

**The Magnitude and Factors Associated with Perinatal Mortality, Prospective
Cross Sectional Study at Nekemte Referral Hospital Oromia Regional State,
Ethiopia.**



By:

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Abstract

Background: Perinatal deaths are deaths after seven completed months of gestation plus early neonatal death. It has a much higher burden on least developed and developing countries than the developed world. It is one of the indicators used to show the quality and coverage of ante natal and perinatal services provided. In our country there has been a few researches done in different areas in a different time. Thus, this study aims to provide information on the magnitude of perinatal mortality and factors associated with it in the study area during the study period.

Methods: Facility based cross-sectional study was conducted from January 2017 to July 2017, by reviewing all the available data; interview of relevant health staff, clients and families of all births attended that perinatal deaths occurred at Nekemte Referral Hospital. Data were collected by trained data collectors using structured questionnaire and the data was cleaned, entered, processed and analyzed using SPSS version 22 Statistical test for significance; Bivariate and multivariable logistic regression were used to identify the candidate and predictor variables respectively. Statistically significance was declared at $p < 0.05$.

Result: The hospital perinatal mortality was revealed to be 107 deaths per 1000 live births (136 still births and 92 early neonatal deaths found to be still births rate and early neonatal deaths rate of 64 and 43 per 1000 live births respectively). The most obstetric risk factors to perinatal death were identified to be mechanical factors 92 (40.4%), followed by hypertensive disorder of pregnancy 90 (39.5%), hemorrhage 43 (18.9%), premature rupture of membrane 41 (18%), preterm labor 13 (5.7%) and perinatal asphyxia 95 (41.7%), prematurity 39 (21%) and neonatal sepsis 33 (14.5%) were the three leading causes of early neonatal death.

Residence, educational status, place and number of ANC follow up, and perinatal asphyxia were significantly associated with perinatal mortality.

Conclusion and recommendations: Residence, level of education, place and low number of ANC and perinatal asphyxia were encountered risk factors identified to be significantly associated with perinatal mortality. Deaths due to these factors may be prevented by improving early referral systems from primary health care units to higher settings, improving the quality and coverage of antenatal and periparturial obstetric care.

Key words: Perinatal mortality rate, early neonatal death, still birth, Nekemte Referral hospital.

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List of Acronyms

AFD	Amniotic Fluid Disorders
ANC	Antenatal Care
AOR	Adjusted Odds Ratio
APH	Ante partum Hemorrhage
CI	Confidence Interval
COR	Crude Odds Ratio
EDHS	Ethiopian Demographic and Health Survey
ENND	Early Neonatal Death
JUSH	Jimma University Specialized Hospital
GA	Gestational Age
HDP	Hypertensive Disorders of Pregnancy
Hgb	Hemoglobin
IESO	Integrated Emergency Surgery and Obstetrics
LBW/VLBW	Low/Very Birth Weight
LNMP	Last Normal Menstrual Period
MDG	Millennium Development Goal
MSAF	Me conium Stained Amniotic Fluid
NRH	Nekemte Referral Hospital
NICU	Neonatal Intensive Care Unit
OB GYN	Obstetrician & Gynecologist
PNM/R	Perinatal Mortality/Rate
PROM	Premature Rupture of Membrane
SB	Still Birth
SPSS	Statistical Package for Social Science
WHO	World Health Organization

1. Introduction

1.1. Background

Perinatal deaths are deaths that include stillborn babies of greater than 28 weeks of gestational age or weight of greater than 1000 gm and deaths that occur during the first week of life. It is one of the indicators used to measure the health status of women, newborns and the quality of healthcare provided during the antenatal and perinatal period [1].

Globally about 130 million births occur every year, and of these approximately 4million die during the neonatal period; 3 million of these deaths occur in the early neonatal period, and 3.3 million babies are stillbirths; one in three of these deaths occurs during delivery and could largely be prevented. Ninety-eight per cent of the deaths take place in the developing world [2]. Perinatal mortality in developing countries is five times higher than in developed countries at 10 deaths per 1000 total births in developed regions, and 50 per 1000 in developing regions and over 60 per 1000 in least developed countries [3].

Causes and determinants of early neonatal deaths and stillbirths are attributed to poor maternal health, inadequate care during pregnancy, inappropriate management of complications during pregnancy and delivery, poor hygiene during delivery and in the first critical hours after birth, as well as lack of newborn care [2, 4].

Intrauterine death occurs either before onset of labour (antepartum death) or during labor (intrapartum death). Fetuses may die in utero, before onset of labour, because of pregnancy complications or maternal diseases; however, no special reason can be found for many antepartum and intrauterine deaths. Complications arising during birth are the main cause of death among almost all infants who were alive when labour started, but were born dead. It is therefore important to know at what point before birth the baby died, so that appropriate interventions can be planned accordingly. Where women receive good care during childbirth, intrapartum deaths represent less than 10% of stillbirths due to unexpected severe complications [2].

Early neonatal deaths occur during the perinatal period, and have obstetric origins, similar to those leading to stillbirths. Worldwide, there are over 6.3 million perinatal deaths a year, almost all of which occur in developing countries, and 27% of them in the least developed countries alone. Stillbirths account for over half of all perinatal deaths. One third of stillbirths take place during delivery, and are largely avoidable [2].

Babies die after birth because they are severely malformed, are born very prematurely, suffer from obstetric complications before or during birth, have difficulty adapting to extra uterine life, or because of harmful practices after birth that lead to infections. Around 1% of infants have a major congenital anomaly. These anomalies are more common in developing than in developed countries, especially those caused by diseases such as syphilis, or by nutrient deficiency, which leads to neural tube defects and cretinism. Low birth weight is associated with the death of many newborn infants. Around 15% of newborn infants weigh less than 2500 gm, the proportion ranging from 6% in developed countries to more than 30% in some parts of the world [2].

From a global standpoint, the prevalence rate of preterm birth varies from 47.5 to 137 per 1000 live births. Extreme parity, a previous history of preterm birth or abortion, younger maternal age, inadequacy of prenatal care, reported hypertension, antepartum hemorrhage, premature rupture of fetal membranes and induced labor are significant determinants of preterm birth [5, 6]. In developing countries, it is estimated that asphyxia during labor and delivery leads to approximately seven deaths per thousand births, whereas in developed countries this proportion is less than one per 1,000[2].

In Nigeria secondary data from the 2003 Nigerian Demographic and Health Survey was analyzed and of the 5783 live singleton births that were analyzed, 194 were perinatal deaths giving an estimated perinatal mortality rate (PNMR) of 72.4 per 1000 live births [7].

In one study done in Three Municipal Hospitals of Dar Es Salaam, Tanzania, major causes of perinatal mortality were recognized to be prolonged/ obstructed labour (22%), pre eclampsia/ eclampsia (23%), and prematurity accounting for 18.5% of the perinatal deaths. Mothers of the cases were more likely to have a history of previous adverse pregnancy outcome, hypertensive disorder, and premature delivery [8].

In Ethiopia a study done at black lion specialized hospital showed the gross perinatal and early neonatal mortality rates were 91.8 and 26.1/1000 births each, respectively. In this study the three leading causes of perinatal mortality were identified to be malpresentation (13.1%), uterine rupture (12.5%) and obstructed labor (11.9%) [9]. In 1977, a one-year perinatal and maternal mortality review by Naeye and et al found the PMR at TikurAnbessa teaching hospital to be 91/1000 live births, obstructed labour being the second commonest cause of mortality [10]. Based on the 2011 EDHS the perinatal mortality rate is 46 per 1,000 pregnancies of seven or more months of gestation, which is among the highest rates in the world.

The perinatal mortality rate is higher among births to young mothers (less than 20 years of age) as well as among births that occur less than 15 months after the previous birth. Perinatal mortality generally decreases with an increase in the levels of education and of household wealth [11]. A 4-year (1980-1984) and 10-year (1990-1999) retrospective perinatal death reviews were done in Jimma teaching hospital, South-Western Ethiopia, by Ghidey et al and Ashebir, respectively. The PMR was found being increased by about 1.5-fold from 1980-1984 review (95.9/1000 live births) to 1990-1999 (138.9/1000 live births). The latter study, out of 1664 perinatal deaths, identified mechanical factors (53.4%) as a leading cause of perinatal mortality, followed by unexplained intrauterine death (28.8%), prematurity (7.2%), preeclampsia/eclampsia (6.7%) and APH (2.1%) [12,13].

In Gondar university teaching hospital about 23% of women had adverse birth outcomes (14.3% preterm, 11.2% low birth weight and 7.1% still births) [14].

This research is therefore intended to analyze perinatal mortality rate and the causes and determinants identified in each perinatal death occurred.

1.2. Statement of the Problem

Perinatal mortality which includes both late fetal deaths and early neonatal deaths is an important indicator of the status of maternal/child health, the conditions of obstetric care and the level of economic development of a community. At the global level, in 1995 WHO estimated 7.6 million perinatal deaths take place each year, most of which are in developing countries (98%) which is at an unacceptably high level and could largely be prevented. Perinatal mortality rate reflects both the characteristics of reproductive health and the quality of antenatal care, delivery, and newborn care [15]. Even though comparisons between different countries are limited by the heterogeneity of the criteria used for defining perinatal death and by the quality of the information available, large differences in mortality rates exist between different countries, ranging from less than 10 per 1,000 in most developed countries to up to 60 per 1,000 in certain regions of Asia and Africa [2, 16]

In addition 75% of all neonatal deaths occur during the perinatal period. It is therefore obvious that MDG-4 cannot be achieved without substantially reducing these perinatal deaths most especially in the high burden countries of south central Asia and sub Saharan Africa. [2, 17].

Complications during delivery such as obstructed labor and fetal malpresentation are frequent causes of perinatal death in settings where obstetric care is lacking. In developing countries, it is estimated that asphyxia during labor and delivery leads to approximately seven deaths per thousand births, whereas in developed countries this proportion is less than one per 1,000[2]

On recognition of the challenges in reaching the MDG 4, the African union declaration by heads of states and governments in September 2004 urged all countries in the region to accelerate reduction of maternal and newborn deaths. Most perinatal and neonatal deaths are caused by infectious diseases (30–40%), such as sepsis and pneumonia; pregnancy-related complications, such as placenta previa and abruption placentae; and delivery-related complications, including premature birth, intrapartum asphyxia and birth trauma. Additionally, there are many indirect causes of early infant death, including poor maternal health, untreated maternal infections, including sexually-transmitted diseases, urinary tract infections, and chorioamnionitis.

Perinatal and neonatal mortality can be addressed by interventions in pregnancy, during labor and delivery, and in the first few weeks of an infant's life. For each possible intervention, it is necessary to determine what proportion of the cause could be addressed. The need for action is compelling, as is the need for research that will enable informed policies, more effective and efficient programs, and greater reduction of perinatal and neonatal deaths.

Low income countries account for 97-98 percent of reported global perinatal deaths. This accounts for 68-70% of annual global less than five mortality and 40% of infant mortality. It is therefore not possible to achieve the stated MDG 4 goal of reducing infant mortality rate without addressing the causes and determinants of perinatal mortality especially in these low income countries. Many useful interventions can be implemented in resource poor settings, but weak health care delivery systems remain a major challenge [17, 18].

2. Literature Review

Globally over 130 million babies are born every year, and over 4 million babies die in the first four weeks of life; 3 million of these deaths occur in the early neonatal period. Moreover, it is estimated that more than 3.3 million babies are stillborn every year; one in three of these deaths occurs during delivery and could largely be prevented. Ninety-eight per cent of the deaths take place in the developing world. Perinatal mortality in developing countries is five times higher than in developed countries at 10 deaths per 1000 total births in developed regions, and 50 per 1000 in developing regions and over 60 per 1000 in least developed countries. In the African region perinatal mortality is estimated at 62 deaths per 1000 births which is among the highest rates. Around 38% of deaths among children younger than 5 years of age occur during the first 28 days of life (neonatal deaths), and 75% of these neonatal deaths occur within the first 7 days [1, 2, 3]. Two thirds of the neonatal deaths occur in first week of life and of these, two third occur in first 24 hours [19].

In one expert review in UK, in 2005 there were 5496 perinatal deaths which were attributed for 07 most important causes being ‘unexplained antepartum death’ 33% (1818), lethal congenital abnormalities and immaturity each accounting 17% each(953 and 948 respectively), intrapartum deaths(11%). The remaining three were antenatal complications (such as hemorrhage and preeclampsia) which accounted for 11% of the cases, infections (3%) and other specific causes (6%) which are impossible to prevent [20].

Though most of the countries in south central Asia and sub Saharan African have made little progress in reducing perinatal deaths in the past decade, it is important to note that some progress has been made [21]. During the past decade, China has dropped from the second to fourth highest burden of stillbirths because of a rapid reduction in stillbirth rate and a reduced total fertility rate. Nigeria has moved up to the second highest as the national stillbirth rate and total fertility rate remain high [22].

In one descriptive study at Obstetrics & Gynecology Unit A of Khyber Hospital in Pakistan, a total number of 11260 patients were analyzed for perinatal mortality. Out of these there were 740 perinatal deaths giving a perinatal mortality rate of 65.7/1000 total births. There were 605 SBs

and 135 ENDS. Commonest risk factor was antepartum hemorrhage (29.7%), followed by hypertensive disorders of pregnancy (26.7%) and mechanical factors affecting labour (14.5%). Congenital abnormalities were found in 10% while maternal medical disorders were observed in 4.5% of the cases. However in 5.6% of the cases, the cause remained unknown [23].

The perinatal mortality and stillbirth rates in Medical College Hospital, Kottayam, India was 38.5 per 1000 total births and More than 85% of perinatal deaths occurred in low birth weight and preterm babies. In this hospital based study perinatal hypoxia and congenital anomalies were the leading causes in late fetal deaths. The main causes of early neonatal deaths (END) were perinatal hypoxia, infections, congenital anomalies and hyaline membrane disease (HMD) [24].

A facility based unmatched case-control study done in Arua referral hospital, Uganda showed that the mean age of mothers was 24.1 and the majorities were in the age range 15-35 years. In this study nearly half of the babies 27 (45%) were fresh stillbirths while 12 (20%) were macerated stillbirths. Twenty (33.3%) out of the babies who were born alive died within 24 hours. Low Apgar score of ≤ 6 was associated with increased risk of perinatal death [25].

In one study done in Three Municipal Hospitals of Dar Es Salaam, Tanzania, major causes of perinatal mortality were recognized to be prolonged/ obstructed labour (22%), pre eclampsia/ eclampsia (23%), and prematurity accounting for 18.5% of the perinatal deaths. Mothers of the cases were more likely to have a history of previous adverse pregnancy outcome, hypertensive disorder, and premature delivery [8].

In a three years period retrospective study done in South Africa at Johannesburg tertiary hospital 559 perinatal deaths (still births > 1000 gram & neonatal deaths before 7 days of extra-uterine life) were analyzed. In this study, the mean PMR was 25.9/1000 births and the five most common causes of death were unexplained intrauterine death (33%), antepartum hemorrhage (APH) (18%), infection, mainly syphilis (13%), asphyxia (10%) and preterm labour (9%), with avoidable factors implicated in 31.3% of all perinatal deaths [26].

In 2000 Perinatal mortality rate in Egypt was about 45/1000 total births, compared with 11/1000 in the developed countries [27]. According to UNICEF, In Egypt in 2008 the perinatal mortality rate was 28/1000 live births and the still birth rate was 13/1000 [28]. Most perinatal deaths are

due to Pregnancy and delivery-related complications, including prematurity, intrapartum asphyxia and birth trauma besides infectious diseases, such as sepsis and pneumonia; additionally, there are many indirect causes, including poor maternal health and untreated maternal infections [29].

According to the 2004 WHO estimation, in Ethiopia, there were a total of 128,000 perinatal deaths, making the PMR to be 41/1000 births. Of these, 34,000 (27%) were still births and 94,000 (73%) were early neonatal deaths [30]. In 2006, however, the PMR estimated by WHO was 57/1000 total births with about 2:1 ENDS to stillbirths ratio [31].

In one case-control study done in Hawassa University hospital a total of 1356 newborns (452 cases and 904 controls) were included in this analysis. The adjusted perinatal mortality rate was 85/1000 total delivery. Stillbirths accounted for 87% of total perinatal mortality. The proportion of hospital perinatal deaths was 26%. Obstructed labor was responsible for more than one third of perinatal deaths. Adjusted odds ratios revealed that obstructed labor, malpresentation, preterm birth, antepartum hemorrhage and hypertensive disorders of pregnancy were independent predictors for high perinatal mortality [32].

A retrospective one-year medical record review of major emergency obstetric performance at black lion specialized hospital showed the gross perinatal and early neonatal mortality rates were 91.8 and 26.1/1000 births each, respectively. In this study the three leading causes of perinatal mortality were identified to be malpresentation (13.1%), uterine rupture (12.5%) and obstructed labor (11.9%). During a one year period 3583 women gave birth to 3672 babies: 3431(93.4%) and 241 (6.6%) were born alive and dead, respectively.

Fourteen (5.8 %) of the stillbirths occurred antepartum and intrapartum among mothers admitted to ward as high-risk (including intentionally terminated severe preeclampsia cases remote from term). Among the live births, 96(2.7%) died of various causes in the early neonatal period in the hospital. The gross and corrected (excluding congenital anomaly incompatible with life & birth weight <1000grams) perinatal mortality rates of the year were 91.8 and 77.6/1000 total births (98.2 and 83.1/1000 live births), respectively [9].

In 1977, a one-year perinatal and maternal mortality review by Naeye and et al found the PMR at Tikur Anbessa teaching hospital to be 91/1000 live births, obstructed labour being the second commonest cause of mortality [10].

Based on the 2011 EDHS the perinatal mortality rate is 46 per 1,000 pregnancies of seven or more months of gestation. The perinatal mortality rate is higher among births to young mothers (less than 20 years of age) as well as among births that occur less than 15 months after the previous birth. Perinatal mortality generally decreases with an increase in the levels of education and of household wealth [11].

A 4-year (1980-1984) and 10-year (1990-1999) retrospective perinatal death reviews were done in Jimma teaching hospital, South-Western Ethiopia, by Ghidey et al and Ashebir, respectively. The PMR was found being increased by about 1.5-fold from 1980-1984 review (95.9/1000 live births) to 1990-1999 (138.9/1000 live births). The latter study, out of 1664 perinatal deaths, identified mechanical factors (53.4%) as a leading cause of perinatal mortality, followed by unexplained intrauterine death (28.8%), prematurity (7.2%), preeclampsia/eclampsia (6.7%) and APH (2.1%) [12, 13].

Another retrospective perinatal death review done in Jimma university teaching hospital by Dejene A et al. from September 2012 to February 2015. The overall perinatal mortality rate during the study period was 109.3/1000 total Birth with stillbirths to early neonatal death ratio of 3.6:1. Most Of the mothers were; 25-29 years old, para II-IV and had ANC Accounting for 30.6%, 60.3% and 73.8% respectively. More than three-fourth of the cases were delivered at term and close to two third of them weighted 2500-3999 gms at delivery. There is an Association between perinatal mortality with maternal parity, ANC, Weight and gestational age at delivery. Mechanical factors followed by ante partum hemorrhage, Hypertensive disorder of pregnancy and congenital anomalies were primary obstetric causes initiating the cascade of perinatal death [33].

2.1. Significance of the study

The findings of this study will provide the hospital, policy makers and NGOs with relevant information regarding on perinatal mortality rate of the facility and related causes and determinants of perinatal deaths, so that they can understand the magnitude of the problem and for future planning of appropriate strategies. It might also be used by program implementers as an input for efforts directed towards improving quality of obstetric care with their ultimate goal of reducing perinatal mortality. As there are no similar studies done previously, this paper will be hopefully vital to be used as a baseline for future studies.

2.2. Conceptual frame work

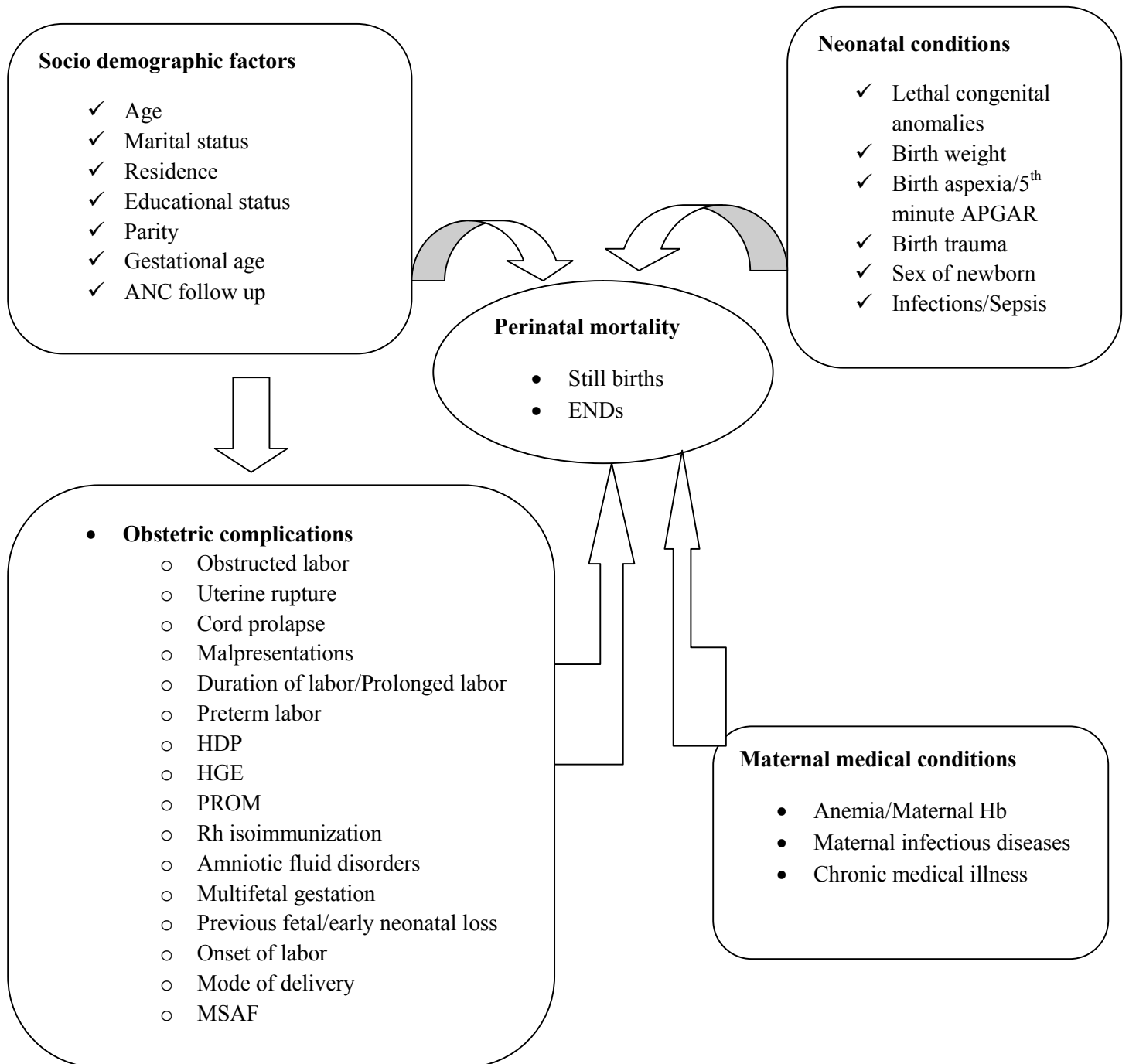


Figure 1: Conceptual frame work of the study

3. Objectives

3.1. General objective:

- ❖ To determine the magnitude and factors associated with perinatal mortality at Nekemte Referral Hospital from December 2016 to July 1017..

3.2. Specific objectives

- ❖ To determine the magnitude of perinatal death among deliveries attended at the facility during the study period.
- ❖ To identify the possible obstetric complications that cause perinatal death among deliveries attended at the facility during the study period.
- ❖ To assess factors that contributes to perinatal death among the cases during the study period.

4. Methods and Materials

4.1. Study area and period

The study was conducted in Nekemte Referral Hospital from December 2016 to July 2017, which is found in Nekemte town, East Wollega zone, Oromia regional state, Ethiopia. The town is located 331 kilometer West of Addis Ababa. The zone has 298 health post, 61 health center two primary hospitals and NRH. There are also 207 private clinics. The hospital is serving for a total population of over 2.1 million peoples of East Wollega Zone, parts of west Wollega Zone, Horoguduru Wollega Zone and West Shoa Zone.

Nekemte referral hospital was established in 1923 E.C, and currently provides both outpatient and inpatient services. It had a total of 208 beds among these 57 beds for obstetrics and gynecology ward. The services delivered by these departments were pre-operative, post-operative, in patient, post abortion care, safe abortion services, labor, delivery, and others. The labor and delivery ward had 5 beds first stage, 3 couches second stage, 9 beds post natal and there is also a relatively well organized Neonatal Intensive Care Unit (NICU) on different block which is about 30 meters away from labor ward, where newborns are admitted from different hospitals, health centers including home deliveries which contains 32 beds. The average annual number of delivery is about 3700, among these the majority of them are high risk pregnancy which are referred from different institutions. Almost all high risk neonates are admitted to neonatal intensive care unit and evaluated by the NICU team.

In this hospital there were a total of 326 workers, 216 health professionals and 116 administrative staffs, from the health professionals 2 obs/gyn specialists, 2 IEOs, 16 midwifery, Emergency surgery students from Jimma University and medical intern students from Wolega University who are working in the obs/gyn ward. There are also 2 pediatrician and 5 trained nurses working in the neonatal unit.

4.2 Study design

A facility based prospective, cross sectional study design conducted.

4.3. Population

4.3.1. Source population: all deliveries attended in the hospital and neonatal admissions to the neonatal unit registered.

4.3.2. Study population: Perinatal deaths admitted during the study period and fulfilling inclusion criteria.

4.4. Inclusion and exclusion criteria

4.4.1. Inclusion criteria:

- ✓ All stillbirths who were delivered after the mother was admitted to labor and delivery ward with the GA of 28 completed weeks or birth weight 1000gr or more.
- ✓ All deaths which occurred in the first seven days of life (GA 28 wk or birth weight 1000gr or more) and admitted to NICU were followed during the study period

4.4.2. Exclusion criteria:

1. Deliveries with good perinatal outcome and discharged and these who are ill but didn't die.
2. GA less than 28 weeks by any of the methods of estimations and all late neonatal deaths.
3. All deaths in NICU who were admitted from other hospital, health center and home deliveries.

4.5. Sample size and sampling procedure

All admitted perinatal deaths attended in NRH that full fill the inclusion criteria were included in the analysis. We did not expect to miss any cases consecutively until the necessary sample size is achieved.

4.6. Study variables

4.6.1. Dependent variable

- ✓ perinatal death (SB and ENND)

4.6.2. Independent variables:

❖ Socio demographic factors

- ✓ Age
- ✓ Marital status
- ✓ Residence
- ✓ occupation
- ✓ Educational status
- ✓ parity
- ✓ Gestational age
- ✓ ANC follow up

❖ Obstetric complications

- ✓ obstructed labor,
- ✓ uterine rupture,
- ✓ cord accidents,
- ✓ malpresentations
- ✓ HDP,PROM, HGE, Preterm labor

❖ Neonatal conditions

- ✓ Lethal congenital anomalies
- ✓ Birth weight
- ✓ Birth aspxia/5th minute APGAR
- ✓ Birth trauma
- ✓ Sex of newborn
- ✓ Infections/Sepsis

❖ Other chronic medical illness.

4.7. Operational definition of terms

Live birth: is the complete expulsion or extraction from its mother of a product of conception, which, after such separation, breathes or shows any other evidence of life.

Still birth: is death prior to the complete expulsion or extraction from its mother of a product of conception, weighing at least 1000gm or 28weeks of gestation or more; the death is indicated by the fetus does not breathe or show any other evidence of life.

Early neonatal deaths: deaths occurring during the first seven days of life.

Perinatal mortality: is the summation of still births and early neonatal deaths

Perinatal mortality rate: the number of perinatal deaths per 1000 total births

Corrected perinatal mortality rate: perinatal mortality rate after excluding for extreme prematurity and congenital anomaly incompatible with life.

4.8. Data collection tool and procedure

Structured questionnaire was developed and adapted and data was collected through face to face interview and reviewing maternal records (after informed consent) of all births attended that perinatal deaths occurred by two trained midwifery nurses who were employed in the hospital supervised by one final year IEOS student.

4.9. Data quality assurance

To keep the quality of data detail trainings was given for all data collectors, day to day activities during data collection was supervised and evaluated, errors was corrected by the principal investigator before the following day activity. And to have good quality data health professionals was involved in the data collection.

4.10. Data processing and analysis

The collected data was checked for completeness, coded and entered to SPSS-22 database program for analysis. A Bivariate Logistic regression was used to identify candidates of multiple logistic regressions. Those P-values < 0.25 were candidates to multiple logistic regressions to determine independent determinants of perinatal mortality. Odds ratio was presented at 95 % CI and P-value < 0.05 was considered statistically significant. Frequency distributions of both dependent and independent variables were done and the association between independent and dependent variables analyzed and tested. Confidentiality was insured by not recording names or any personal identifiers. Finally, the data was described and presented using tables and charts. Aberdeen's classification of perinatal mortality was used to categorize the independent variables and see their effect on perinatal outcome.

4.11. Ethical consideration

Letter of ethical clearance was obtained from Research Ethical Committee of Jimma University. Permission was obtained from NRH administration office. Verbal consent obtained from the individual respondent before data collection. Additionally confidentiality of the patient information was kept.

4.12. Dissemination Plan

The results of the study are going to be submitted to the institute of health and medical faculty of Jimma University, NRH and other responsible bodies. The result will be presented during thesis defense in the collage of public health and 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.

4.13. Limitations

Perinatal mortality may be underestimated since deaths of newborn who were discharged from hospital before seven days were lost if the death occurred at home or in another health facility.

5. Result

5.1. Descriptive statistics

5.1.1. Socio demographic characteristics

During the study period of six months registration report from February 1st to July 30th 2017 there were a total of 2126 admitted mothers who gave birth in the labor and delivery ward of Nekemte Referral Hospital (NRH). There were a total of 228 perinatal deaths of which 136 were stillborn and 92 died within 7 days of life making perinatal mortality rate (PMR) 107/1000 (64/1000 still birth (SB) and 43/1000 early neonatal death (END)).

The great majority of mothers, 198 (86.8%) who had perinatal deaths were in the age group 20-34 years [Mean age 25.10 and standard deviation of 5.036], and most of the mothers 122 (53.5%) of them were protestant followers. One hundred sixty four (71.9%) of the cases came from rural areas and the rest 64 (28.1%) reside in urban areas. One hundred ninety three (84.6%) of mothers were married and only 19 (8.3%) were divorced or widowed. Related to the occupation 200 (87.7%) of them were house wife whereas 16(7%) were employee. Eighty five (37.3%) of mothers had skill of write and read but 76(33.3%) were illiterate (Table-1).

Table 1: socio-demographic characteristics of mothers with perinatal mortality in nekemte referral hospital, February 1st-July 30th, 2017

S.no	variable	category	frequency	Percent
1	Age	<19	22	9.6
		19-35	198	86.8
		>35	8	3.5
2	Ethnicity	Oromo	175	76.8
		Amhara	32	14
		Others*	21	9.2
3	Religion	Orthodox	64	28.1
		Protestant	122	53.5
		Muslim	42	18.4
5	Marital status	Married	193	84.6
		Unmarried	16	7
		Widowed/divorced	19	8.3
6	Occupation	House wife	200	87.7
		Employee	16	7
		Student	9	3.9
		Other**	3	1.3
7	Educational status	Illiterate	77	33.8
		Write & read	86	37.7
		1-8	28	12.3
		9-12	18	7.9
		Higher education	19	8.3

Other*; gurage, tigre other**; merchant

5.1.2. Obstetric characteristics

Most of the mothers were multi gravid mothers 113 (49.6%) and 78 (34.2%) were primigravida. Related to gestational age 139 (61%) mothers did know their LNMP and most of them were delivered at Term 97 (69.8%). Eighty nine (39%) were didn't know their date, for those cases the fundal height measurement or ultrasound estimation was taken to estimate the gestational age of the fetus at time of delivery. Based on these records about 54 (60.7%) were born at term [Mean and SD of the GA was 37.36 weeks and 2.601 respectively] (Table-2).

Majority of the cases 215 (94.3%) had regular antenatal care follow ups of which about 204 (94.9%) had four visits and most of them were at health center 140 (61.4%). only 13 (5.7%) mothers never had any visit (Figure-2).

Table 2: Obstetric characteristics of mothers with perinatal mortality in nekemte referral hospital from February 1st-July 30th, 2017.

s.no	variable	category	frequency	Percent
1	Gravidity	One	78	34.2
		Two to five	113	49.6
		More than five	37	16.2
2	parity	One	107	46.9
		Two to five	108	47.4
		More than five	13	5.7
3	GA at delivery	Known	139	61
		estimated	89	39
4	If known GA by LNMP	28-33wks	9	6.5
		34-36wks	28	19.6
		37-42wks	97	70.3
		>42wks	5	3.6
5	If estimated GA by US/FH	28-33wks	7	7.9
		34-36wks	28	31.5
		37-42wks	54	60.7
6	Did you have ANC	No	13	5.7
		Yes	215	94.3

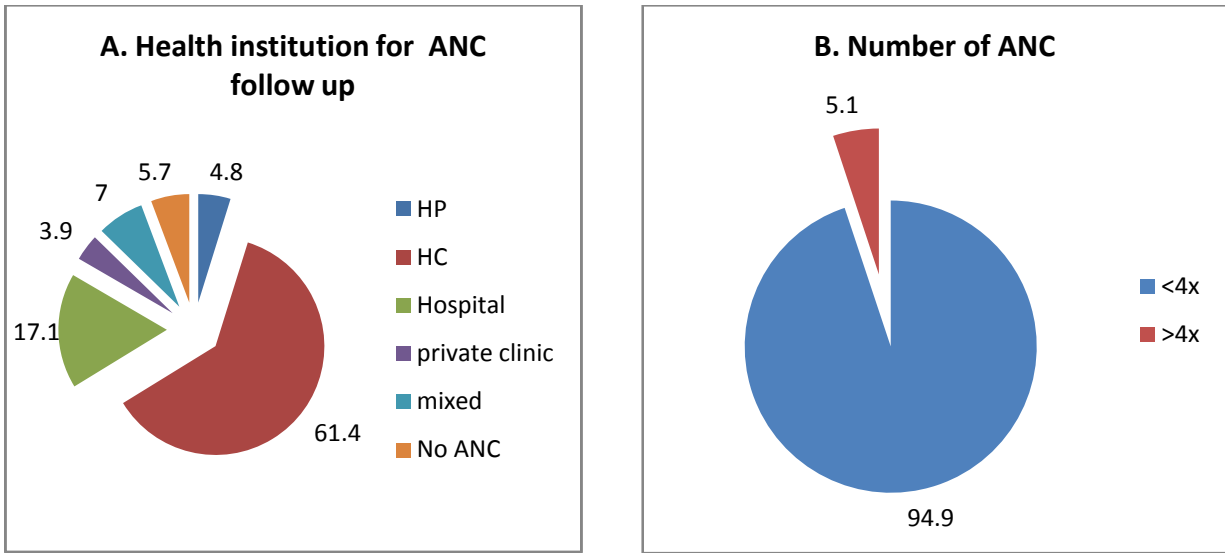


Figure 2: type of health institution and number ANC follow up of mothers with perinatal mortality in nekmete referral hospital from February 1st to July 30th 2017.

The presence of chronic medical illnesses, of all mothers with perinatal deaths during the study period were assessed and 10 cases (4.4%) were had, of those 7(3.1%) developed/diagnosed prior to the index pregnancy and the rest 3(1.3%) diagnosed during the index pregnancy.

Of all the 228 cases about 183 cases (80.3%) had at least one identified obstetric complication. Forty five cases (9.7%) had no risk factor. Based on the result, mechanical factors (obstructed labor, uterine rupture, cephalopelvic disproportion, malpresentation, cord prolapse) 92 (40.4%), HDP 90 (39.5%) and hemorrhage 43 (18.9%) were the leading cause of perinatal death followed by premature rupture of membrane 41 (18%) and preterm labor. Recent laboratory done to check for the presence of anemia and other infectious diseases the mothers seek medical attention. Based on these about 187 (82%) of the mothers had hemoglobin (Hgb) level < 11gm/dl. The Mean and SD of Hgb is 11.989 and 2.2607 respectively). Twelve mothers (5.3%) had infections like chorioamnionitis and HIV.

Majority of delivery mothers 208 (91.2%) had single outcome and 20 (7.9%) of mothers had previous history of fetal/early neonatal loss. Most of the mothers start labor spontaneously 180 (78.9%) and 130 (58.8%) were stay in labor for 12-24 hrs. more than half of the final delivered mothers that results perinatal death were by spontaneous vaginal mode of delivery 118 (51.8%). (The obstetric complications are summarized in table-3).

Table 3: Obstetric complications of all perinatal mortality in NRH, Feb 1st-July 30th, 2017.

S/No	Obstetric complications		Frequency	percent
1	Obstetric complication	No	45	9.7
		Yes	183	80.3
2	Hypertension	No	138	60.5
		Yes	90	39.5
3	Type Hypertension disorder obstetric complication	gestational hypertension	21	9.2
		S.Preclampsia/Eclampsia	38	16.7
		HELLP syndrome	8	3.5
		Chronic HTN/Superimposed PE	9	3.9
		Mild preclampsia	14	6.1
4	Hemorrhage related obstetric complication	Antepartum hemorrhage	17	7.5
		Postpartum hemorrhage	20	8.8
		Other	6	2.6
		NO hemorrhage	185	81.1
5	Hemoglobin	>11gm/dl	187	82
		<11gm/dl	41	18
6	Pregnancy related infection complication	Chorioamnitis	8	3.5
		Human immunodeficiency Viruse	4	1.8
		No infection	216	94.7
7	Labor mechanical factors	No	136	59.6
		Yes	92	40.4
8	Labor related disorder complication	obstructed labor w/o ux rupture	35	15.4
		obstructed labor with ux rupture	16	7
		Cephalopelvic disproportion	14	6.1
		other labor related d/order	37	16.2
		no labor related d/order	126	55.3
9	Other labor d/order obstetric complication	Umbilical cord accident	7	3.1
		Preterm labor	13	5.7
		Amniotic fluid d/order	10	4.4
		RH-isoimmunization	5	2.2
		Other	13	5.7

		None	180	78.9
10	malpresentation	No	177	77.6
		Yes	51	22.4
11	type of malpresentation?	Breech	27	11.8
		Brow	5	2.2
		Face	10	4.4
		Shoulder	9	3.9
12	prom	No	187	82
		Yes	41	18
13	If prom ,type	Term	29	12.7
		Preterm	12	5.3
14	Number of gestation	Singleton	208	91.2
		Twin	20	8.8
15	Previous fetal/early neonatal loss	No	210	92.1
		yes	18	7.9
16	Mode of onset labor	Induced	48	21.1
		spontaneous	180	78.9

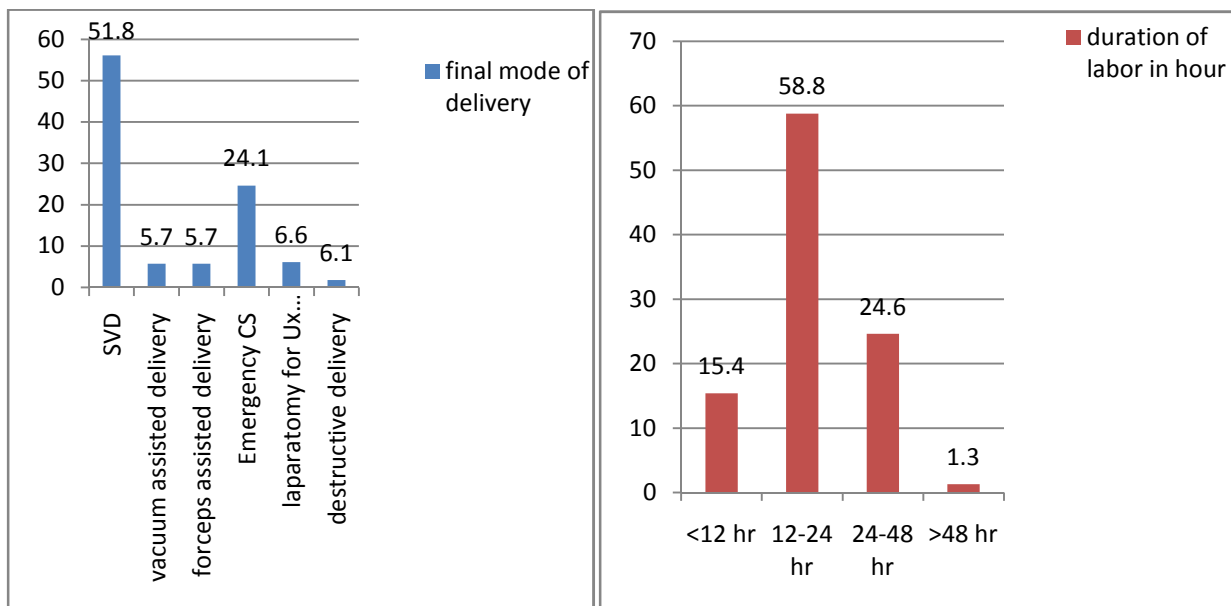


Figure 3: final mode of delivery and duration labor in hour of mothers with perinatal death in nekemte referral hospital, February 1st to July 30th 2017.

5. 1.3. Fetal and Neonatal conditions

Up on delivery summary and ante natal sonographic records 7 cases (3.1%) had lethal congenital anomalies. The great majority of perinatal deaths, 160 (70.2%) fetuses delivered with very low APGAR score of (0-3) in the 5th minute, (the mean and SD of the fifth minute APGAR score was found to be 1.42 and 0.70 respectively) and 47 (20.6%) laboring mothers had MSAF. Regarding to sex distribution 137 (60.1%) of were male. Sixty (26.4%) of the cases had low or very low birth weight, the mean birth weight of all the registered perinatal deaths is 2899.56 and SD of 777.237. Based on the delivery summary of each birth 95 (41.7%) had birth asphyxia, 3 (1.3%) had birth related trauma that may or may not be directly related to the death, 33 (14.5%) of the early neonatal deaths had sepsis (Table-4).

Based on perinatal death type evaluation more than half 136 (59.6%) were delivered with still birth and 92 (40.4%) were occurred in the early neonatal period. Regarding the possible timing of fetal death presence of body maceration was taken as the best predictor and was checked for all the still births. Based on this 90 (66.2%) had a macerated body suggesting the possible time of intrauterine death beyond 12 hours and the rest 46 (33.8%) were fresh still births. more than Two third of the early neonatal deaths 76 (82.6%) died within the first 24 hours of life (Figure-4).

Table 4: fetal and neonatal conditions of all perinatal mortality in NRH, Feb 1st-July 30th, 2017.

S.no	Variables		Frequency	Percent
1	lethal congenital anomaly	No	221	96.9
		yes	7	3.1
2	5 th minute APGAR score	0-3	160	70.2
		4-6	58	25.4
		7-10	10	4.4
3	Presence of MSAF	No	181	79.4
		yes	47	20.6
4	Birth weight in gram	1000-1499 g	12	5.3
		1500-2499 g	48	21.1
		2500-4000 g	157	68.9
		>4000 g	11	4.8
6	Perinatal asphyxia	No	133	58.3
		yes	95	41.7

7	birth trauma	No	225	98.7
		yes	3	1.3
8	Infection/sepsis	No	195	85.5
		Yes	33	14.5

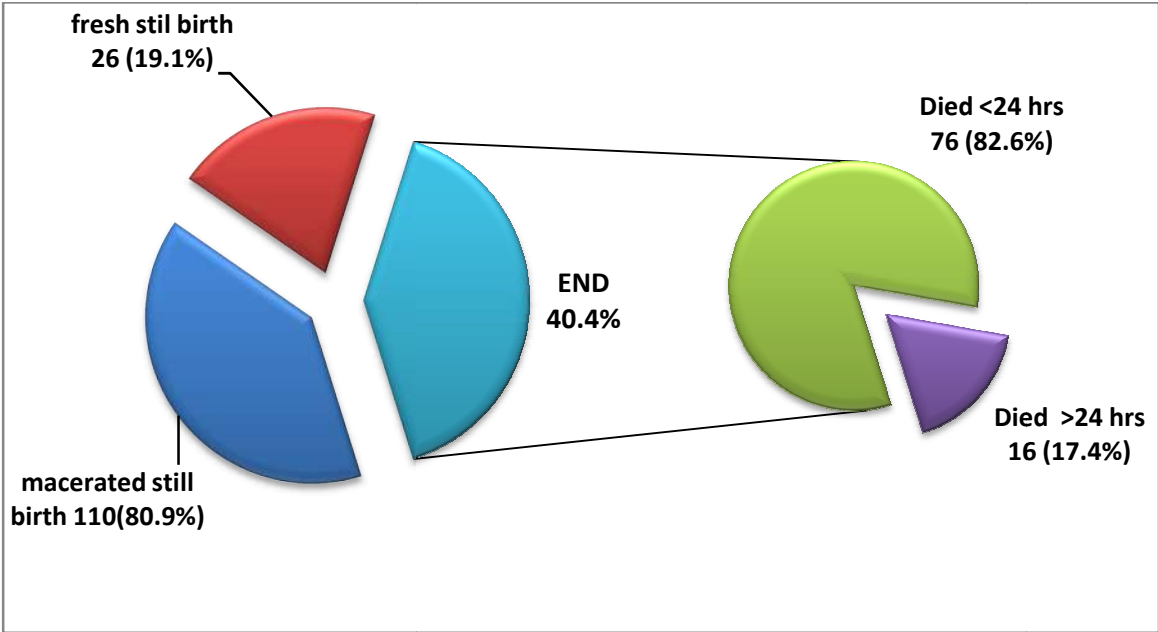


Figure 4: Frequency distribution of macerated Vs fresh still births and new born died before and after 24 hours of life

5.2. Logistic Regression Model summary out put

Binary logistic regression analysis was performed to check for association of the independent variables with the dependent variable, and Multivariate data analysis made to see which of the independent predictors were mostly associated with perinatal death. According to the results residence, educational status, type of health institution for ANC, number of ANC visit and perinatal asphyxia were significant associated with perinatal deaths.

Mothers in urban residence were 3.4% decrease perinatal death than rural area [AOR=.034, 95% CI (.000-.542)], similarly mothers with illiterate were 63% more likely to have perinatal death than who have higher educational status [AOR=.37, 95% CI (2.07-21.8)]. Mothers who have ANC follow up at health post were 97.2% more likely to have perinatal death than at health center and hospital. [AOR=.028, 95% CI (.000-.572)]. Similarly, mothers who had less than four ANC follow up were 17 times more likely had perinatal death than four and above [AOR=17, 95% CI (1.23-26.9)]. Mothers with perinatal asphyxia were 97.7% more likely had perinatal death than their counterparts [AOR=.023, 95% CI (.000-.751)] (Table-5)

Table 5: logistic regression for factors significant associated with perinatal mortality in nekemte referral hospital, February 1st-July 30th, 2017.

Variables	Frequency (n=228)	COR(95%CI)	AOR(95%CI)	P-value
Residence; Urban	64(28.1%)	1.73(.967-3.108)*	.034(.000-.542)	.028**
Rural	164(71.9%)	1	1	
Occupation House wife	200(87.7%)	1	1	.902
Employee	16(7%)	2.098(.750-5.865)*	1.19(.070-20.48)	.764
Student	9(3.9%)	2.039(.531-7.831)	1.55(.088-27.5)	.143
Other	3(1.3%)	3.263(.291-36.601)	45.34(.27-742.8)	
Educational status; Illiterate	76(33.3%)	1	1	
Write & read	85(37.3%)	1.67(.875-3.188)*	3.47 (.753-16.076)	.110
1-8	27(11.8%)	2.33(.952-5.719)*	3.962 (.467-33.58)	.207
9-12	17(7.5%)	.289(.061-1.365)*	.263(.020-3.526)	.313
Higher education	23(10.1%)	4.063(1.52-10.88)*	.37 (2.07-219.8)	.018**
Gravidity: One	78(34.2%)	1.64(.712-3.797)	.000(.000----)	1.000
Two to five	113(49.6%)	1.81(.815-4.016)*	.000(.000---)	.999
More than five	37(16.2%)	1	1	
Where did you have ANC				
Health post	11(4.8%)	1	1	
Health center	140(61.4%)	.492(.143-1.694)	.028(.000-.572)	.016**
Hospital	39(17.1%)	1.078(.281-4.139)	.028(.000-.285)	.015**
Private clinic	9(3.9%)	.417(.067-2.584)	.001(.000-.182)	.016
Mixed	16(7%)	.250(.043-1.443)*	.001(.000-.192)	.016
If you have ANC how many times				
less than four	204(94.9%)	3.35(.705-15.878)*	17.4(1.23-26.9)	.044**
More than four	11(5.1%)	1	1	
Hypertension No	138(60.5%)	1		
yes	90(39.5%)	1.508(.870-2.612)*	.153(.018-1.29)	.085
Hypertension complication;				
Gestational Hypertension	21(9.2%)	1.022(.496-2.104)	.073(.000-17.07)	.351
S. Preclampsia/eclampsia	38(16.7%)	.757.174-3.295)	.433(.034-5.546)	.351
HELLP syndrome	8(3.5%)	.361(.072-2.799)	.284(.002-49.812)	.633
Chronic HTN/Superimposed PE	9(3.9%)	.210(.045-.976)*	.000(.000-.272)	.020
Mild preclampsia	14(6.1%)	1		
Hemorrhage complication				
Antepartum hemorrhage	17(7.5%)	1.49(.551-4.054)	.12(.342-1.252)	.089

Postpartum hemorrhage	20(8.8%)	3.12(1.188-8.203)*	.086(.563-3.453)	.920
Other	6(2.6%)	.84(.154-4.710)	1.231(.980-4.281)	.703
NO hemorrhage	185(81.1%)	1	1	
Hemoglobin >11gm/dl	187(82%)	.52(.261-1.021)*	.399(.712-22.45)	.115
<11gm/dl	41(18%)	1		
Labor disorder complication				
Obstructed labor w/o ux rupture	35(15.4%)	1.57(.735-3.353)	.000(.000-2.191)	.074
Obstructed labor with ux rupture	16(7%)	.430(.116-.1.590)	.000(.000-.....)	1.00
Cephalopelvic disproportion	14(6.1%)	1.86(.614-5.654)	.000(.000-.679)	.041
Other labor related d/order	37(16.2%)	2.73(1.289-5.796)*	1.431(.010-206.6)	.888
No labor related d/order	126(55.3%)	1		
Mode Onset of labor Induced	48(21.1%)	1		
Spontaneous	180(78.9%)	1.65(.835-3.240)*	.476(.117-1.928)	.298
Final mode of delivery;				
Spontaneous Vx delivery	118(51.8%)	1		
Vacuum assisted vx delivery	13(5.7%)	3.005(.923-9.778)*	31.57(.446-223.97)	.112
Forceps assisted vx delivery	13(5.7%)	3.005(.923-9.778)*	5.5(.176-17.24)	.332
Emergency c/s	55(24.1%)	2.095(1.092-4.017)*	.95(.099-9.016)	.961
Laparotomy for ux rupture	15(6.6%)	.470(125-1.759)*	.003(.000-----)	1.000
Destructive delivery	14(6.1%)	.512(.135-1.940)	.002(.000-.770)	.041
Lethal congenital anomaly				
No	221(96.9%)	1		.999
yes	7(3.1%)	4.20(.497-35.480)*	.000(.000-----)	
Sex of new born Male	137(60.1%)	.55(.311-.917)*	.152(.000----)	1.000
female	91(39.9%)	1		
Perinatal asphaxia No	133(58.3%)	.087(.047-.164)*	.023 (.000-.751)	.001**
Yes	95(41.7%)	1		
Perinatal sepsis No	195(85.5%)	.047(.014-.159)*	.000(.000---)	.999
Yes	33(14.5%)	1		

*= p-value <0.25, **=p-value<0.05 statically significant, 1=Reference

6. Discussion

This study tried to look for the magnitude and associated factors of perinatal mortality at Nekemte referral hospital, Nekemte Town, East Wollega Zone, Oromia Regional state, Ethiopia from February 1st to July 30th 2017. Aberdeen's classification of perinatal mortality was used to categorize the independent variables and see their effect on perinatal outcome.

According to the results the PMR of the facility was revealed to be more than two times greater than the national PMR. The 2011 EDHS report showed that the PMR of the country is 46/1000 live births [11]. This is also higher than study conducted in Egypt In 2000 Perinatal mortality rate was about 45/1000 total births [27]. This great difference of perinatal death rates could be due to the fact that most of the cases referred from neighborhood health centers and district hospitals present with some serious complications and managed after the damage had already occurred because of delayed presentations. This might be also due to hospital related factors and institutional set up such as absence of well-equipped neonatal ward, suboptimal obstetric care during ante partum, intrapartum, postpartum and delay from client or service provider. In this study the still birth to early neonatal death ratio is found to be 1.5:1.

This finding was nearly similar with other study conducted at JUTH from September 2012 - February 2015 which was 109.3/1000 of total birth [33]. However these rates are not comparable with the studies conducted at black lion specialized hospital showed the gross perinatal mortality rate was 91.8/1000 total delivery and In Nigeria secondary data from the 2003 Nigerian Demographic and Health Survey was analyzed and an estimated perinatal mortality rate (PNMR) of 72.4 per 1000 live births [9,7]. The global estimation of PMR is 10 per 1000 births in developed countries, 50 per 1000 births in developing countries and 60 per 1000 births in least developed countries[2].

Most of the mothers with age group of 20-35 years old had higher perinatal death (86.8%) which might be due to less obstetric care, ante partum and intra partum complications. similar that of study done in Arua referral hospital, Uganda showed in the age range 15-35 years [25]. But different to EDHS 2011 higher among less than 20 years of age [11].

Majority of the mothers have at least one identified obstetric risk factor (80.3%) even though there is no association, this leads birth asphexia which is 19.1% and 82.6% death of fresh still birth and less than 24 hr early neonatal death respectively. This finding suggests that deaths are most likely happened in the peripartum period and to be associated with intrapartum obstetric complications leading to intrauterine fetal hypoxia and birth asphexia results in perinatal death Studies done in Tanzania, Uganda and Jimma also showed that having intrapartum obstetric complications leading to intrauterine fetal hypoxia and birth asphexia are the most important causes of perinatal death [8, 25, 33]. But this different from other study done in South Africa at Johannesburg tertiary hospital, unexplained intrauterine death, antepartum hemorrhage and infection were the leading causes [26].

Mothers who lives in the town were 3.4% decrease perinatal death than rural area [AOR=.034, 95% CI (.000-.542)]. This could be due to delay in decision and transportation to arrive at health facility, and the fact that with low ANC follow up pregnant mothers at lower health institution were risk factors couldn't be detected early and they couldn't had a better service to identifying risks that can clearly improve the perinatal outcome. In this study finding about 9.7% of the cases there was no known obstetric risk factor identified and this rate (unexplained fetal death) which could be lower than 33% shown in other studies [20].

On analysis the educational status of the laboring mothers were significantly associated with perinatal death, in this mothers who were not educated were 96.3% more likely to have perinatal death than who have higher educational status [AOR=.37, 95% CI (2.07-21.8)]. This might show having low awareness and less health seeking behavior towards health service standard ANC follow up which results perinatal death. This study finding shows as the level of education increase perinatal death is decreased, similar to the 2011 EDHS Perinatal mortality generally decreases with an increase in the levels of education [11].

Mothers who have ANC follow up at health post were 97.2% more likely to have perinatal death than at health center and hospital. [AOR=.028, 95% CI (.000-.572)]. Similarly, mothers who had less than four ANC follow up were 17 times more likely had perinatal death than four and above [AOR=17, 95% CI (1.23-26.9)]. These, mothers having low ANC at lower health institution were the risk factors couldn't be detected early and they couldn't had a better service to identifying risks that could clearly improve the perinatal outcome. The result showing the effect of ANC follow up on perinatal death is comparable with the study done in Jimma Ethiopia [33].

Mothers with perinatal asphyxia were 97.7% more likely had perinatal death than their counterparts [AOR=.023, 95% CI (.000-.751)]. This might be because most of the various labor related disorders and obstetric complications like severe preeclampsia/eclampsia, PROM, IUGR, preterm labor, oligohydramnios, chorioamnionitis, and other medical conditions that causes fetal hypoxia and perinatal asphyxia.. This finding similar that of done in Medical College Hospital, Kottayam, India which showed perinatal asphyxia, infections and congenital anomalies were leading causes of perinatal death [24].

Overall, in this study mechanical factor like (40.4%) are the most frequently encountered risk factors followed by hypertensive disorders of pregnancy (39.5%), hemorrhage (18.9%), premature rupture of membrane (18%) and preterm labor. among the ENDS birth asphyxia (41.7%) followed by prematurity and neonatal sepsis are the most common complications. In other studies done in developed countries prematurity, underweight and congenital anomalies are most common complications [20, 23, 24]

7. Conclusions

The hospital perinatal mortality is 107/1000 live births (adjusted PMR is 103.95/1000 live births). The most frequently encountered risk factors are mechanical factors (obstructed labor, uterine rupture, malpresentations, and cord accidents), HDP, PROM, hemorrhage and preterm labor.

Birth asphyxia, prematurity and neonatal sepsis are the three leading risk factors of early neonatal death. The peripartal still births and more than half of the early neonatal deaths occurred within the first 24 hours of life which suggests these perinatal deaths were peripartal and mostly associated to intrapartal obstetric complications.

8. Recommendations

Since the hospital PMR is very high and since it is one of the indicators showing the quality of maternal and child/neonatal health care provided by the facility and neighboring health centers & district hospitals making referrals to the hospital, efforts should be made to improve the service and reduce perinatal deaths. Hence, to avert the situation, improvement in antenatal care service (supported with ultrasound examination); improving obstetrics care; and early diagnosis and appropriate management of severely asphyxiated fetus at the time of delivery could reduce the prevalence. Easily accessible health facilities (which provide comprehensive essential and emergency obstetric services) could reduce perinatal death attributable to referral related causes.

As shown in the results, most of the perinatal dead cases had intra partal obstetric complications of which mechanical factors are the most commonly encountered risk factors. These factors are greatly preventable since they are the result of dalliance in presentation of the cases to the facility. Therefore making early referral, making timely decisions and improving the perinatal care at the facility can significantly reduce the PMR.

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Annex-1 Questionnaire

Jimma University, institute of health, medical faculty, coordinating office of integrated emergency obstetrics and surgery, Check list format on causes of PNM at NRH, Nekemte Town, Ethiopia, facility based cross sectional study from Jan 2017-July 2017.

Consent form:

My name is _____. I am working with G/Slasie Abraha who is doing a research on the magnitude and factors associated with perinatal mortality in NRH. We are saddened to hear of your loss. The purpose of this study is to understand better why this happened so that we can help improve care for mothers and babies in this hospital in the future. By addressing these issues we hope to better inform policy makers, health providers and women key finding that will contribute towards devising interventions that will improve perinatal health in the country. In order to assess what might have been reasons for the perinatal loss, we will interview you using a structured questionnaire. We would like to collect some information about the care provided to you and your baby by reviewing the medical records and by interviewing you. All information will be kept confidential and neither your name nor other identifying information will be recorded. If you don't want to answer all of or some of the questions, you do have the right to do so. However your willingness to answer all of the questions would be appreciated.

Would you participate in responding to the questions in this questionnaire?

Yes No

Name of interviewer: _____ signature _____

Name of the supervisor _____ signature _____

Instruction: The respondents must be mother herself or close relatives if she will be unable to communicate and from her documentation card.

Please encircle the letter corresponding to the correct response or write the response of the respondent on the space provided.

Identification

1. Questionnaire I.D: _____

2. Card No _____

3. Date of checking _____

Remark: 1. Complete 2. Incomplete

Part I: Socio-demographic Information			
No.	Questions	Response	code
Q101	Stated age in years	
Q102	Ethnicity	1.Oromo 2.Amhara 3.Others	
Q103	Religion	1.Orthodox 2.Protestant 3.Muslim 4.other	
Q104	Residence	1.Urban 2.Rural	
Q105	Marital status	1.Married 2.Unmarried 3.Widowed/Divorced 4.Not stated	
Q106	Occupation	1.House wife 2.Employee 3.Student 4.Other	
Q107	Educational status	1.Illiterate 2.Write and read 3. Completed primary school (1-8) 4. High school (9-12) 5. Higher level education	
Part II: Obstetric characteristics			
Q201	Gravidity	1.Once 2.Two or .more 3.more than five	
Q202	Parity	1.Once 2.Two or more	

		3.more than five	
Q203	GA of pregnancy at delivery of the index	1. Known 2. Estimated	
Q204	If known for Q203 her GA in weeks	
Q205	If estimated for Q203 her GA by fundal height/US	
Q206	Where did you have ANC follow-up during the index pregnancy?	1.Health post 2.Health centre 3.Hospital 4.Private Clinic 5.Mixed 6.No ANC	
Q207	If yes for Q206, how many times?	1.<4x 2.>4x	
Q208	Is there any medical illness pre-existing or newly developed in the index pregnancy?	1. Medical illness Pre-existing /prior to the index pregnancy 2. Medical illness diagnosed during the index pregnancy 3. Can't specify..... 4. No Medical illness	
Q209	Is there any index pregnancy related obstetric complications?	1.No 2.Yes	
Q210	Hypertensive disorder related obstetric complications in the index pregnancy	1.Gestation HTN 2.Severe preeclampsia/Eclampsia 3.HELLP syndrome 4.chronic HTN/Super imposed PE 5. Mild preeclampsia 6. No HTN d/order	
Q211	Haemorrhage related obstetric complications in the index pregnancy	1. APH (PP, AP, vasa previa,...) 2. PPH (Atonic, Traumatic, RP, Coagulopathy) 3 .Other causes; _____ 4 .No Haemorrhage	
Q212	Maternal hemoglobin	1.>11gm/dl 2.<11gm/dl	

Q213	Pregnancy related Severe systemic infection complications	1.Chorioamnioties 2.HIV 3.Malaria 4.STIS 5.others 6..None	
Q214	Labour related disorder complications?	1.Obstructed labour without uterine rupture 2.Obstructed labour with uterine rupture 3.Inverted uterus 4.CPD 5.Others _____ 6.None	
Q215	Other pregnancy related obstetric complications?	1.Umbilical cord accidents 2.Preterm labor 3.Amniotic fluid Disorder 4.Rh-Isomerization 5. Other 6.None	
Q216	If malpresentation during labor is it?	1.Breech 2.Brow 3.Face 4.Compound 5.Shoulder 6.No Malpresentations	
Q217	If PROM during labor is it?	1.Term 2.Preterm 3.No Prom	
Q218	Number of gestation	1.single tone 2.Twin 3.Triplet	
Q219	Any previous history of fetal/early neonatal loss?	1.No 2.Yes	
Q220	Mode of Onset of labor	1.Induced 2.Spontaneous	
Q221	Duration of labor in hours	
Q222	Final Mode of delivery, Underline that applies	1. Spontaneous Vaginal Delivery (SVD) 2. Vacuum assisted Vaginal Delivery	

		3. Forceps assisted Vaginal Delivery 4. Emergency C /S 5. Elective (planned C/S) 6. Laparotomy for Ux Rupture 7. Destructive vaginal delivery	
Part III: Fetal/ Neonatal conditions			
Q301	Any Lethal congenital anomaly?	1.No 2.Yes	
Q302	Fifth minute APGAR score	
Q303	Presence of MSAF	1.NO 2.Yes	
Q304	Birth weight in gram	
Q305	sex of new born	1.male 2.Female	
Q306	Perinatal asphexia	1.No 2.Yes	
Q307	Any birth trauma	1.No 2.Yes	
Q308	Infections/sepsis	1.No 2.Yes	
Q309	Status of the newborn at birth	1. Dead (SB) 2. Alive (END)	
Q310	For still birth how was the dead body	1. macerated 2. fresh	
Q311	For early neonatal death when occurred	1. <24 hr 2. 24 hr-6 day	

DECLARATION

I, the undersigned, declared that this thesis is my original work, has not been presented for a degree in this or any other university and that all sources of materials used for the thesis have been fully acknowledged.

Declared by, candidate

Name: Gbreslasie Abraha

Signature: _____

Name of the institution: _____

Date of submission: _____

This thesis has been declared for final submission with my approval internal examiner and University advisor

Name of internal examiner: -----

Signature: ----- Date: -----

Confirmed by, advisers

Name and Signature of the first advisor: - Dr. Dejene Asefa

Signature: _____ Date: _____

Name and Signature of the second advisor:-Mr. Demeke Kifle

Signature: _____ Date: _____