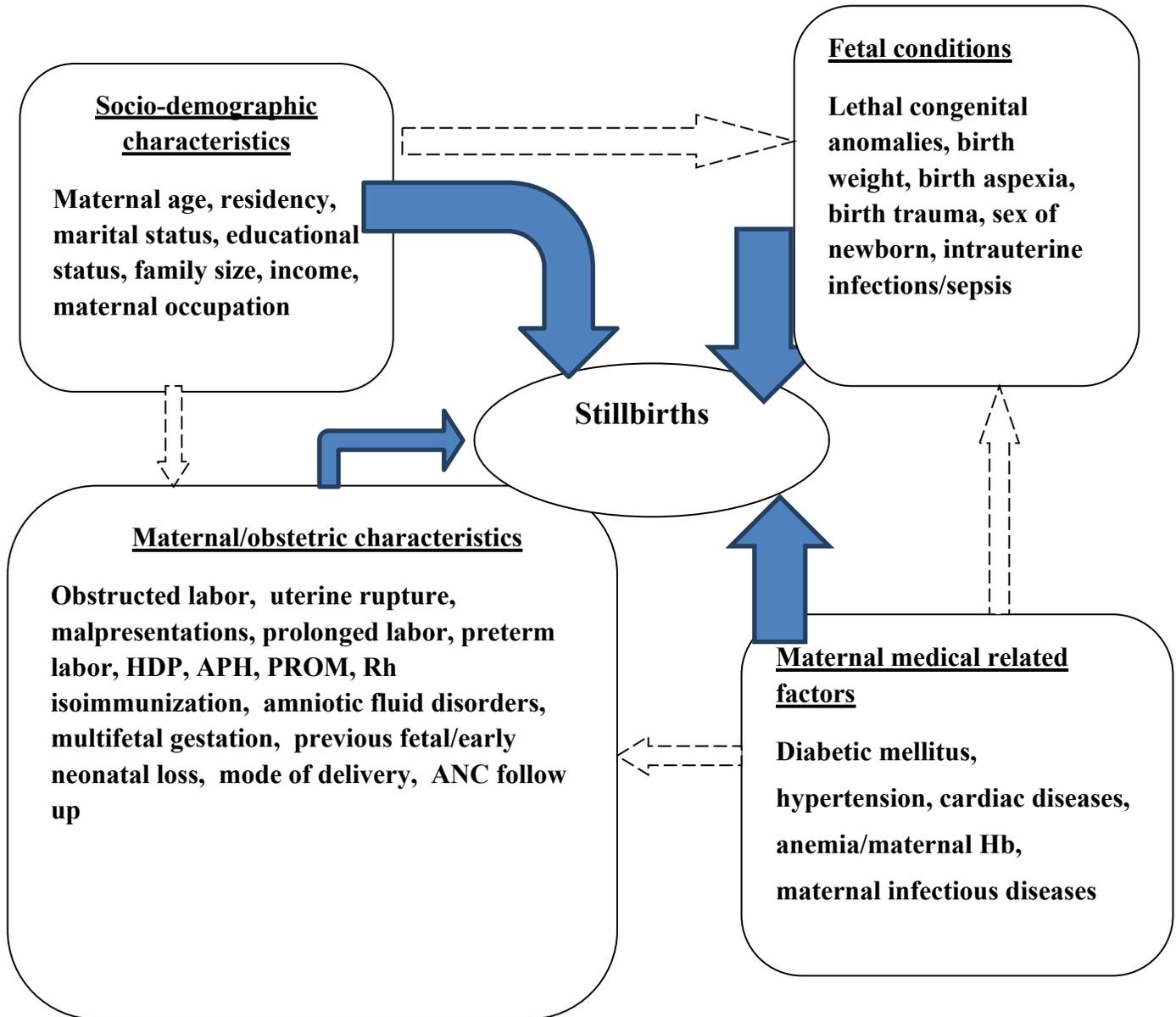


Figure 1. Conceptual framework for assessing the prevalence and associated factors of stillbirth at Dore-bafano Primary Hospital from March 10, 2022 - March 9, 2023.

Source: Adapted after reviewing different peer reviewed articles (23, 40)

### **3. OBJECTIVES**

#### **3.1. General objective:**

- ❖ To assess the magnitude of stillbirth and associated factors among women delivered from March 10, 2022 - March 9, 2023 at Dore-bafano Primary Hospital, Sidama regional state, southern Ethiopia, 2023, facility based cross sectional study.

#### **3.2. Specific objectives:**

- ❖ To determine the prevalence of stillbirth among women delivered at Dore-bafano Primary Hospital.
- ❖ To identify factors associated with stillbirth among women delivered at Dore-bafano Primary Hospital.

## **4. METHODS AND MATERIALS**

### **4.1. Study area**

This study was carried out at Dore-bafano Primary Hospital which is found at Hawassazuriaworeda, Sidama national regional state, Ethiopia. The Hospital is found at Dore-bafano town which is located 23 km away to the west from the capital city of the region, Hawassa city. The hospital provides almost all major types of medical care, surgical service and Obstetric & gynecologic services as a primary level. It has a total of 58 beds of which 15 are found in the maternity ward, 05 beds in gynecology ward. The first and second stage rooms of the labor ward has 05 beds and 04 delivery coaches respectively; the post natal room has 05 beds. The Neonatal unit contains 6 beds, 03 incubator machines, and 02 radiant warmers and adequate oxygen cylinders and concentrators. The labor ward, maternity ward and Gynecology wards are run by midwives, clinical nurses, health officers, two emergency surgical professionals and general practitioners. The hospital serves as a referral hospital for the nearby health centers and most of the laboring mothers came from rural areas. A total of 1456 deliveries were attended last year during the same period as the study period. In addition to this hospital there are a total of 23 health posts and 04 health centers that are actively engaging in delivering basic health care services to the rural community. The woreda has a total population of 180,000.

### **4.2. Study design and period**

Facility based retrospective cross-sectional study was conducted from March 10, 2022 - March 9, 2023.

### **4.3. Source and Study population**

#### **4.3.1. Source population:**

All records of women who delivered at Dore-bafano Primary Hospital.

#### **4.3.2. Study population:**

Randomly selected records of women who delivered at Dore-bafano Primary Hospital from March 10, 2022 - March 9, 2023 were the study population.

#### 4.4. Inclusion and exclusion criteria

##### 4.4.1. Inclusion criteria:

All the records of women who delivered at Dore-bafano Primary Hospital were the source population.

##### 4.4.2. Exclusion criteria:

- Records of women who delivered with gestational age of < 28 weeks
- Those who had incomplete medical records and those with missing charts.

#### 4.5. Sample size determination

##### 4.5.1. Sample size for first objective

The sample size for first objective was calculated by using a single population proportion formula considering the following assumptions, Proportion 8.6% of stillbirths at NegestElene Mohammed Memorial General Hospital in Hosanna Town(60), margin of error (d) 3% 95% Confidence level, and considering 10% for none retrieval rate. Then after by substituting the above figures in to the sample size calculation, the calculated sample size becomes 369.

$$n = \frac{(Z_{\alpha/2})^2 * P(1-P)}{d^2}$$

d<sup>2</sup>

##### 4.5.2. Sample size for second objective

Sample size for the second objective, which is factors identification, is calculated using double population proportion formula using epi info version 7.2 and presented with the following table.

Table 1: Sample size determination considering factors associated with neonatal stillbirth.

Variables	CI	Power	AOR	Ratio	% of outcome of unexposed	Sample size	Reference
Obstruc-ted labor (Yes vs. No)	95%	80	2.56	1	12.20	274	(61)
PROM (Yes vs. No)	95%	80	2.08	1	60.5	302	(16)

Gestational age ( $<37$ Weeks vs. $\geq 37$ Weeks)	95%	80	3.86	1	2.2	518	(23)
Non-booking for ANC follow-up (Yes vs. No)	95%	80	2.80	1	9.20	278	(61)

According to the sample size calculation for the selected risk factors, 518 was the largest value and taken as the final sample size.

#### **4.6. Sampling technique and procedure**

Systematic random sampling technique was used to select study participants from the register within the Hospital. Sampling interval ( $k=3$ ) was determined by dividing the expected number of deliveries attended in a one year period of the previous year to the total sample size. A total of 1456 deliveries were attended last year during the same period as the study period. So by dividing 1456 to the total sample size (518) the sampling interval becomes 3. The first mother from the delivery register was identified using a lottery method. A random number from 1 to 3 was taken as a start number and then every 3<sup>rd</sup> subsequent mothers on the register was taken until we achieve our sample size.

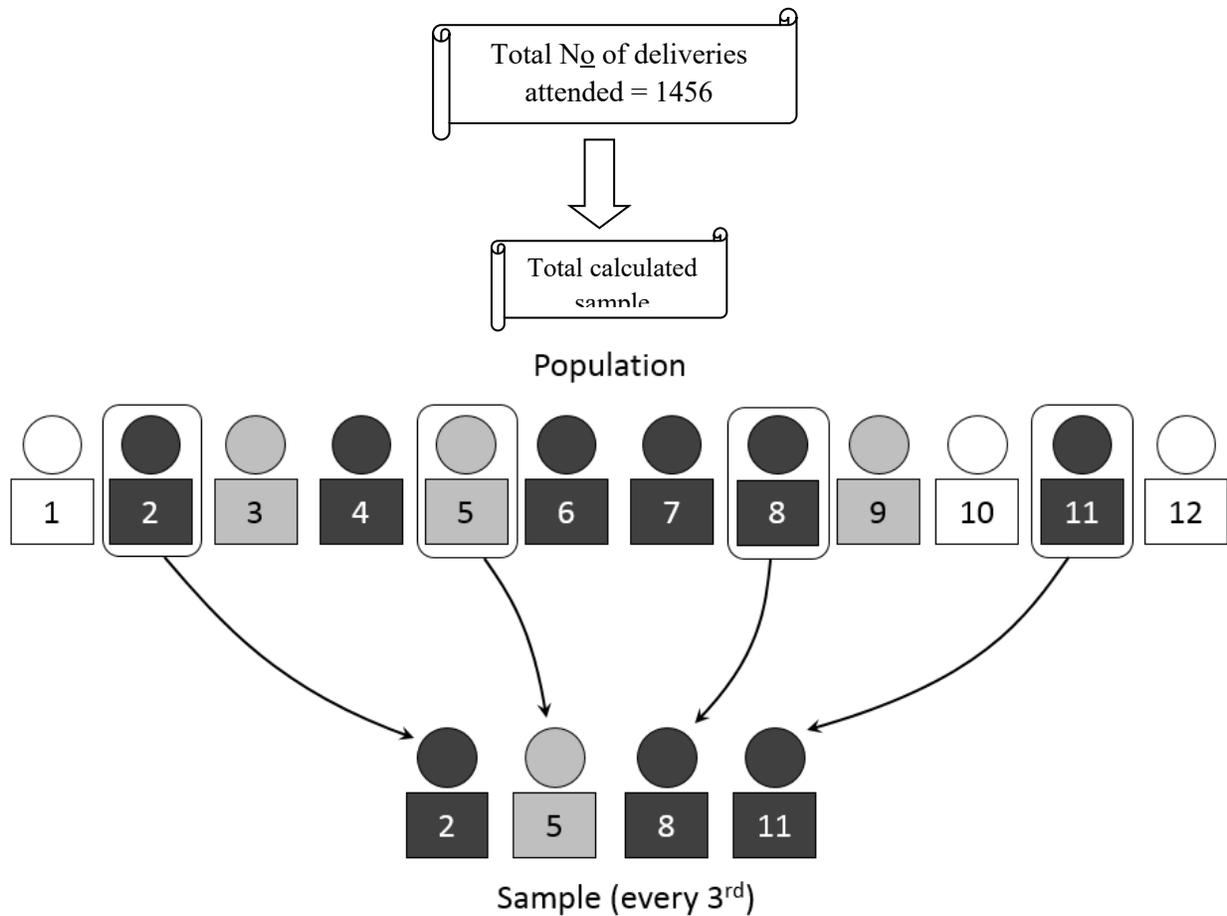


Figure 2. Schematic presentation of sampling procedures for assessing the magnitude of still birth and associated factors among mothers who gave birth at Dore-bafano Primary Hospital Sidama Ethiopia, 2023.

#### 4.7. Variables of the study

##### 4.7.1. Dependent variable:

- Stillbirth (Yes).

##### 4.7.2. Independent variables:

- Socio-demographic characteristics: Maternal age, ethnicity, religion, place of residence, marital status.
- Maternal/obstetric characteristics: Gravidity, parity, gestational age in weeks, ANC follow up and number of visits, pre-eclampsia, eclampsia, malpresentation, obstructed labour, PROM, APH, pre-term labour, uterine rupture, umbilical cord accidents, amniotic

fluid disorders, Rh isoimmunization, number of gestation, previous history of stillbirth, onset of labour, duration of labour in hours, mode of delivery and use of partograph.

- Maternal medical related factors: Hypertension, diabetes mellitus, cardiac diseases, maternal hemoglobin in mg/dl, UTI, IP, malaria, syphilis and chorioamnionitis
- Fetal conditions: Sex of the fetus, birth weight, number of gestation (singleton, twins), lethal congenital anomalies, perinatal asphyxia, fifth minute APGAR score, MSAF and birth trauma.

#### **4.8. Operational definitions**

**Live birth:** Is complete expulsion or extraction of a product of conception from its mother; which, after such separation, breathes or shows any other evidence of life is considered live born (62).

**Stillbirth:** Is death prior to the complete expulsion or extraction of a product of conception from its mother; the death is indicated by the fact that after such separation the fetus does not breathe or show any other evidence of life (63).

#### **4.9. Data collection tool and procedures**

Data were extracted by midwives through a checklist that includes maternal data such as age, parity and other socio-demographic details, period of gestation, onset of labour, any complications during pregnancy and labour (obstetric, medical or surgical) and mode of deliveries, perinatal data including birth weight, reported gestational age and sex, APGAR score at birth, and possible causes of death.

#### **4.10. Data quality assurance**

To have a good data quality, detail orientations were given for all data extractors, day to day activities during data retrieving was supervised and evaluated for errors and was corrected by the principal investigator before the following day activity and health professionals were involved in the data extraction process.

#### **4.11. Data processing and analysis**

Once the data were extracted by trained data retrievers by using a checklist and then the extracted data were checked for its completeness, edited, cleaned and entered in to Epidata

version 4.6 and exported to SPSS version 22 for further analyses. Bivariable and multivariable binary logistic regression analyses were done to identify associated factors of stillbirth. Associations were measured using both crude and adjusted odds ratios. Variables with p value < 0.25 during bivariable binary logistic regression analyses were considered for multivariable binary logistic regression analyses to control for all possible confounders. Finally p-value <0.05 together with 95% confidence interval were used to determine the statistical significance and the data were described and presented using tables and chart.

#### **4.12. Ethical considerations**

Ethical clearance was obtained from Institutional Review Board (IRB) of College of public health or Sidama regional health bureau (RHB). Permission was granted from Dore-bafano Primary Hospital administration office after discussing the objectives of conducting the study and its contributions towards improving obstetric care, records were returned back to the medical record office after the data extraction process was over.

#### **4.13. Plan for dissemination of results**

The results of this study are going to be submitted to the Pharma College department of public health and Dore-bafano Primary Hospital and other responsible bodies. The result will be presented during thesis defense in the college and possibly in different seminars, meetings, conferences and workshops. Moreover, efforts will be made to publish the findings of the study and disseminated through different journals and scientific publications.

## **5. RESULTS**

### **5.1. Socio-demographic characteristics**

Out of the total 518, 503 records of women who gave birth at Dore-bafano Primary Hospital were reviewed, resulting in a retrieval rate of 97.1% and 15 were excluded because of incompleteness of some information. The majority (68.6%) of the study participants were between 20-34 years of age. The mean ( $\pm$  SD) age was 27.62 ( $\pm$  6.65) years. The minimum and

maximum ages of the study subjects were 17 and 43, respectively. In terms of ethnicity, (394 78.3%) were Sidama, while 394 (78.3%) identified as protestant in terms of religion. Additionally, more than half, 269 (53.5%), of the study subjects resided in urban areas and 326 (64.8%) were married (**as shown in table 2**).

Table 2. Sociodemographic characteristics of study subjects (n = 503) at Dore-bafano Primary Hospital, Sidama, Southern Ethiopia, 2023.

<b>Variables</b>	<b>Frequency</b>	<b>Percent (%)</b>
Age		
<20	71	14.1
20-34	345	68.6
≥35	87	17.3
Ethnicity		
Siam	394	78.3
Wolaita	61	12.1
Others	48	9.6
Religion		
Protestant	394	78.3
Muslim	60	11.9
Orthodox	49	9.8
Residence		
Urban	269	53.5
Rural	234	46.5
Marital status		
Married	326	64.8
Unmarried	44	8.7
Not stated	133	26.4

\*Other ethnicity: Amhara, Kambata, Oromo

## **5.2. Maternal/obstetrics characteristics**

Out of the total, 503 reviewed maternal records, more than half (284, 56.5%) were multiparous. The majorities of the study subjects (440, 87.5%) were greater than or equal to 37

weeks of gestational age. The mean and standard deviation of gestational age were 37.34 weeks and 1.693 respectively. Of the total, 368 (73.2%) had ANC follow-up. Among them, the majority, (261, 70.9 %) had 2-4 visits and only 17 (4.6%) had more than 4 visits. A history of pre-eclampsia was noted in 31 (6.2%) cases, while eclampsia was observed in 13 (2.6%) cases. Additionally, 36 (7.2%) had malpresentation and 37 (7.4%) and 19 (3.8%) experienced premature rupture of membrane and antepartum hemorrhage, respectively. The majority (492, 97.8%) had no obstructed labour. Uterine rupture was observed in 9 (1.8%) mothers, while umbilical cord accidents occurred in 8 (1.6%) cases. The mean duration of labour was 12.32 hours ( $\pm$  sd 4.945). A total of 75 (14.9%) mothers did not use a partograph (**Table 3**).

Table 3. Maternal/obstetrics characteristics of study subjects (n = 503) at Dore-bafano Primary Hospital, Sidama, Southern Ethiopia, 2023.

Variables	Frequency	Percent
Gravidity		
Primigravida	219	43.5
Multigravida	284	56.5
Parity		
Nulliparous	219	43.5
Multiparous	284	56.5
Gestational age		
<37 weeks	63	12.5
$\geq$ 37 weeks	440	87.5
ANC follow up		
No	135	26.8
Yes	368	73.2
Number of ANC visits		
<02 visits	90	24.5
02-04 visits	261	70.9
>04 visits	17	4.6
Preeclampsia		
No	472	93.8
Yes	31	6.2
Eclampsia		
No	490	97.4
Yes	13	2.6
Malpresentation		

No	467	92.8
Yes	36	7.2
Obstructed labor		
No	492	97.8
Yes	11	2.2
Premature rupture of membrane		
No	466	92.6
Yes	37	7.4
Antepartum hemorrhage		
No	484	96.2
Yes	19	3.8
Type of APH		
Abruptio placenta	13	68.4
Placenta previa	6	31.6
Preterm labour		
No	459	91.3
Yes	44	8.7
Uterine rupture		
No	494	98.2
Yes	9	1.8
Umbilical cord accidents		
No	495	98.4
Yes	8	1.6
Amniotic fluid disorders		
No	493	98.0
Yes	10	2.0
Number of gestation		
Singleton	481	95.6
Twins	22	4.4
Previous history of stillbirth		

No	469	93.2
Yes	26	5.2
Not stated	8	1.6
Onset of labour		
Induced	74	14.7
Spontaneous	429	85.3
Duration of labour in hours		
≤18	426	84.7
>18	72	14.3
Not stated	5	1
Mode of delivery		
Spontaneous vaginal delivery	337	67.0
Instrumental delivery	106	21.1
Cesarean-section	53	10.5
Destructive delivery	7	1.4
Partograph use		
No	75	14.9
Yes	428	85.1

### 5.3. Maternal medical related factors

Regarding the previous medical history of the mothers, the lowest record was chorioamnionitis, accounting for 7 cases (1.4%), while the highest record was anemia (hgb<11 gm/dl), with 140 cases (27.8%). The mean hemoglobin (hgb) level was 11.89 gm/dl (sd ± 1.36). Additionally, 27 mothers (5.4%) had hypertension, 16 (3.2%) had diabetes mellitus and 10 (2%) had cardiac disease. Furthermore, 71 mothers (14.1%) experienced urinary tract infections and 53 (10.5%) had intestinal parasitosis respectively (as shown in table 4).

Table 4. Maternal medical related factors of study subjects (n = 503), at Dore-bafano Primary Hospital, Sidama, Southern Ethiopia, 2023.

<b>Variables</b>	<b>Frequency</b>	<b>Percent</b>
Hypertension		
No	476	94.6
Yes	27	5.4
Diabetes mellitus		
No	487	96.8
Yes	16	3.2
Cardiac disease		
No	493	98.0
Yes	10	2.0
Maternal hemoglobin ( gm/dl )		
≤ 11	140	27.8
>11	345	68.6
Not stated	18	3.6
Urinary tract infections		
No	432	85.9
Yes	71	14.1
Intestinal parasitosis		
No	450	89.5
Yes	53	10.5
Malaria		
No	488	97.0
Yes	15	3.0
Syphilis		
No	494	98.2
Yes	9	1.8
Chorioamnionitis		
No	496	98.6

Yes	7	1.4
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#### 5.4. Fetal Conditions

Out of 503 mothers, 7 (1.4%) gave births to a congenitally malformed baby, 406 (80.7%) babies had over 8 fifth minute APGAR score. Regarding birth weight of baby, 60 (11.9%) had high birth weight (>4000gm) while 415 (82.5%) had normal birth weight (2500-4000) and only 28 (5.6%) had low birth weight (<2500gm). More than half, 274 (54.5%) were female and the rest, 229 (45.4%) were male. Only 04 (0.8%) had birth trauma (**Table 5**).

Table 5. Fetal conditions of study subjects (n = 503), at Dore-bafano Primary Hospital, Sidama, Southern Ethiopia, 2023.

Variables	Frequency	Percent
Any Lethal congenital anomaly		
No	496	98.6
Yes	7	1.4
Fifth minute APGAR score		
< 1	17	3.4
1-7	80	15.9
≥8	406	80.7
Presence of MSAF		
No	423	84.1
Yes	80	15.9
Birth weight in gm		
<2500	28	5.6
2500-4000	415	82.5
> 4000	60	11.9
Sex of new born		

Male	229	45.5
Female	274	54.5
Perinatal asphyxia		
No	414	82.3
Yes	89	17.7
Any birth trauma		
No	499	99.2
Yes	04	0.8

Table 6. Birth outcome of mothers (n=503) who gave births at Dore-bafano Primary Hospital.

Birth outcome	Frequency	Percent
Live birth	486	96.62
Stillbirth	17	3.38

### 5.5. Magnitude of stillbirth

There were 486 live births and 17 stillbirths. The overall prevalence of stillbirth in the present cross-sectional study was 3.38% (95% CI: 2%-5.4%) with a stillbirth rate of 33.8/1000 births (**Figure 3**).

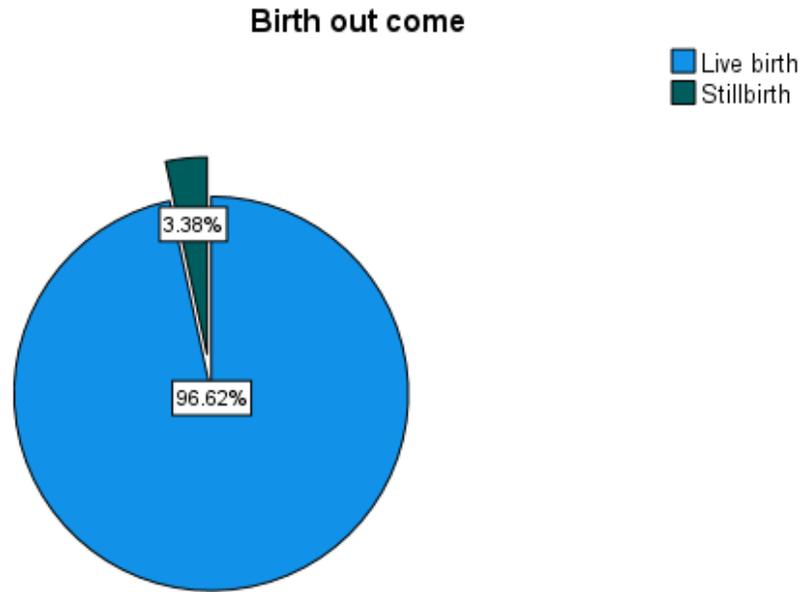


Figure 3. Prevalence of stillbirth mothers who delivered at Dore-bafano Primary Hospital

### 5.6. Factors Associated with Stillbirth

Bivariable binary logistic regression analysis was used to differentiate factors associated with the outcome variable. It was performed for all of the independent variables separately analyzed with the dependent variable as shown below. Stillbirth was taken as a dependent variable. Based on results residence, gestational age, ante-natal follow-up (ANC), malpresentation, obstructed labour, pre-term labour, umbilical cord accidents, number of gestation, onset of labour, duration of labour, congenital anomaly, birth weight, sex of new born and perinatal asphyxia were independent variables found to be statistically significant with p-value  $<0.25$  and taken as a candidate for multivariable binary logistic regression analysis with stillbirth.

Multivariable binary logistic regression analysis was performed to identify which of the independent variables were mostly associated with stillbirth after controlling for all possible confounders. According to the result revealed that gestational age, obstructed labour, duration of labour and congenital anomaly were independent factors associated with stillbirth with p-value  $<0.05$ .

The odds of experiencing stillbirth were 97.6% reduced among fetuses who had gestational age  $\geq$  37 weeks compared to their counterparts [AOR=0.024;95% CI: (0.002-0.37)]. On the other hand, mothers who had obstructed labour were 30.26 times more likely to have stillbirth as compared to those women who gave births free of obstructed labour [AOR= 1.01;95% CI: (0.15-6.55)]. Also, women with duration of labour greater than 18 hours were 17 times more likely to give stillbirths than those mothers who had less than or equal to 18 hours duration of labour [AOR=17; 95% CI: (1.23-253.35)]. Whereas, Fetuses who had congenital malformation were 19 times more likely to be a stillbirth as compared to normal fetuses [AOR=19; 95% CI: (1.33-295.02)] (Table 7).

Table 7. Factors associated with stillbirth mothers delivered at Dore-bafano Primary Hospital.

Variables	Stillbirth		COR (95% CI)	AOR (95%CI)
	No n (%)	Yes n (%)		
Maternal age in years				
<20	66 (93%)	5 (7%)	1	1
20-34	340 (98.6%)	5 (1.4%)	0.87 (0.26-2.85)	
>34	80 (92%)	7 (8%)	0.17 (0.05-0.54)	
Residence				
Urban	265 (98.5)	4 (1.5)	1	1
Rural	221 (94.4)	13 (5.6)	3.90 (1.25-12.12)	1.99 (0.34-11.64)
Gestational age				
< 37 weeks	52 (82.5)	11 (17.5)	1	1
$\geq$ 37 weeks	434 (98.6)	6 (1.4)	0.06 (0.02-0.18)	<b>0.024 (0.002-0.37)**</b>
ANC follow up				
No	123 (91.1)	12 (8.9)	7.08 (2.45-20.51)	1.01 (0.15-6.55)
Yes	363 (98.6)	5 (104)	1	1
Malpresentation				
	454 (97.2)	13 (2.8)	1	1

No				
Yes	32 (88.9)	4 (11.1)	4.36 (1.35-14.16)	7.44 (0.43-129.87)
Obstructed labour				
No	477 (97)	15 (3)	1	1
Yes	9 (81.8)	2 (18.2)	7.07 (1.40-35.57)	<b>30.26 (1.14-804.20)*</b>
Preterm labour				
No	445 (96.9)	14 (3.1)	1	1
Yes	41 (93.2)	3 (6.8)	2.32 (0.46-8.47)	0.43 (0.014-13.24)
Umbilical cord accidents				
No	481 (97.2)	14 (2.8)	1	1
Yes	5 (62.5)	3 (37.5)	20.61 (4.48-94.90)	2.80 (0.18-43.04)
Number of gestation				
Singleton	466 (96.9)	15 (3.1)	1	1
Twin	20 (90.9)	2 (9.1)	3.11 (0.67-14.52)	2.11 (0.06-77.99)
Onset of labour				
Induced	66 (89.2)	8 (10.8)	0.177 (0.066-0.474)	0.90 (0.01-1.14)
Spontaneous	420 (97.9)	9 (2.1)	1	1
Duration of labour in hours				
≤18	416 (97.7)	10 (2.3)	1	1
>18	65 (90.3)	7 (9.7)	4.48 (1.65-12.19)	<b>17 (1.23-253.35)*</b>
Congenital anomaly				
No	483 (97.4)	13 (2.6)	1	1
Yes	3 (42.9)	4 (57.1)	49.54 (10.05-244.16)	<b>19 (1.33-295.02)*</b>
Birth weight				
<2500	24 (85.7)	4 (14.3)	4.83 (0.83-28.1)	16.45 (0.29-922.40)
2500-4000	404 (97.3)	11 (2.7)	0.79 (0.17-3.6)	0.87 (0.09-8.84)
>4000	58 (96.7)	2 (3.3)	1	1
Sex of new born				
Male	216 (94.3)	13 (5.7)	0.25 (0.08-0.77)	0.28 (0.03-1.56)

Female	270 (98.5)	4 (1.5)	1	1
Perinatal asphyxia				
No	402 (97.1)	12 (2.9)	1	1
Yes	84 (94.4)	5 (5.6)	1.99 (0.68-5.81)	0.77 (0.11-5.13)

**AOR= Adjusted odds ratio, CI= Confidence interval, COR= Crude odds ratio, 1= Referece,**

**\*=p-value < 0.05, \*\*= p-value < 0.01**

## 6. DISCUSSION

The overall aim of this study was to determine the prevalence and associated factors of stillbirth among women who gave birth at Dore-bafano Primary Hospital, Sidama region, Southern Ethiopia. Accordingly, the prevalence of stillbirth in the present cross-sectional study was 3.38% (33.8/1000 births) which is higher when compared to the global stillbirth rate estimate 13.9/1,000 births in 2019 (17) and the United Nations (UN) stillbirth rate recommendation rate to be reduced below 12/1,000 births (13, 64), in Latin America, there are an estimated 91 000 stillbirths each year, with an estimated rate of 8.2 stillbirths per 1000 births (95% CI 7.5–9.2) (39), 14.82/1000 in Brazil (53), 0.85% in East Africa (34), 10/1000 in India (40) and in Ethiopia, the world health statistics in 2013 revealed a stillbirth rate of 26/1000 deliveries which is the third highest in the eastern Africa countries (12). This high prevalence of stillbirths could be attributed to poor quality of health care system, knowledge gap about ANC follow-up, difference in socio-demographic characteristics and poor transport facilities. It is comparable to study done in Tanzania 3.5% (65) and Aksum 3.68% (23). This comparability could be due to similar methodological characteristics, socio-demographic characteristics. The prevalence also lower than study conducted in South eastern Nigeria 180/1000 (66), Bahir Dar 8.7% (67), Harar Hiwotfana Specialized University hospital 6.7% (68), Wolaita zone 8.7% (55) and Yirgalem Hospital 92/1000 births (22). In this respect the discrepancy could be regional variation, setting difference where this study was conducted.

The current study showed gestational age less than 37 weeks was one of the factor that was significantly associated with stillbirth. This finding was consistent with study conducted in China, a high proportion (29 319 [78.2%] of 37 514) of stillbirths occurred at gestational ages of younger than 37 weeks (52), United Kingdom (69), Northern Tanzania (65), Nigeria (43), Aksum (23), HiwotFana Specialized University Hospital and Jugol Hospital, Harar Ethiopia (16, 70). This result might be due to premature newborns had less time to grow in the mother's uterus with minimal lung maturity and they are at risk of being asphyxiated and distressed which leads to stillbirth (16).

In addition, having obstructed labour was strongly associated with stillbirth. This study was in line with Nigeria(43), HiwotFana Specialized University Hospital Eastern Ethiopia, Harar(16, 61) and Hawassa University Comprehensive Specialized Hospital(59). The possible explanation could be due to delayed presentation of the mothers at a health facility, poor referral system, delayed diagnosis and poor emergency preparedness and response, resulting in rupture of the uterus which increases stillbirth (61).

On the other hand, prolonged duration of labour was strong factor to have women's experience stillbirth. This finding was supported by study done in Ghana (71), North Shoa zone Oromia region(58), Yirgalem Hospital (22) and Hawassa University Comprehensive Specialized Hospital(59). The reason behind could be prolonged duration of labour causes asphyxia and fetal distress which causes stillbirth.

Moreover, congenital anomaly was more prone to have stillbirth. This study was consistent with studies conducted at North Shoa zone Oromia region (58)and Hawassa University Comprehensive Specialized Hospital (59). This could be due to lack of vital organs for the fetus's survival and fetus's proneness to fatal complications and infections could be the reason for such finding (58). In addition, some of the congenital malformations that are incompatible with life like hydrocephalus might be vaginally delivered by destructive delivery (craniotomy) which literally is killing the fetus in-utero.

## **6.1. Strength and limitation of the study**

### **6.1.1. Strength of the study**

The study comes up with important findings that can have an input in obstetric care and was carried out with minimal cost. It used a large sample size and a lot of literatures were reviewed. And as this was a retrospective chart review, there is no risk to the participants.

### **6.1.2. Limitation of the study**

Firstly, since it is institutional study, it is difficult to generalize to the whole community. In addition, this study shares all the limitation of cross-sectional studies and since the study was based on a secondary data, some information concerning variables like educational status,

occupation and income might not be available and had no control for some variables which were missing despite that they were important in the present study.

Moreover, this study took place at a single Primary Hospital, it is possible that a limited number of deliveries, leading this study to underestimate the rate of stillbirth and not show the real picture of these stillbirth outcomes in the area as compared to other studies conducted in Ethiopia.

## **7. CONCLUSIONS AND RECOMMENDATIONS**

### **7.1. Conclusions**

In this study, the prevalence of stillbirth was 3.38% (33.8/1000 births, this is higher than a global stillbirth rate of 13.9 stillbirths per 1,000 total births (17) and national stillbirth rate of 26/1000 deliveries(13). The present study showed that gestational age less than 37 weeks, obstructed labour, duration of labour greater than 18 hours and congenital malformation were independent risk factors for stillbirth. So most stillbirth factors were preventable in this study, the concerned bodies must pay more attention to improve quality of healthcare service and make awareness to mothers to come to health facility as soon as the labour begins and women should take folic acid before and during pregnancy so as to minimize the risk of having birth defects on newborns.

### **7.2. Recommendations**

Since stillbirth is a critical measure of maternal and fetal health and is a major public health issue that affects families, health care providers and communities worldwide, it should be given a great deal of attention to reduce high stillbirth rate.

As shown in the results, most of the stillbirths can be preventable through serious interventions that focus on improving maternal and child health care starting from preconception, during pregnancy and peri-partum periods.

Proper implementation of quality improvement plans and close monitoring of the results by regulatory bodies that addresses the factors like delay in presentation of the cases to the facility, delay in receiving care or making important clinical decisions during peri-partum period could significantly reduce the high stillbirth rate.

Additionally, stillbirths are often referred to as the invisible death so further research and analysis should be conducted to explore potential interventions that can mitigate the impact of these risk factors and improve overall maternal and fetal outcomes.

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## 9. APPENDIX

### A. Information sheet and consent form

My name is Tsegedingel Yigzaw and I am a graduating student of masters of public health at Pharma College. I am here to carry out a research on the prevalence of stillbirth and its associated factors in your health facility as a partial fulfillment for my post graduate study. I would like to assure you that conducting the study will have a paramount importance to understand the magnitude of the problem & the contributing factors of stillbirth in your health facility and to act accordingly. I would like to thank you for your time and patience and for allowing me to explain more about the ethical issues and how the study will be conducted.

**Study title:** Prevalence and factors associated with stillbirth at Dore-bafano Primary Hospital Sidama Region, Southern Ethiopia, 2023.

**Procedure and duration:** I will be reviewing the registers and charts of mothers who delivered at the facility during the study period. Data which is only pertinent to the study will be retrieved using a structured checklist which contains 45 relevant questions divided in four parts.

**Risk and benefit:** Since we are using a secondary data, the risk of this study is minimal but the benefits are substantial.

**Confidentiality:** The information extracted will be confidential. There will be no information that will identify the individual patient because their name will not be included in the data extraction tools. The findings of the study will be general for the study area and will not reflect anything particular to individual persons. The checklist will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the study.

**Rights:** Permitting data extraction for this study is voluntary. Considering the importance of the research to your health institution, you are free to decide. If any violation of ethical rules and conduct seen throughout study, your health institution has full right to withdraw and stop study.

**Contact address:** If you have any questions about the study, the procedure or anything else related to the study, please contact through the following address:

Email: [tsigey8@gmail.com](mailto:tsigey8@gmail.com)

Mobile phone: +251918721589

## B. Check list

Pharma College of medicine and health sciences, department of public health. A Check list format on the prevalence and determinants of stillbirth at Dore-bafano primary Hospital, Dore-bafano, Sidama, Ethiopia, facility based cross sectional study from Mach 10, 2022 - March 9, 2023.

### Part I: Socio-demographic Information

No.	Questions	Categories
Q101	Maternal age in years	_____
Q102	Ethnicity	1. Sidama 2. Wolaita 3. Other Specify _____
Q103	Religion	1. Protestant 2. Orthodox 3. Muslim
Q104	Residence	1. Urban 2. Rural
Q105	Marital status	1. Married 2. Unmarried 3. Not stated

### Part II: Maternal/ obstetric characteristics

Q201	Gravidity	1. Primigravida 2. Multigravida
Q202	Parity	1. Nulliparous 2. Multiparous
Q203	GA in weeks	_____
Q204	Does the mother have Antenatal care follow-up?	1. No 2. Yes 3. Not stated
Q205	If yes for Q204, how many times?	_____
Q206	Is there pre-eclampsia?	1. No 2. Yes
Q207	Is there eclampsia?	1. No 2. Yes

Q208	Is there malpresentation?	1. No	2. Yes
Q209	Is there obstructed labor?	1. No	2. Yes
Q210	Is there Premature Rupture of membrane?	1. No	2. Yes
Q211	Is there Antepartum hemorrhage?	1. No	2. Yes
Q212	Which type of Antepartum hemorrhage?	1. Abruptio placenta	2. Placenta previa
Q213	Is there preterm labor?	1. No	2. Yes
Q214	Is there uterine rupture?	1. No	2. Yes
Q215	Is there umbilical cord accidents?	1. No	2. Yes
Q216	Is there amniotic fluid disorders?	1. No	2. Yes
	Rh-isomerization	1. No	2. Yes
Q217	Number of gestation	1. Singleton	2. Twin
Q218	Any previous history of stillbirth?	1. No 2. Yes	3. Not stated
Q219	Onset of labor	1. Induced	2. Spontaneous
Q220	Duration of labor in hours	_____	
Q221	Mode of delivery	1. SVD 2. Laparotomy 3. Destructive delivery	4. Instrument 5. C/S
Q222	Use of partograph	1. No	2. Yes
	<b>Part III: Maternal medical related factors</b>		
Q301	Is there hypertension?	1. No	2. Yes
Q302	Is there diabetes mellitus?	1. No	2. Yes
Q303	Is there cardiac disease?	1. No	2. Yes
Q304	Maternal hemoglobin in mg/dl	_____	

Q305	Is there UTI?	1. No	2. Yes
Q306	Is there IP?	1. No	2. Yes
Q307	Is there malaria	1. No	2. Yes
Q308	Is there syphilis?	1. No	2. Yes
Q309	Is there chorioamnionitis?	1. No	2. Yes

**Part IV: Fetal/ Neonatal conditions**

Q401	Any Lethal congenital anomaly?	1. No	2. Yes
Q402	Fifth minute APGAR score	_____	
Q403	Presence of MSAF	1. No	2. Yes
Q404	Birth weight	_____	
Q405	Sex of new born	1. Male	2. Female
Q406	Perinatal asphyxia	1. No	2. Yes
Q407	Any birth trauma	1. No	2. Yes
Q408	Birth outcome	1. Live birth	2. Stillbirth