Perinatal Mortality Magnitude, Determinants and Causes in West Gojam: Population-Based Nested Case-Control Study

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This is to certify that the thesis prepared by Robel Yirgu,entitled: *Perinatal Mortality Magnitude and Determinants in West Gojam: Population Based Nested Case Control Study* and submitted in partial fulfillment of the requirements for the Degree of Masters in Public Health complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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Abstract

Introduction: The millennium development goal was set to achieve a reduction of child mortality by two thirds by the end of 2015. In Ethiopia even if a significant reduction in mortality was seen among the post neonatal age children yet the death of newborns in the perinatal age category is still high. This study estimated the perinatal mortality rate and identified its determinant factors and causes of death in West Gojam zone,Amhara region.

Methods and materials: Out of the 4158 pregnant mothers who were followed in the cohort of this nested case control study, 73 cases and 146 controls were identified and interviewed in three districts of the West Gojam zone, from Feb 2011 to Mar 2012. Wealth index was used to estimate the wealth difference among the studied families. Factors such as birth spacing, history of abortion and history of perinatal mortality were included in a multiple binary logistic regression model to identify risk factors. Physician review method was used to identify the causes of death from the verbal autopsy data.

Result: The perinatal mortality rate was 27.04 per 1000 live and stillbirths (95%CI, 15.1, 38.9). Perinatal mortality was significantly associated with household wealth and family size, those with 2-5 and greater than three family members had a lesser risk for perinatal mortality as compared to those with a family size of only two (AOR=0.04,95%CI 0.01- 0.38) and (AOR=0.03,95%CI 0.01-0.27) respectively. Primiparous mothers indicated a greater risk for perinatal mortality as compared to those who gave birth to five or more children (AOR=7.89,95%CI 1.46-42.77). In addition women with a previous history of perinatal death and abortion showed a higher risk for perinatal mortality than those who had no history of perinatal mortality or abortion (AOR=14.29,95%CI 5.28 , 38.67) and (AOR= 0.24,95%CI 0.1,0.58) respectively. Preterm newborns were more at risk (AOR=17.49,95%CI 1.51, 202.78) than the term babies. Twins were also at higher risk for perinatal mortality than the singletons (AOR= 5.09,95%CI 1.21,21.4). Home delivery was found to protect against perinatal death (AOR=0.05 95%CI 0.01, 0.26) in comparison to the births that took place in health facilities.

Conclusion: Findings of this study indicated a high perinatal mortality rate and the increased risk that was associated with selected socio-economic and health service related factors some of which are amenable to change.

This study is dedicated to my father, Mr.Yirgu Belachew, who invested his time and withdome in my education and made an everlasting difference in my life.

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Abbreviations

AIDS	Acquired Immuno Deficiency Syndrome
ANC	Anti Natal Care
CDC	Center for Disease Control
DHS	Demographic and Health Survey
ENM	Early Neonatal Mortality
HEW	Health Extension Worker
HIV	Human Immunodeficiency Virus
ICD	International Statistical Classification of Diseases and Related Health Problems
MaNHEP	Maternal and Neonatal Health Ethiopia partnership
NGO	Non-Governmental Organization
PI	Principal Investigator
PNC	Postnatal Care
PM	Perinatal Mortality
QIT	Quality Improvement Team
TBA	Traditional Birth Attendant
VA	Verbal Autopsy
VDRL	Venereal Disease Research Laboratory
WHO	World Health Organization

1. Introduction

1.1. Background

Pregnancy complications, maternal and new born death or stillbirth, ages as old as the history of mankind and has been shadowing the joy of bearing children for many parents. Through the centuries the development of knowledge and technological advancements brought about a significant improvement in quality and coverage of health care services (1). These advancements resulted in a gradual decline in the occurrence of pregnancy related maternal and newborn health complications (1). Yet, unacceptably high number of such complications and deaths still exist in different parts of the world (2).

Years of experience showed that it is occasionally difficult to distinguish stillborn infants from the live born infants who die right after birth (3). Especially those who were born to mothers with labour complications that may lead to preterm birth, fetal distress, asphyxia or neurological depression (3). To overcome this challenge the world health organization (WHO) placed late fetal and early neonatal deaths in one category and labeled it perinatal mortality (3). Thus according to standard definitions, the perinatal period commences at the 22 completed weeks of gestation and ends seven completed days after birth (4). But various jurisdictions of different countries define late fetal death (stillbirth) differently (5). In most developing countries, including Ethiopia, and in some developed nations, late fetal death is considered when it occurs during and after the 28^{th} gestational week (5). So, death of a fetus or a newborn that takes place during the perinatal period is termed as perinatal mortality.

It was estimated that from the global under five mortality 38% of deaths occurr during the neonatal period, among which 75% of it take place during the first week of the postnatal period (2). And from the 6.3 million perinatal deaths that were estimated to occurr annually 98% occurr in the developing countries (1). The 3.3 million stillbirths and 3 million early neonatal deaths contributed for the total 6.3million perinatal mortalities (1, 2). Since perinatal mortality is a sensitive indicator of obstetric care quality and the level of socioeconomic development of a country (6), the developing nations with a staggering health care quality and access contribute to nearly all the perinatal deaths of the world. This figure is assumed to be even higher due to the existing considerable underreporting of deaths because of poor

reporting and absence of vital event registration systems in most of the developing countries (7). The sub Saharan Africa countries take the lead as far as perinatal mortality rate is concerned, followed by the south central and south East Asian countries(1). But progressive decline in magnitude is seen in case of most countries in these Regions (1).

Ethiopia, like the many sub-Saharan Africa countries is suffering from a high stillbirth and early neonatal mortality rates. According to the 2011 Ethiopian National Demographic and Health Survey report (EDHS), the national average perinatal mortality rate was 46 per 1000 births with a considerable variation among different regions in the country (8). The difference ranges from 20 per thousand in Afar region to 58 per thousand in Benishangul-Gumuz, which has the highest of all the rates in the nine regions (8). The Amhara regional state, where this study was conducted,is reported to have a perinatal mortality rate of 55 per thousand which was the second to the highest perinatal mortality rates of all the regions (8). The DHS also concluded that these figures might possibly be under estimated, since in most cultures people are uncomfortable to report the death of newborns and stillbirths.

Most contributing factors for perinatal mortality are health care service related. Studies showed that suboptimal antenatal, intrapartal and postnatal health care services are strongly associated with adverse pregnancy outcomes (9). Age of the mother at pregnancy, maternal education and wealth are some of the socioeconomic and demographic factors that are often seen to increase the likelihood of perinatal mortality when they are lesser in their respective magnitudes (10). Maternal health condition is the other factor that is usually associated with perinatal mortality. For instance, mothers with a positive VDRL (Venereal Disease Research Laboratory) during ANC (Anti Natal Care) have a significantly increased risk of losing their newborns for perinatal death (11).

Congenital malformations, preterm birth, intra uterine growth restriction (IUGR) are the leading causes of perinatal mortality in areas where one can access quality health care service (12). But in places where high perinatal mortalities and poorly accessible health care service exists, the leading causes are asphyxia, neonatal tetanus, and neonatal infections (7, 13).

1.2. Rationale of the study

Ethiopia is still struggling with the unacceptably high number of perinatal deaths in all the regions in the country (8). The WHO Country, Regional and Global estimates of perinatal mortality indicated that Ethiopia is among countries of the world with a leading perinatal mortality rate (1). Yet, the lack of evidence on the distribution and determinants of perinatal mortality appears to be a key bottle-neck against the endeavor to reduce the death of newborns in Ethiopia. There are only very few studies on perinatal mortality in the country, despite the desirable rapid intervention to reduce the high number of deaths in the age category. In addition, the existing variation in magnitude, distribution and determinants of perinatal mortality in varying localities in the country, magnifies the lack of scientific evidence on the subject.

There is an absence of vital event registration system in the country,data on perinatal mortality comes from different health facilities. Unfortunately data from reports of health facilities often misrepresent the reality at a population level as far as their source of data are subjects that visit health facilities only. And the existing few studies on perinatal mortality in the Nation were health facility based studies either on a data from records or on mothers who came seeking for health care service from hospitals or health centers. The only nation wide population-based study that currently serves as source of reliable evidence concerning perinatal mortality is the EDHS. However, the EDHS didn't not report the determinant factors for perinatal mortality except for the distribution with regard to different socio demographic variables. Furthermore, the EDHS results do not indicate the distribution at lower administrative units including districts.

The Millennium development goal is set to cut child mortality by two thirds by the end of the coming three years. The country has traveled towards this goal for the past 12 years, through these years an achievement in reducing child mortality is seen. But the reduction in the burden of child mortality was mainly a reflection of the significant reduction in the post neonatal child mortalities (8,14). Therefore, interventions that focus on perinatal age category are believed to be worthwhile to bring about a significant change in child mortality. This is because magnitude of the deaths in the neonatal age category is dominated by the early

neonatal deaths (2). But despite the desire to bring more interventions to newborns of this age category, evidence from progrms that support clinical and community-based interventions that are tuned to local contexts are very scarce.

So this community-based nested case control (NCC) study is intended to narrow the existing knowledge gap regarding the magnitude and distribution of perinatal mortality at a zonal and district level in the region that has the second highest perinatal mortality rate of all the other regions of Ethiopia (8). Furthermore, major determinants of perinatal mortality with their respective strength of effect were studied. The community based NCC study we used in this study better measures the strength of association between the independent and outcome variables with a better certainty than the often used cross-sectional studies.

2. Literature Review

2.1. Definition

Years of experience showed that it is occasionally difficult to distinguish stillborn infants from the live born infants who die right after birth. Specially, if the labour is complicated due to preterm birth, fetal distress, asphyxia or neurological depression the challenge worsens (3). Parts of the world where institutional delivery is low and most labours being attended by traditional birth attendants or family members with no formal medical training are to be affected the most during newborn death notification (3). In addition further epidemiological studies also revealed a high mortality rate both in the late fetal and early neonatal periods as compared to the remaining age category of newborns(5). And not only distribution of the deaths but also determinants of mortality in the late fetal and early neonatal periods are frequently similar (2). So these arguments gave birth to the concept of the perinatal period and perinatal mortality around the 1940s and 1950s (5). According to the World Health Organization International statistical classification of diseases and related health problems (ICD-10) the perinatal period commences at 22 completed weeks (154 days of gestation) a time when the gestational weight is estimated to be 500gm,and ends at the seventh completed day after birth(4). When gestational age of the fetus is not known and weight not taken fetal length could be measured to estimate the fetal gestational age where the crown to heel length is expected to be 25 cms at the gestational age of 22 weeks (4). And the WHO defines Live birth as a complete expulsion or extraction of a product of conception from its mother, irrespective of the duration of pregnancy, which, after such separation breaths or shows any other evidence of life such as, beating of the heart, pulsation of the umbilical cord, or definite movement of the voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is called live birth (4).

A stillbirth or fetal death is referred to as a death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles (1).

Therefore, perinatal mortality is death of a child in the perinatal period and it is defined as the death of a fetus after the 22 week of gestation and a neonate before celebrating the first postnatal week (4).

These are WHO standard case definitions are to be followed by every nation, since it gives a common ground to compare health status of the people in different countries and also to direct health care interventions. But there exists a difference in defining the perinatal period and perinatal mortality in different countries. Jurisdictions of different countries define late fetal death in different ways. In most developed nations the occurrence of fetal death in general and late fetal death in particular has significantly declined due to the changing patterns in reproductive health, socioeconomic development and the quality of obstetric and neonatal health care facilities(1). So in most developed nations where late fetal death cases are fewer and very young newborns have a better chance of survival, 22 weeks of gestation is often taken as the age of viability (15). But most developing nations, including Ethiopia that have a high number of stillbirth cases have a jurisdiction to categorize deaths as a late fetal death when the death in utero occurs after the 28th week of gestation(10,16,14). African and south East and south central Asian countries are good examples to support this fact. Yet it doesn't mean that all the developed nations use the 22 weeks of gestation as a cutoff point to define late fetal death. For instance, Sweden that has one of the least perinatal mortality magnitudes of our world consider the deaths after the 28^{th} gestational week as cases of late fetal death (5).

2.2. Magnitude of the problem

2.2.1. The global situation

In the year 2000 it was estimated that worldwide 6.3 million perinatal deaths occurred annually of which 98% took place in the developing countries (1). From the total 6.3 million deaths more than 3.3 million were stillbirths and the 3 million were early neonatal deaths (1,2). The mentioned number of deaths were calculated to give rise to the 47 per 1000 global estimate of perinatal mortality rate with stillbirth and early neonatal mortality rates to be 24 and 23 per thousand respectively(1). Perinatal mortality is an important indicator of obstetric care quality and the level of socioeconomic development as far as most of the determinant factors for the incidents are obstetric care related (6). So, it is rational to see the developing

nations contributing to nearly all the perinatal deaths of the world. In the developing countries, the risk of death in the neonatal period is six times greater than the developed and in the least developed countries it is over eight times higher(1). The magnitude of perinatal deaths in the developing nations is assumed to be even higher than this since there exists a considerable underreporting of deaths due to poor reporting systems and absence of vital event registration systems (7). In addition more than half of all the childbirths take place at home having a meager chance of being reported to the authorities due to the absence of reporting systems. Plus, there is lack of knowledge about the need of reporting newborn deaths and cultural factors that consider discussing stillbirths or neonatal deaths as a taboo, so most of the deaths that take place at home stay unreported (2).

2.2.2. The situation in the developed nations

The WHO Country, Regional and Global Estimates of neonatal and perinatal mortality indicated that the developed countries are entertaining the lowest perinatal mortality rates with an average of 10 per 1000 births, excluding Australia/New Zealand and Japan from this estimate (1). As the European Union Vital statistics report indicates Australia has a perinatal mortality rate of 5.9 deaths per 1000 births (17). The United States of America has a lesser burden of perinatal deaths than the global average mortality rate and it is even showing a promising decline over the years. In 1952, when 99 percent of deliveries took place in hospitals, a study conducted in all the Hospitals of the New York City came up with a perinatal mortality rate of 29.7 per 1000 births (18). Five decades letter in 2003 the National Vital Statistics Report revealed a 6.74 rate with a due variation in magnitude among the states (15).

The European countries are also voicing similar success stories in reducing the perinatal mortality rates over a number of years and reaching at a fairly low perinatal mortality rates in the current days. The United Kingdom center for maternal and child enquiries 2009 report indicated a downward trend in perinatal mortality rates in the UK from 8.3 per 1000 in 2000 to 7.6 per 1000 births in 2009(12). This decline was reported to be the effect of the reduction of both stillbirth rate and early neonatal mortality rates. Since stillbirth rate was reduced from 5.4 to 5.2 per 1000 total births and early neonatal mortality from 2.9 to 2.5 per thousand live

births (12). In 2009 the average adjusted perinatal mortality rate for the Nations in the United kingdom (UK) was only 6.8 per 1000 live births and the adjustment was made by removing pregnancy terminations and the death of babies born at less than 22 weeks of gestation(12). But in this estimate there existed an upward and downward variation in perinatal mortality rates among the UK nations, the lowest rate was observed in the crown dependencies with 6.3 and the highest in the northern Ireland with 7.5 per 1000 births(12).

The Scandinavian Countries are also known for their low perinatal mortality rates. According to a comparability study on published perinatal mortality rates in Western Europe, Norway, Sweden and Denmark showed a perinatal mortality rate of 7.5, 5.4 and 7.4 per 1000 births respectively the late fetal death was taken from the 28^{th} week of gestation in the case of all the three countries (5).

2.2.3. The situation in the developing nations

In the year 2000 nearly 4 million neonatal deaths took place globally, 99% of these deaths appeared in the low and middle income countries while only 1% of the deaths were registered in 39 high income countries (2). Two-thirds of the world's neonatal deaths took place in the African and South East Asian regions of the WHO (World Health Organization) (2). Even if the Asian countries had the highest deaths in absolute numbers however the countries of the Sub-Saharan Africa had the highest rates of perinatal mortality (2). In general, the highest neonatal mortality rates and rates of stillbirth occur in sub-Saharan Africa, followed by Asia (7). Neonatal mortality can serve as a proxy indicator to identify the distribution of perinatal mortality as far as 75% of neonatal deaths are early neonatal deaths (2). According to WHO Country, Regional and Global estimates of 2004, The south central and western Asia had the highest rates of neonatal and early neonatal deaths, with 61 and 39 deaths per 1000 births respectively followed by the Eastern and South Eastern Asia that had an equal 30 per 1000 perinatal mortality rates (19).

A population based prospective cohort study on the determinants of perinatal mortality in west Africa involving pregnant women in the urban, areas of Burkina Faso, Ivory Coast, Mali, Mauritania, Niger and Senegal indicated a rate of 42 per 1000 births (20). This high rate also nearly represents the circumstances in the Eastern and Central Africa. A study in North

Eastern Tanzania indicated a 41.1 per thousand births of perinatal mortality rate (21). A study conducted on a data from the 2003 KDHS (Kenyan Demographic and health survey) calculated a perinatal mortality rate of 37.5 per 1000 births in Kenya (22). And in South Africa a Perinatal Problem Identification programme (PPIP) database showed a 36.4 perinatal mortality rate (23). Northern Africa countries, that have a better economic condition than the sub-Saharan Affrica countries, have a much lower perinatal mortality rates. The WHO Country Regional and global estimate of neonatal and perinatal mortality indicated that the northern Africa countries have an average perinatal mortality rate of 31 per 1000 births (19). A prospective study that was conducted on 16,563 mothers in Libiya Bengazi hospital indicated a perinatal mortality rate of 27.5 per 1000 births. In spite of a rapid reduction in under five and fetal mortality in most low and middle income countries, perinatal mortality is showing no significant decrease over many years (2).

2.2.4. The situation in Ethiopia

Ethiopia also has a high record of perinatal deaths like the other sub-Saharan Africa countries. According to the 2011Ethiopian National Demographic and Health Survey Report the national average perinatal mortality rate was 46 per 1000 live and stillbirths with a considerable variation among different regions, 20 per thousand which is the smallest rate was observed in the Afar region and 58 per thousand in Benishangul Gumuz region, which is the highest of all the rates in the regions (8). The capital city Addis Ababa had 30 and the Dire Dawa city administration had 39 deaths per thousand births (8). In the survey it was admitted that the figure might possibly be under estimated since in most cultures people are uncomfortable to talk about their late newborns and stillbirths. Studies conducted at hospitals showed a higher number of perinatal deaths. A retrospective review of perinatal deaths that was done from 1990-1999 at Jimma teaching hospital revealed a perinatal mortality rate of 138.9 per thousand live births. And a retrospective study done on a one-year record of only stillbirths in Tikur Anbesa hospital also revealed a stillbirth rate of 53.3/1000 births (24). And the rate seems to follow a declining trend. The 2000 DHS reported a perinatal mortality rate of 57 per thousand births after five years, and the 2005 DHS report showed a National average perinatal mortality rate of 37 per thousand births (14,25). In DHS 2011 report the nation has an average perinatal mortality estimate of 46 per thousand births (8).

2.3. Determinants of perinatal mortality

Even if biological death is an inevitable natural phenomenon there are numerous socioeconomic, socio demographic and health behavior related factors that influence the likelihood of the occurrence of diseases and conditions which lead to death eventually. The usual determinant factors that showed a strong association with perinatal mortality in most studies, regardless of the study area, are those variables that are related with maternal and child healthcare services. A study conducted in Sweden on immigrants regarding the effect of suboptimal perinatal care on perinatal outcomes indicated that a mother with a suboptimal antenatal care is 6.2 times more prone for the development of adverse perinatal outcomes as compared to those with the optimal care (9). Suboptimal intrapartum and early postnatal care also showed 13 and 18 times more risk respectively as compared to the mothers who got the optimal care (9). The lancet child survival series also strongly argues that interventions that are intended to reduce neonatal deaths belong in two health system programs which are maternal health care during; pregnancy, child birth, and early neonatal care and child health programs (1). A community based prospective study in Eastern Uganda indicated that mothers who gave birth at home had 3 times more risk of perinatal death as compared to those who gave birth at heath facilities (10). Indicating the risk of low intrapartum care that is associated with home birth and its adverse pregnancy outcome.

Some of the socio demographic factors that usually had an association with perinatal outcomes in most studies were age, educational status of the mother and family income. Two times higher risk of having adverse perinatal outcomes is observed among mothers with the age of less than 20 years in comparison to those in the age range of 20 to 30 years (10). Mothers with no education showed a 2.67 times more risk of losing their newborns as compared to the mothers with secondary and higher education (21). In a study that was conducted in zimbabwe mothers with no education or primary education showed five times more risk of losing their newborns for perinatal death (16). Wealthier families or those families with a better income had a better chance of protecting their newborns from perinatal death.

Taking mothers from families with middle socioeconomic status as a reference, mothers with high socioeconomic status have a lower risk of losing their child for a perinatal death (26). Newborns that were born in the poorest families were three times more likely to die as compared to those in the richest category (29).

Obstetric and newborn related factors are the other categories of determinants that determine perinatal outcome. Mothers with previous history of stillbirth and early neonatal death had an increased chance of having those incidents again (11,24). Maternal history of abortion showed a significant association with perinatal mortality, mothers with a history of abortion were at a higher risk of losing their last pregnany to perinatal death as compared to mothers who had no history of perinatal mortality (16,29). But a study done in northern rural Tnazania didn't show a significant association between history of abortion and perinatal mortality (11). Multiple pregnancy is also known to be significantly associated with perinatal mortality increasing the risk in comparison to the singletons (16). The gestational age of the fetus also affects the fetal outcome and stay of the newborn in the first early days after birth. Term babies had an increased chance of surviving the perinatal period than the preterm babies (28). Pregnancy complications were also strongly associated with perinatal mortality in a number of studies. In a case control study that was conducted in Zimbabwe mothers with pregnancy complications had 7.04 chance of having a baby with a stillbirth or early neonatal death (16). Birth order of the newborn also affected the chance of survival, for the 6^{th} child the chance of dying during the perinatal period is 1.7 times more than those below (11). Birth weight is the other factor that affected the chance of survival of newborns, particularly newborns with a birth weight of <2500 gm had a strong chance of failure to survive the perinatal period (29).

2.4. Causes of perinatal mortality

Preterm birth, congenital malformations and IUGR are the frequently mentioned causes of stillbirth and early neonatal deaths particularly in the developed nations (30). A study on perinatal mortality in the United Kingdom indicated that the causes of death for 20.3% of neonatal death incidents were major congenital malformations and 5.5% of them were due to IUGR (12). In a similar study 8% of the stillbirths were due to congenital malformations and

7.5% due to IUGR. Another study that involved Europeans, Pakistanis and Indians showed that 26% of the perinatal deaths were due to congenital malformations and 25% were caused by preterm birth (13). Asphyxia related complications covered 18% as a cause of perinatal mortality (13). In areas where neonatal mortality is higher, the contributions of asphyxia, tetanus, and infections to the occurrence of adverse perinatal outcome is higher (7). Maternal health condition is the other factor that is strongly associated with perinatal mortality in an article on perinatal mortality in the northern Tanzania, mothers with appositive VDRL test result have a 5 times increased chance of losing their newborns for perinatal mortality (11).

3. Objectives

3.1. General objective

To determine the magnitude, determinants and causes of perinatal mortality among a cohort of pregnant women in three districts of the West Gojam Zone.

3.2. Specific objectives

To determine the perinatal mortality rate among pregnant women in West Gojam.

To identify the socioeconomic, biologic and service related determinants of perinatal mortality.

To identify individual causes of mortality for the deaths that took place in the perinatal period.

4. Methods and Materials

4.1. Study area

The study was conducted in West Gojam zone which is one of the 11 zones of the Amhara regional state. It is situated 500 kms away from Addis Ababa towards north. The zone has 14 districts containing 395 kebeles (lowest administrative unit) in which 362 are rural kebeles and 33 are urban (31). It covers a total area of 13912 sq.kms (32). It is one of the highly populous zones in the region with a total population count of 2,107,723 (31). From the total count 50.2% were males whereas 49.2% were females. And 8.7% of the population is urban dwellers whereas the remaining 91.3% live in the rural areas of the zone.

The study was conducted in three districts of West Gojam Zone namely Mecha, South Achefer and North Achefer districts. The three districts are further subdivided into 85 kebeles where 44 are found in Mecha 20 in South Achefer and 21 in North Achefer (31). From the total 85 kebeles of the three districts 24 were involved in the study where 10 were from Mecha,7 from North Achefer and another 7 from south Achefer and all the selected kebeles were rural. The selected kebeles for the study are kebeles that are close either to the main road or to the kebele where the district administration offices are situated (33). The three districts have two health centers each and Bahir Dar Hospital serves as a referral hospital for the three districts (31). Seventy two health posts are found in the districts in which 30 are found in Mecha, 18 in S.Achefer and 24 in N.Achefer districts. All the 24 kebeles that were involved in the study have health posts (32).

The three districts are among the highly populous districts of the zone with a total population count of 292,250 in Mecha, 155,863 and 173,211 in South and North Achefer districts respectively (31). The sex distribution of the population in the districts is 50.5% males and 49.5% females who live in Mecha district. The South Achefer district has a total of 50.6% males and 49.4%females. And 51.2% males and 48.8% females constitute the population of the North Achefer District (31). The residential distribution of the people indicates that 22,676 people live in the urban kebeles of the Mecha district and the remaining 269,574 live in the rural. South Achefer District has 15,621 urban and 140,242 rural population. And the North Achefer District has 11,732 urban and 161,479 rural populations.

4.2. Study setting

This NCC study was conducted on a cohort of pregnant mothers that was established by Maternal and Newborn Health in Ethiopia Partnership (MaNHEP) project. The Maternal and Newborn Health in Ethiopia Partnership (MaNHEP), based at Emory University's Nell Hodgson Woodruff School of Nursing, is a two-and-a-half year learning project (34). Goal of the project was to demonstrate a community-oriented model for improving maternal and neonatal health (MNH) care in rural Ethiopia through the delivery of MNH services (34). The project was determined to address three major interdependent objectives where the first one was enhancing the demand for focused and evidence based maternal and neonatal health care (33). The second objective was providing focused and evidence based maternal and neonatal health care (33). And the last objective was developing the ability of frontline health workers and the community to continuously improve the process of maternal and neonatal health care service (33).

The cohort was first established in mid 2010 in the 24 intervention kebeles. It was an open cohort where pregnant mothers that reach the 28th gestational week are identified and recruited in to it by local volunteers. Pregnant mothers are identified by asking about their pregnancy status and by looking for socially recognizable behaviors of a pregnant woman. Then a mother stays in the cohort and receives antenatal care (ANC) service and repeated training by the volunteers till she gives birth. Following the delivery she only stays in the cohort till she receives postnatal care (PNC) by Health Extension Workers (HEWs) then she leaves the cohort (33).

4.3. Study period

The study was conducted from March 2011 to Feb 2012.

4.4. Study design

A population-based nested case control study.

4.5. Study population

The source population

All pregnant women of age 15-49 years with a gestational age of 7 months and above who lived in Mecha, South Achefer and North Achefer districts of the West Gojam zone.

The study population

All women who lost their newborns to perinatal death and randomly selected women whose newborns are alive till the end of the seventh postnatal day.

Cases: Mothers who lost their newborns for perinatal death (i.e.from the 28^{th} gestational week to the end of the seventh post partum day.)

Controls: Mothers with newborns that at least survived the first seven postnatal days.

4.6. Sample size

All perinatal deaths that occurred during the study period were included but to check for the minimum sample that is needed to undergo statistical analysis the minimum sample size was calculated.

The sample size was calculated by Epi info version 3.5.1 statistical software using the two population proportion formula for unequal sample size.

$$n_1 = \frac{\left[Z_{\alpha/2}\sqrt{\bar{p}\bar{q}\,(1+1/\lambda)} + Z_{\beta}\sqrt{p_1q_1+p_2q_2/\lambda}\right]^2}{\Delta^2}$$

Where $n_2=n_1\lambda$, $\bar{p} = (p_1+\lambda p_2)/(1+\lambda)$

- Taking; 95% confidence level and 80% power.
- Birth interval of <24 months was taken as a key variable to estimate the sample size. According to the EDHS 2011 report the percentage of mothers who gave birth to a newborn with an interval of less than 24 months in nationally were 6.4%. And in our study the proportion of mothers who were exposed for a short birth spacing as a risk among the cases were assumed to be 15% and among the controls 3%.

  - Number of cases(n)=72
  - Number of controls(n)=144

To estimate the minimum sample size which is needed to calculate the preinatal mortality rate in the study area, single proportion formula was used.

$$N=\frac{(Z_{\alpha/2})^2 pq}{D^2}$$

- Taking- P=4.6, (EDHS 2011 report national perinatal mortality proportion.)
  - D= 5% (Margin of error)
  - 95% confidence level.
  - Required number of cases(n)= 67

A total of 73 cases were identified during the study period and due to its cost implication only two controls for one case were selected giving rise to 146 controls.

4.7. Sampling frame preparation

We prepared the sampling frame by including all pregnant mothers who were brought to the cohort from March 2011 to February 2012 by the guide team members of the project. It was prepared by gathering data concerning contact addresses and obstetric variables from MaNHEP registration books (master list) that were kept in the health posts of the 24 intervention kebeles for routine registration. Complete data to form the frame was obtained from the registration books for 2658 mothers. But there was no enough data in the master list concerning pregnancy outcome for 1500(36.1%) mothers. Twelve data collectors went door to door to find out the pregnancy outcome, for those mothers whose pregnancy outcome was not recorded in the master list, by using a data tracking format (Annex D). In the one year follow-up period 4158 mothers were captured in the frame including those who were interviewed at home. But at the end of the follow up period 1447(34.8%) mothers stayed pregnant and they were excluded from the sampling frame. Lost to follow up was reported for 11(0.26%) mothers. So, this left 2700(64.9%) mothers for the denominator and for the controls to be selected from.

Role of the PI in preparing the frame and the data collection process was organizing the data concerning the pregnancy outcome of the mothers from the routine records of MaNHEP that were kept in the 24 health posts of the intervention kebeles. Also collecting data, by using the data collectors, from cases of perinatal mortality after identifying them from the routine records. In addition the mothers who were pregnant were followed till they give birth and data was collected on the cases whenever it occurs.

4.8. Sampling procedure

Mecha, South Achefer and North Achefer districts were initially selected by MaNHEP due to their comparability with respect to health indicators, population density, accessibility of health services, presence of frontline workers, absence of other NGOs (Non Governmental Organizations) working on maternal and child health issues and overall representativeness of the region (34). From the 2700 mothers who gave birth during the follow up period 73 cases of perinatal death were identified where 37 were stillbirths and 36 were early neonatal deaths. After identifying the cases two controls for every case were randomly selected from the list of mothers in the respective smallest units of a kebele called “gotes” by using the sampling

frame (Fig.1.). For the random selection of controls from the list, systematic random sampling was used. The sampling interval"K" was calculated by dividing the total number of normal deliveries to the desired number of controls in a given "gote".

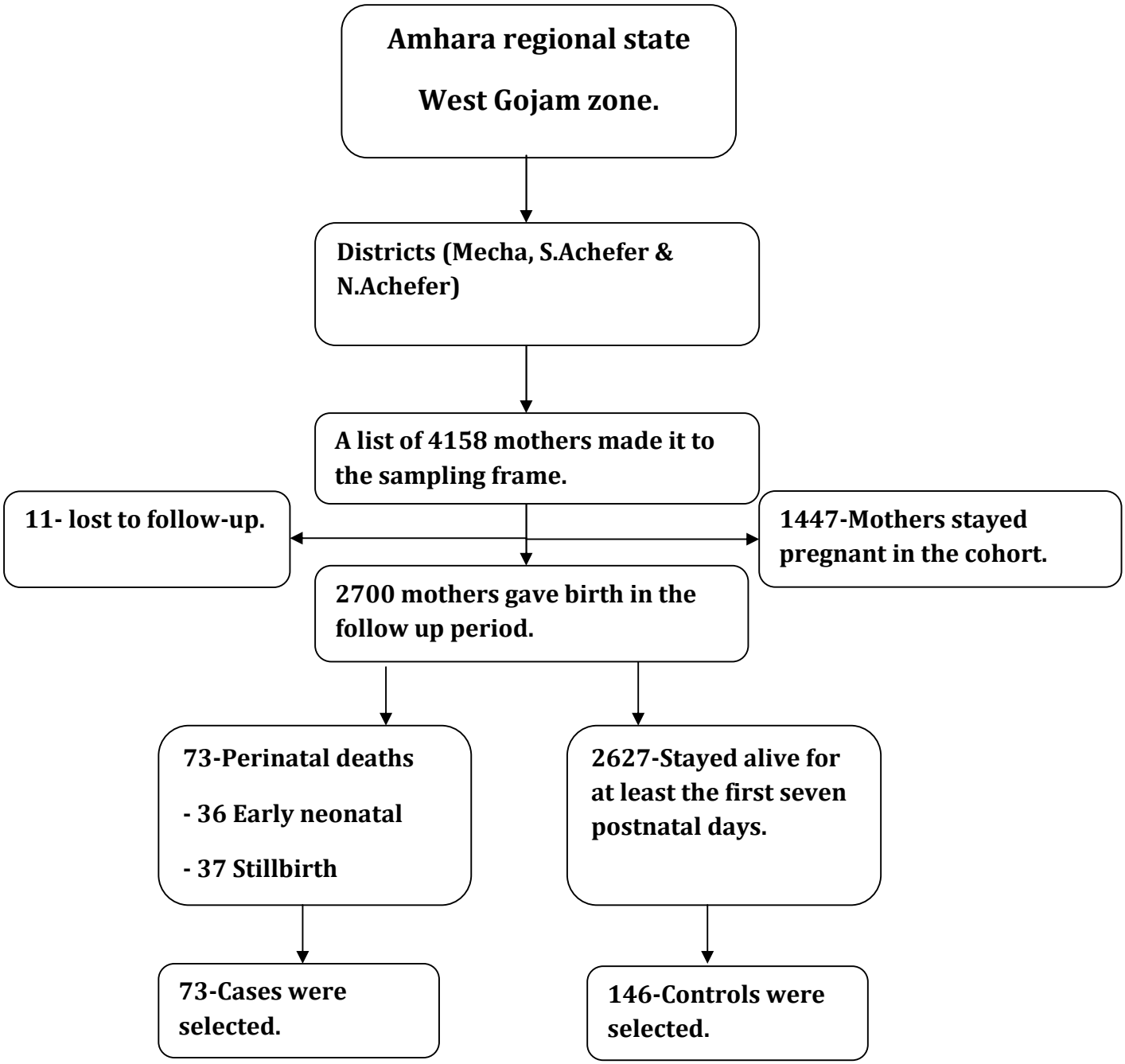

Fig.1. Algorithm showing the sample selection procedure.

4.9. Inclusion criteria

The inclusion criteria was maternal age of 15-49 years, willingness to be part of the study, having a gestational age of 28 weeks or more, intended to stay in the area for at least three months after being recruited in to the cohort and having no mental disorders.

4.10. Data collection tools

Data on determinant factors for perinatal mortality were collected using a pretested interview questionnaire which was translated to the local Amharic language from English. And the 2006 international standard WHO verbal autopsy questionnaire for neonatal mortality was also used to collect verbal autopsy data on the disease manifestations of the causes of early neonatal death and stillbirths. The questionnaire had 12 parts that mainly deal with; livelihoods and living conditions, maternal health and contextual factors and history of the last pregnancy. The standard verbal autopsy questionnaire covers from part six to twelve and it contains closed questions section with filter questions to identify specific symptoms and an open ended verbatim part that gives detailed account of the circumstances surrounding the time of death.

4.11. Study variables

1. Dependant variable
    - Perinatal mortality
2. Independent variables
    - *Socio-demographic and socio economic variables*: Age of the mother, marital status, educational status, occupation, family size, wealth index.
    - *Obstetric and newborn related variables:* Gestational age, birth spacing, place of delivery, parity, history of perinatal death, history of abortion.
3. Standard verbal autopsy questions on disease manifestations, accidents and history of treatment.

4.12. Data collection procedure

The initial step in the data collection process was preparing a sampling frame that provides a complete information on the maternal socio-demographic characteristics and the pregnancy outcome so that both the cases and the controls can be easily selected from it.

To prepare the sampling frame a data recording form was prepared and data on the mentioned socio demographic characteristics of the registered mothers was continuously collected from the MaNHEP master lists that were kept in the 24 health posts of the identified kebeles. But in cases where there was no enough information on the pregnancy outcome of a mother data was collected in the field by interviewing the mother. For this purpose twelve data collectors were hired and trained for half a day on the data tracking format. Then they went to every household to trace the identified mothers with an unknown pregnancy outcome and collect data on the socio-demographic variables and pregnancy outcomes.

After the source population was fully listed out, data on the identified cases was collected by using the interview questionnaire. Following end of the data collection on the cases, mothers who would be interviewed as a control were randomly selected from the respective gotes of the cases by using the sampling frame and data were collected from them too.

The data on cases and controls were collected by three female grade 10 complete data collectors who took five days training on the data collection tools and interview techniques.

Generally, the primary respondent in the interviews were mothers but in some cases the father, grandparents or close family members were interviewed, only when the mother failed to give the interview due to different reasons.

4.13. Data quality control

The data collectors had five days intensive training to enhance their interview techniques, familiarize them with the measurement tools and enable them understand the meaning and implication of every variable in the questionnaire.

The PI (Principal Investigator) himself supervised the whole data collection process closely and conducting the data cleaning in the field. The data collectors submitted the questionnaires to the PI in the field so that the data quality and completeness would be assessed soon and errors shall be corrected immediately. And only female data collectors were used to minimize the bias that may occur due to discomfort of the respondents to discuss reproductive health matters with a man.

The questionnaire was pretested to make further adjustments so that the tool would be reliable enough to make valid measurements. And the verbal autopsy questionnaire that was used in the study was a standard tool developed and pretested by the WHO.

Finally an effort was in place to clean the data in the field, before and after entry using Epi Data and SPSS statistical software.

4.14. Operational definition

Perinatal mortality: Death of a fetus after 28 completed weeks of gestation till birth and a new born from birth to the seventh postnatal day.

Stillbirth: Death of a fetus in the uterus after the 28 completed weeks of gestation.

Late fetal death: In utero death of a fetus after 28 completed weeks of gestation.

Early neonatal death: Death of a newborn within the first seven days after birth.

Traditional birth attendant (TBA): Volunteer members of the community who attend labour culturally but has no formal professional training as a midwife.

Health extension worker (HEW): Community health workers that are certified after 1 year training and reside in the community to provide primary health care services.

Housewife: women who mainly participate in the domestic activities with no outdoor income generating tasks including farming.

Master list: A registration book that was used to list identified mothers, who were added to the cohort, with respect to socio demographic characteristics and pregnancy outcome.

Verbal Autopsy: The process of interviewing family members or caregivers and taking data on the circumstances leading to death of the newborn.

Data tracking: The process of identifying, locating and interviewing mothers whose pregnancy outcome was not registered in the master list.

4.15. Data processing and analysis

Data cleaning

Data were entered using **EpiData** *version 3.1 statistical* software. First templates were prepared by using the program and the variables were coded automatically by the program using the first ten letters of each variable along with the roll numbers.

Data cleaning took place in the field and both before and after data entry. When data entry templates were prepared the template was designed in a way that limits magnitude of the values which would be entered in to fields of the template by assigning legal values. And skipping patterns for all eligible filter variables was in place to avoid the possibility of entering a value erroneously. And the dependent variable and major independent variables were held as a must to enter variables, not to allow the chance of skipping them during entry.

Data cleaning after data entry was conducted by exporting the data to SPSS version 16 statistical software and checking the data for outliers by sorting it in an ascending and descending order and also by cross tabulating the data. After data entry and cleaning was over, the data was exported to the **SPSS** *version 16* statistical software for analysis.

Univariate analysis: was done on the socio-demographic and socio-economic variables, on maternal health and contextual factors and also on variables related to pregnancy by calculating for the frequency and proportion of the variables under the mentioned categories.

Perinatal mortality, early neonatal mortality and stillbirth rates were calculated. Perinatal mortality rate was calculated per thousand live and still births. And early neonatal mortality rate was calculated by taking all live births as a denominator. The denominator for the still birth rate was all births including live and stillbirths.

Bivariate analysis: was conducted to check the presence and measure the strength of an association between the dependent variable which is perinatal mortality and a list of independent variables in the category of socio-demographic variables, maternal health and contextual factors and pregnancy history related variables. Odds ratio with 95% confidence interval was used to measure the strength and direction of the association between the dependent and list of independent variables.

Multivariate analysis: was conducted to calculate for adjusted odds ratios by controlling for confounding variables using multiple binary logistic regression model with a 95% confidence interval. Two logistic regression models were developed for socio-economic and socio-demographic variables and for the pregnancy labour and delivery related markers and all the variables in these categories were taken in to the model.

Generating wealth index: A total of 15 dichotomous household asset variables were used to generate the wealth index, the variables were related to ownership of domestic animals, household appliances and furniture and housing condition. Principal component analysis was used to generate seven principal components and those components with an Eigenvalue greater than 1 were taken to generate the index since they best explain the variation in the asset ownership among the families. So, adding and ranking these components gave an asset index for every household, on the basis of which, households were divided into quintiles ranging from the poorest 20% to the richest 20%.

Verbal autopsy data review and coding: The verbal autopsy (VA) data was interpreted by, *physician review* method. Two physicians, a neonatologist and a pediatrician, who were assigned to review the cause of death, were introduced to the ICD-10(International Statistical Classification of Diseases and Related Health Problems) coding system and procedures of reaching at an agreement for two days. Further communication was also in place whenever difficulties arise in the process of reviewing the VA data. The structured questions and the verbatim account of every VA data were reviewed and causes of death were assigned separately for every case. Finally the causes of death were agreed upon after the two physicians sit together and discuss on their view concerning the causes for every case. In cases where there was a difference in diagnosis the physicians discussed on the different results and reached at an agreement to come up with a consensus probable diagnosis. Whenever there was a significant disagreement a third physician was ready to assign the final cause of death however, we did not have such an incident in this specific study. Finally the two physicians gave codes to the identified causes of death according to the ICD-10 coding system.

4.16. Ethical consideration

Ethical clearance was obtained from Addis Ababa University College of Health Sciences. Data were collected after an informed consent was obtained from every respondent. Privacy was maintained by isolating the respondents during the interview. And for the mothers who lost their newborns, data were collected after the culturally accepted grieving period of forty days was over. And name of the respondents were removed from the questionnaires and replaced with a code after the data was entered in to computerized data storage to keep it anonymous.

5. Results

5.1. Source population profile and perinatal mortality rate.

A total of 4158 pregnant mothers were registered, where 2700(64.9%) gave birth during the study period but 1458(35%) mothers were pregnant till the end of the study period and 11 (0.26%) mothers were lost to follow up. In this study 73 stillbirths and early neonatal deaths were identified, where 36 were early neonatal deaths while 37 were stillbirths. This count gave rise to a perinatal mortality rate of 26.9(95%CI 21.6, 32.2) per thousand live and still births. The stillbirth rate was 13.6 per 1000 births and early neonatal mortality rate was 13.5 per thousand live births (Table 1). From all the deliveries in the study period only 2.1% took place in health facilities the remaining gave birth at home. In the current study we included 146 randomly selected controls from the mothers who gave birth to live babies and whose newborns stayed alive for at least the first seven days. For the interview with the 73 cases and 146 controls we obtained a 100 percent response rate. From the overall respondents for the interview 74.4%were mothers of the baby. In cases where the mother was dead,or was away from home for days fathers and grand parents were interviewed covering 9.6%and 5%of the interviews respectively. The remaining interviews took place with siblings and other relatives of the baby.

Table – 1 Perinatal mortality rates for the one-year follow up time (Mar. 2011 to Feb. 2012) in West Gojam zone, Ethiopia, Feb 2012.

District	No of pregnancies (7+ months)	Still birth	Early neonatal	perinatal	[a]Still birth rate (95%CI)	[b]Early neonatal mortality rate(95%CI)	[c]Perinatal mortality rate (95%CI)
Mecha	1112	18(48.6%)	19(51.4%)	37(100%)	16(8.63, 23.4)	17.2(9.56,26.8)	33.3 (29.46, 37.14)
S.Achefer	940	7(50%)	7(50%)	14(100%)	7.4(1.92,12.9)	7.5(1.98, 13)	14.9 (0.2, 29.6)
N.Achefer	648	12(54.5%)	10(45.5%)	22(100%)	18.5(15.5,21.5)	15.7(6.13,25.3)	33.9 (6.9, 60.9)
Total	2700	37(50.7%)	36(49.3%)	73(100%)	13.7(9.25,17.9)	13.5(9.15,17.9)	27.04(15.1, 38.9)

[a]Stillbirth rate was calculated per 1000 births.
[b]Early neonatal mortality rate was calculated per 1000 live births.
[c]Perinatal mortality rate was calculated per 1000 live and stillbirths.

5.2. Socio economic and socio demographic characteristics of the family of the study subjects.

The mean age of the mothers that were interviewed for being cases was 29.3 while for the controls it was 29.1. The proportions of families with a size of two covered 5% of the total and those with six and above were 50.2%. From those families with a size of six and above 29.4% were among the cases while the remaining were among the controls. From the mothers in the case category 26% were in the lowest category of the wealth index, while 17.8% of the controls were in this category (Table 2).

Table -2 Socio-economic and socio-demographic variables of the families of the study subjects in West Gojam zone, Ethiopia, Feb 2012.

Variables	Cases(n=73) No (%)	Controls(n=146) No (%)
Age of the mother		
18-24	10(13.7)	16 (11)
25-29	23 (31.5)	60(41.1)
30-34	28 (38.4)	55 (37.7)
35-40	12 (16.4)	15 (10.3)
Mean age ± SD	29. 3 ± 4.3	29. 1 ± 3.8
Maternal education		
Illiterate	71 (97.3)	140 (95.9)
Primary education(1-6) and above	2 (3.7)	6 (4.1)
Paternal education		
Illiterate	67 (91.8)	136 (93.2)
Primary education(1-6) and above	6 (8.2)	10 (6.8)
Maternal occupation		
Farmer	25 (34.2)	54 (37)
House wife	48(65.8)	92 (63)
Family size		
2	10(13.9)	1 (0.7)
3-5	30(41.7)	68 (46.6)
6+	32(29.4)	77 (70.6)
Wealth quintiles		
Lowest	19 (26)	26 (17.8)
Second	14 (19.2)	29 (19.9)
Middle	6 (8.2)	38 (26)
Fourth	11 (15.1)	32 (21.9)
Highest	23 (31.5)	21 (14.4)

5.3. Housing condition of mothers of the newborns.

All the housing condition variables showed no significant difference in distribution between the families of the cases and the controls. From all the house holds 16.4% only had one living room and from these households 17.8% belong to the families of the cases and 15.8% to that of the controls. Five houses each for the case and control groups had no windows. Majority of the houses for the cases 65.8% had a separate place for cattle. Regarding the presence of a separate kitchen 50.7% of the houses in the control group had a separate kitchen and in the case group the proportion was 61.5% (Table 3).

Table-3 Housing condition of the families of the study subjects in West Gojam zone, Ethiopia, Feb 2012.

Variables	Cases(n=73) No (%)	Controls(n=146) No (%)
Number of rooms		
1	13 (17.8)	23 (15.8)
2	54 (74)	114 (78.1)
3	6 (8.2)	9 (6.2)
A separate place for cattle		
Yes	48 (65.8)	91 (62.3)
No	25 (34.2)	55 (37.7)
A separate kitchen		
Yes	45 (61.6)	74 (50.7)
No	28 (38.4)	72 (49.3)
Number of windows		
0	5 (6.8)	5 (3.4)
1	24(32.9)	69(47.3)
2	42(57.5)	67(45.9)
3	2 (2.7)	5 (3.4)
Roof material		
Iron sheet	66(90.4)	140(95.9)
Grass	7(9.6)	6(4.1)
Toilet facility		
Yes	50(68.5)	94(64.4)
No	23(31.5)	52(35.6)
Drinking water		
Tap water	26(35.6)	53(36.3)
Protected well/spring	15(20.5)	19(13)
River/lake/pond/unprotected Spring	32(43.8)	74(50.7)

5.4. Past pregnancy, labour and delivery related conditions of the newborns and their mothers.

Among the cases 23.3% adimitted a previous history of abortion while it was only 8.2% among the controls. From the mothers in the case category 43.8% reported a previous history of perinatal death but only 6.8% of the controls had a similar history (Table 4).

Table -4 Past pregnancy, labour and delivery related characteristics of the newborns and their mothers in West Gojam zone, Ethiopia, Feb 2012.

Variables	Cases(n=73) No (%)	Controls(n=146) No (%)
Number of deliveries (parity)		
One	12 (16.4)	11 (7.5)
2-4	25 (34.2)	64 (43.8)
≥5	36 (49.3)	71 (48.6)
History of abortion		
Yes	17 (23.3)	12 (8.2)
No	56 (76.7)	134 (91.8)
Number of abortion		
1	10 (58.8)	10 (76.9)
2	7 (41.2)	3 (23.1)
History of perinatal death		
Yes	32 (43.8)	10 (6.8)
No	41 (56.2)	136 (93.2)
Gestational age of the preceding pregnancy		
Term	69 (94.5)	145 (99.3)
Preterm	4 (5.5)	1 (0.7)

5.5. Pregnancy, labour and delivery related characteristics of the last pregnancy.

As compared to the control category most newborns with preterm delivery were found in the case group and only one preterm baby was found in the control category. Six mothers who were interviewed as controls admitted a sign of pregnancy related complications, whereas 15.1% of mothers in the case category had these manifestations. From the controls 97.3% of mothers gave birth at home but the proportion was only 78.1% in the cases; the remaining mothers in both categories gave birth in different health institutions. Among the mothers who lost their newborns 6 gave birth by caesarian section and 3 among the control mothers had this procedure (Table 5).

Table-5 Pregnancy, labour and delivery related characteristics of the last pregnancy in West Gojam zone, Ethiopia Feb 2012.

Variables	Cases(n=73) No (%)	Controls(n=146) No (%)
Sex of the new born		
Male	44 (60.3)	77 (52.7)
Female	29 (39.7)	69 (47. 3)
Gestational age at delivery		
Preterm	9 (12.3)	1 (0.7)
Term	64 (87.7)	145 (99.3)
Birth spacing		
<2years	1 (1.4)	2 (1.4)
2 years	4 (5.5)	17 (11.6)
>2years	66 (90.4)	121 (82.9)
Any sign of pregnancy complications		
Yes	11 (15.1)	6 (4.1)
No	62 (84.9)	140 (95.9)
TT immunization		
Yes	30 (41.1)	41 (28.1)
No	43 (58.9)	105 (71.9)
Dose of TT immunization		
1	5 (16.7)	30 (73.2)
≥2	25 (83.3)	11 (26.8)
Delivery		
Singleton	66 (90.4)	143 (97.9)
Twin	7 (9.6)	3 (2.1)
Place of delivery		
Home	57 (78.1)	142 (97.3)
Health facility	16 (21.9)	4 (2.7)
Mode of delivery		
Spontaneous vaginal delivery	67 (91.8)	143 (97.9)
Caesarian section	6 (8.2)	3 (2.1)
Presentation		
Head	71 (97.3)	145 (99.3)
Breech	2 (2.7)	1 (0.7)
Cord prolapse		
Yes	5 (6.8)	4 (2.7)
No	68 (93.2)	142 (97.3)

5.6. Socio-economic and socio-demographic characteristics and perinatal mortality

Family size and wealth were the two variables that showed a statistically significant association with perinatal mortality in the multivariate analysis. Newborns that were born in families with a size of 3-5 and 6+ had a lesser risk of dying during the perinatal period (AOR= 0.04, 95%CI 0.01 - 0.38) and (AOR = 0.03, 95%CI 0.01 - 0.27) respectively. Wealth difference was also associated with perinatal mortality, newborn babies from families in the middle quintile of the wealth index had a lesser risk of facing perinatal mortality (AOR=0.26,95%CI 0.08 - 0.82) as compared to those newborns from families that were categorized under the lowest quintile (Table 6).

Table-6 Socio-economic and socio-demographic factors associated with perinatal mortality in west Gojam zone, Ethiopia Feb 2012.

Variables	Cases(n=73) No (%)	Controls(n=146) No (%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Age of the mother				
18-24	10(13.7)	16 (11)	1	1
25-29	23 (31.5)	60(41.1)	0.61 (0.24 , 1.55)	1.27 (0.37 , 4.39)
30-34	28 (38.4)	55 (37.7)	0.82 (0.33 , 2.03)	1.96 (0.53 , 7.28)
35-40	12 (16.4)	15 (10.3)	1.28 (0.43, 3.83)	3.81 (0.83 , 17.45)
Maternal education				
Illiterate	71 (97.3)	140 (95.9)	1	1
Primary education(1-6) and above	2 (32.7)	6 (4.1)	0.66 (0.13 , 3.34)	0.76 (0.08 , 7.12)
Paternal education				
Illiterate	67 (91.8)	136 (93.2)	1	1
Primary education(1-6) and above	6 (8.2)	10 (6.8)	1.23 (0.43 , 3.49)	1.04 (0.28,3.95)
Maternal occupation				
House wife	25 (34.2)	54 (37)	1	1
Farmer	48(65.8)	92 (63)	0.89 (0.49,1.59)	1.03 (0.51 , 2.05)
Family size				
2	10(13.9)	1 (0.7)	1	1
3-5	30(41.7)	68 (46.6)	**0.04 (0.01,0.36)**	**0.04 (0.01 , 0.38)***
6+	32(29.4)	77 (70.6)	**0.04 (0.01,0.34)**	**0.03 (0.01 , 0.27)***
Wealth quintiles				
lowest	19 (26)	26 (17.8)	1	1
Second	14 (919.2)	29 (19.9)	0.66(0.28,1.58)	0.68 (0.27 , 1.75)
middle	6 (8.2)	38 (26)	**0.23(0.08,0.61)**	**0.26 (0.08 , 0.82)***
Fourth	11 (15.1)	32 (21.9)	0.47 (0.19,1.16)	0.61 (0.23, 1.65)
Highest	23 (31.5)	21 (14.4)	1.49(0.65,3.46)	1.73 (0.66 , 4.54)

5.7. Pregnancy, labour and delivery related variables with perinatal mortality

In this study newborns who were born to primiparous mothers had an increased chance of dying in the perinatal period as compared to those who were born to grand multipara mothers (AOR=7.89,95%CI 1.46- 42.77). Similarly new borns who were born to mothers who had a history of previous perinatal death revealed an increased risk of encountering perinatal mortality (AOR= 14.29, 95%CI 5.28 – 38.67). Gestational age at delivery is the other variable that was strongly associated with perinatal mortality. Preterm babies were more at risk for perinatal mortality as compared to the term babies (AOR=17.49,95%CI 1.51 - 202.78). In the current study home delivery appeared to reduce the risk of perinatal mortality as compared to those deliveries that took place in health facilities (AOR= 0.05, 95%CI 0.01-0.26) (Table 7).

Table -7 Pregnancy, labour and delivery related variables and perinatal mortality in West Gojam zone, Ethiopia Feb 2012.

Variables	Cases(n=73) No (%)	Controls(n=146) No (%)	Crude OR (95%CI)	Adjusted OR (95%CI)
Sex of the new born				
Male	44 (60.3)	77 (52.7)	1.36(0.77,2.41)	1.67 (0.75 , 3.78)
Female	29 (39.7)	69 (47. 3)	1	1
Number of deliveries (parity)				
One	12 (16.4)	11 (7.5)	0.36 (0.14,0.92)	**7.89 (1.46 , 42.77)***
2-4	25 (34.2)	64 (43.8)	0.47 (0.19,1.16)	1.18 (0.52 , 2.7)
≥5	36 (49.3)	71 (48.6)	1	1
Abortion				
Yes	17 (23.3)	12 (8.2)	3.39 (1.52 ,7.56)	2.05 (0.64 , 6.59)
No	56 (76.7)	134 (91.8)	1	1
Previous history of perinatal death				
Yes	32 (43.8)	10 (6.8)	**10.62 (4.81,23.42)**	**14.29 (5.28 , 38.67)***
No	41 (56.2)	136 (93.2)	1	1
Gestational age at birth				
Preterm	9 (12.3)	1 (0.7)	**20.3 (2.5,164.3)**	**17.49 (1.51, 202.78)***
Term	64 (87.7)	145 (99.3)	1	1
Birth spacing				
<2years	1 (1.4)	2 (1.4)	0.92 (0.08,10.3)	0.36 (0.03 , 5.09)
2 years	4 (5.5)	17 (11.6)	0.43 (0.12,1.34)	0.23 (0.05 , 1.12)
>2years	66 (90.4)	121 (82.9)	1	1
Any disease during pregnancy				
Yes	11 (15.1)	6 (4.1)	**4.14(1.47,11.69)**	1.72(0.37, 8.02)
No	62 (84.9)	140 (95.9)	1	1
TT immunization				
Yes	30 (41.1)	41 (28.1)	1.79 (0.99 , 3.22)	2.25 (0.97, 5.25)
No	43 (58.9)	105 (71.9)	1	1
Twin birth				
No	66 (90.4)	143 (97.9)	**0.19 (0.05,0.79)**	0.36 (0.06 , 2.18)
Yes	7 (9.6)	3 (2.1)	1	1
Place of delivery				
Home	57 (78.1)	142 (97.3)	**0.1 (0.03 , 0.31)**	**0.05 (0.01 , 0.26)***
Health facility	16 (21.9)	4 (2.7)	1	1
Vaginal delivery				
Yes	67 (91.8)	143 (97.9)	**0.23 (0.06 , 0.96)**	1.63 (0.22 , 12.41)
No	6 (8.2)	3 (2.1)	1	1
Cord prolapse				
Yes	5 (6.8)	4 (2.7)	2.6 (0.68 , 10.03)	3.55 (0.61 , 20.92)
No	68 (93.2)	142 (97.3)	1	1

5.8. Socio-demographic and pregnancy, labour and delivery related characteristics that are associated with perinatal mortality.

History of abortion and birth (single or twin) were associated with perinatal mortality. Mothers with a history of abortion had an increased risk of perinatal mortality as compared to those who had no history of perinatal mortality (AOR=0.24 95%CI 0.1, 0.58).
Twin newborns had more risk of perinatal mortality than the singletons (AOR=5.09 95%CI 1.21, 21.4) (Table 8).

Tabel-8 Socio-demographic variables and pregnancy, labour and delivery related characteristics associated with perinatal mortality.

Variables	Cases(n=73) No (%)	Controls(n=146) No (%)	Crude OR (95%CI)	Adjusted OR (95%CI)
Age of the mother				
18-24	10(13.7)	16 (11)	1	1
25-29	23 (31.5)	60(41.1)	0.61 (0.24 ,1.55)	0.4 (0.13,1.25)
30-34	28 (38.4)	55 (37.7)	0.82 (0.33 ,2.03)	0.46(0.15,1.43)
35-40	12 (16.4)	15 (10.3)	1.28 (0.43 ,3.83)	0.61(0.17,2.23)
Maternal education				
Illiterate	71 (97.3)	140 (95.9)	1	1
Primary education(1-6) and above	2 (32.7)	6 (4.1)	0.66 (0.13 , 3.34)	0.21(0.02,2.89)
Paternal education				
Illiterate	67 (91.8)	136 (93.2)	1	1
Primary education(1-6) and above	6 (8.2)	10 (6.8)	1.23 (0.43 , 3.49)	0.6(0.14,2.56)
Abortion				
Yes	17 (23.3)	12 (8.2)	1	1
No	56 (76.7)	134 (91.8)	0.29(0.13,0.66)	**0.24(0.1,0.58)***
Sex of the new born				
Male	44 (60.3)	77 (52.7)	1	1
Female	29 (39.7)	69 (47. 3)	0.74(0.42,1.3)	0.79(0.42,1.52)
Birth spacing				
<2years	1 (1.4)	2 (1.4)	1	1
2 years	4 (5.5)	17 (11.6)	0.47(0.03,6.57)	0.23(0.01,4.74)
>2years	66 (90.4)	121 (82.9)	1.09(0.09,12.26)	0.57(0.03,9.73)
Twin birth				
No	66 (90.4)	143 (97.9)	1	1
Yes	7 (9.6)	3 (2.1)	5.06(1.27,20.17)	**5.09(1.21,21.4)***
Presentation				
Head	71 (97.3)	145 (99.3)	1	1
Breech	2 (2.7)	1 (0.7)	4.09(0.36,45.81)	9.93(0.6,163.5)

5.9. Causes of perinatal mortality in West Gojam zone.

There were 73 deaths during the study period. Thirty-six (49.3%) of them were early neonatal deaths while 37(50.7%) of them were stillbirth cases. On three of the cases (4%) there was no enough data to identify the causes of death (Table 8). And from the 70 cases that the cause of death was assigned for, there was a disagreement in the diagnosis in four (5.7%) of the cases, but the two physicians discussed on the VA data and the diagnosis and they reached at consensus(Table 9).

Table-9 Probable causes of stillbirths and early neonatal deaths from a verbal autopsy data in the west Gojam zone, Ethiopia Feb 2012.

Causes of early neonatal death	No (%)	Causes of Stillbirth	No (%)
Bacterial sepsis	22 (61.1)	Obstructed labour	7 (18.9)
Birth asphyxia	5 (13.9)	Chorioamnionitis	7 (18.9)
Accidental fall	1 (2.8)	Prematurity	7 (18.9)
Birth injury	1 (2.8)	Ante partum hemorrhage	6 (16.2)
Hemorrhagic disease	1 (2.8)	Hypertensive disorder of pregnancy	3 (8.1)
Unspecified hemorrhage	1 (2.8)	Heart disorder	2 (5.4)
Prematurity	1 (2.8)	Bleeding from the umbilicus	1 (2.7)
Suffocation	1 (2.8)	Anemia	1 (2.7)
Unidentified causes	3 (8.3)	Unidentified causes	3(8.1)
Total	**36 (100)**		**37(100)**

6. Discussion

A significant difference in perinatal mortality is seen between the rate of the region and the study area, but still the perinatal mortality is considerably high. The identified socioeconomic contributing factors for perinatal mortality were small family size and family wealth. From the obstetric and service realted factors giving birth for the first time, previous history of perinatal death and abortion, preterm birth,twin birth and home delivery were significantly associated with perinatal mortality.

6.1. Perinatal mortality rate

This study was intended to find out the rate and determinants of perinatal mortality in one of the regional states of Ethiopia which is known for its second highest perinatal mortality rate of all the remaining Regions (8). The perinatal mortality rate was estimated to be 27.04 per 1000 live and stillbirths with a stillbirth rate of 13.6 per 1000 births and the early neonatal death rate of 13.5 per 1000 live births. The perinatal mortality rate that was estimated in this study was found to be one of the smallest estimates as compared to the majority of health facility and population based studies in the country. According to the EDHS 2011 report the overall National perinatal mortality rate was 46 per 1000 still and live births .In the survey the estimate for the Amhara regional state was 55 per 1000 still and live births and the stillbirth rate was 22.8 per 1000 births and the early neonatal mortality rate was 32.8 per 1000 live births (8). Results of the survey showed that there exists a significant gap between the national and regional perinatal mortality rate estimates and there is also a further difference with the estimates of the current study. This discrepancy could be explained by the variation in the scope of the studies and the level that the results were inferred for. In the EDHS 2011 a total of 624 sub-district enumeration areas were selected from the 11 administrative regions of the country with the aim of generating regionally and nationally representative mortality rates. The number and the selection procedure for households of the study subjects were done in a way that enables to generate a figure which is representative at the level of the regions not districts. Furthermore, one of the rationales of this study was to disclose the unknown nature of perinatal mortality at the district level where lack of evidence appears to exist while the regional and national estimates had been identified by the EDHS. Therefore the existing

variation in the perinatal mortality rates is acceptable given the difference in the scope and objectives of the studies.

Apart from the EDHS most of the studies that were conducted in the country were hospital-based studies. A study conducted in Jimma hospital on perinatal mortality rate and its trend from 1990-1999 indicated an average perinatal mortality rate of 138 per 1000 pregnancies (35). In addition a retrospective study that was conducted in Tikur Anbesa Hospital on stillbirths revealed a perinatal mortality rate of 102.8 per thousand pregnancies and a stillbirth rate of 55.3 per 1000 births (24). These rates are greater in many folds than the findings of the present study. In fact, hospital based studies have a tendency of over estimating deaths unless all deliveries of the given source population take place in the health facility, that is why hospital-based data are not often recommended to be used to calculate mortality rates (1). Especially perinatal mortality is highly prone for overestimation in hospital based studies, since most of the laboring mothers that visit the hospitals are referred from the nearby primary health care facilities for a better intervention after complications are identified and couldn't be solved at the level of the referring health care facilities. In hospitals that mainly serve the rural people like the Jimma teaching hospital and a referral hospital like the Black Lion hospital this justification for the over estimation is more acceptable (35). In addition, statistically the mortality rates were calculated taking the limited number of mothers that gave birth in the hospitals as a denominator. Therefore these circumstances obviously increased the perinatal mortality burden and rates in hospital based studies.

The perinatal mortality rate that was estimated in the current study was still lower than the global and East African regional estimates of perinatal mortality. The WHO global, regional and country estimates of neonatal and perinatal mortality revealed a global perinatal mortality rate of 43 per 1000 pregnancies with 22 per 1000 births and 21 per 1000 live births of stillbirth and early neonatal mortality rates respectively (19). The overall perinatal mortality estimate for Eastern Africa in this report indicated a rate of 48 per 1000 pregnancies while the stillbirth rate and early neonatal mortality rates were 21 per 1000 births and 28 per 1000 live births respectively (19). The report also argues that there exists a high probability of under reporting since one of the major data sources for the estimates were community surveys specially in most of the developing nations (1). In those surveys people either don't see the

need of reporting newborn deaths or discussing the death of newborns may not be culture friendly in a number of developing nations (1). So this fact further widens the discrepancy between the regional estimates of perinatal mortality and the estimates in this study.

The possible additional explanation for the significant difference between the National, East African regional and the global estimates of perinatal mortality rate and the estimates in this study is that the study area for this study is an intervention area for maternal and newborn health project. Three of the west Gojam districts where this study was conducted are intervention districts of the MaNHEP project on maternal and child health aiming at decreasing stillbirths and early neonatal deaths. The reduction was planned to be brought about by increasing the utilization of ANC service, promoting institutional delivery, enhancing postnatal care and stimulating the community involvement in the care for mothers before, during and after labour. Perinatal mortality is a cardinal indicator of obstetric care quality, and the intervention that is designed to increase the prenatal, intranatal and post natal care could be one of the reasons for the lower perinatal mortality rate in the mentioned districts than the regional, national or the East African perinatal mortality rates.

On the contrary the perinatal mortality rate that was estimated in this study was much higher than the perinatal mortality rate estimates of most of the developed nations. The United kingdom center for maternal and child inquiries report depicted a perinatal mortality rate of 6.7 perinatal deaths per 1000 births for England with a 4.7 per 1000 deliveries of stillbirth rate (12). Similarly the National Vital statistics report of America and other members of the developed nations from Europe and the Scandinavian countries also reported perinatal mortality rates of not more than 10 per 1000 births (5,15). Perinatal mortality is a sensitive indicator of obstetric care access and quality (36). This fact is reflected by the global distribution of neonatal deaths, where 99% took place in the low and middle income countries, where the adequacy of both quality and access to obstetric and new born care service is still in question (2). To further support this reality, from the mentioned proportion of the total neonatal deaths in the developing nations 75% was covered by early neonatal death (lan), this again strongly suggests that the cause of death was related to poor or inaccessible obstetric care. So, in a country like Ethiopia where institutional delivery is barely 9% and ANC service utilization is not more that 33% (8) it is reasonable to expect a

significantly high perinatal mortality burden as compared to the developed nations. And even if this study was conducted in an intervention area of a project that aims at improving antenatal, intranatal and postnatal care, the effort is short lived and still there exists a number of unaddressed factors that affect the survival of newborns, that still need further study.

6.2. Determinants of perinatal mortality

6.2.1. Wealth and perinatal mortality

As compared to the parents in the lowest wealth quintile those in the middle quintile had a lesser risk of losing their baby for perinatal mortality. Existing evidences strongly suggest that poorer women have an increased risk of losing their newborns to perinatal and neonatal death as compared to the richer ones (37). Poor living condition and lack of money to cover for medical expenses can be considered as one of the strong links between poverty and increased perinatal death. Even if the service might be affordable there is reluctance to seek the service in fear of possible expensive price due to lack of knowledge about the services and the price. But those parents in the fourth and highest quintile in this study didn't show a significant difference concerning the risk of death as compared to those in the poorest category. The wealth index normally indicates relative than absolute wealth differences among families of the newborns (38). The relative wealth difference only compares the study population among each other. If the collective wealth ownership of the community does not regard them as wealthy then the comparison will only be among groups of poor families. This might be one reason for the absence of a significant difference in the fourth and fifth quintile as compared to the first. In addition the wealth index is constructed from a set of asset indicators that tells wealth ownership over a period of time than the current consumption expenditure (38). So the asset ownership may not necessarily tell ability of the parents to pay in cash for health care service during labour or afterwards. Particularly in rural communities where beforehand planning and preparation for a probable need of extra money during labour is considered a luxury, asset ownership may not necessarily show a significant difference in their ability to pay for health care services.

6.2.2. Parity and family size

Number of deliveries (Parity) was among the factors that showed a significant association with perinatal mortality. In this study newborns who were born to mothers who gave birth to two and more children prior to the last delivery showed a better chance of surviving the perinatal period as compared to first babies. Primigravid and nulliparous women were found to be at an increased risk for pregnancy and labour related complications (39). Primigravid women are prone for obstetric complications like obstructed and prolonged labour, complications that need emergency obstetric care. Unfortunately the full package of emergency obstetric care service that these new mothers need is not given at the level of health posts and health centers. The nearest hospital where this service can be obtained is the Bahirdar hospital which is on average 90 kilometers away from the districts (32). So, primigravids have a low chance of obtaining the service before the complications happen, especially since most labours are tried at home first. In addition lack of knowledge and experience about pregnancy, labour and delivery may possibly make them overlook the risk indicators of complications either during pregnancy or during labour and delivery buying extra time for the complications to end up in perinatal death. This result is consistent with the other study results from Ethiopia, Uganda and Kenya (10,22,39), indicating the existence of increased risk of perinatal mortality among mothers who gave birth to their first babies.

Families with a size of at least three and above have a lower risk of perinatal mortalities as compared to those with a size of two. This might have been resulted from the fact that most of the families with a size of two could be newly married couples. Most women often get pregnant for their first baby soon after they get married (40). Thus, the possible argument for the association between low parity and perinatal mortality may also explain the association between a family size of two and increased perinatal mortality.

6.2.3. Previous history of perinatal mortality

After adjusting for obstetric and service related confounding factors, women with a history previous perinatal mortality had 14 times more risk of losing their newborns to perinatal death during their last pregnancy. This association can possibly be attributed to the improper newborn handling practices that are known to last in families for ages and this practices are highly likely to affect most off springs of a woman if not all, as far as the practices are still in place (40). These practices have a tendency to be held strongly in a family affecting every baby that is born in the family for years (40). For instance giving butter for the baby right after birth and washing the baby in cold water for at least two times a day (40). Furthermore when a mother loses a new born soon after birth there is a desire to replace the lost baby immediately and the locals call the second baby "masresha" (40). This leads to narrow birth spacing and leaves the initial cause of death undetected, promoting the risk of newborn death again. So, this association strongly emphasizes on the need of paying a special attention on mothers who had a previous history of perinatal mortality so as to reduce newborn death. Population based prospective studies in Tanzania and a population based prospective cohort study in six countries of the West Africa showed a similar strong association between previous history of child mortality and perinatal mortality in the last pregnancy (11, 20). But a community based prospective study in Burkina Faso did not show a statistically significant association between previous and current perinatal mortalities (39).

6.2.4. History of abortion

In the current study mothers with no previous history of abortion showed a lower risk of losing their newborns for perinatal mortality as compared to the mothers who had a history of abortion. Repeated abortion is associated with adverse pregnancy outcomes such as bleeding in the first trimester, preterm birth, low birth weight and perinatal mortality (47,48,49). In addition the low ANC service utilization denies the chance of preventing possible risk factors for abortion and other adverse pregnancy outcomes for instance communicable and non communicable diseases perpetuating in the consecutive pregnancies. Further more culturally the need of mothers to replace the lost baby as soon as possible leads to narrow birth spacing adding to the existing risks of perinatal mortality(40). This result is consistent with a case

contril study from Zimbabwe that indicated an increased risk of perinatal mortality among newborns who were born to mothers who had a history of abortion (16).

6.2.5. Twin birth and perinatal mortality

In this study twin babies were five times more at risk for perinatal mortality than the singletons. The pregnancy, labour and delivery process for twins is prone for risks like prolonged second stage, compound presentation leading to trauma, ante partum haemorrahge and others (50). These factors are among the known predictors of still birth and early neonatal mortality (50). Actually these risk factors may affect the first and second twin to a different extent but in this study birth order of the twins was not sought. The mentioned complications that are believed to accompany twin pregnancy could be controlled before they cause perinatal death had there been a quality delivery care. The ANC service provided by HEWs , that have a limited experience, and few aiding equipments to identify twin pregnancy in prior is one of the factors for the inability to prevent the complications due to twin pregnancy on time. In addition the limited institutional delivery care seeking by the community and questionable quality of the service increased the risk of mortality among twins than the singletons. Afterall twin babies are suppose to be delivered in an operating theater in the presence of a neonatologist (50).

6.2.6. Gestational age at delivery

In this study preterm babies were 17 times more at risk for perinatal death than the term babies. Preterm birth is associated with a number of anatomic and physiologic underdevelopments of different organs of the baby that may aggravate the effects of different risk factors of perinatal death. Pulmonary immaturity, Hayaline membrane disease and vulnerability to infections due to the underdeveloped immune system (41). These are among the leading causes of early neonatal death that are caused by the underdevelopment of different systems of the newborn (41). Preterm birth is one of the known risk factors for perinatal mortality even in settings where there exists an advanced neonatal care (36). In rural communities where advanced neonatal care is absent the chance of surviving the physiological underdevelopments is very rare if not nil. This result is comparable with a

community based comparative cross-sectional study from Diredawa and health facility based cross-sectional study from Nigeria (28,42).

6.2.7. Place of delivery

Many studies revealed a strong association between perinatal mortality and home delivery (16, 28). But in this study the opposite was true, showing the protective effect of home delivery as compared to the deliveries that took place in health facilities. The study area has a low institutional delivery rate like the remaining part of the region, which was estimated to be not more than 10% according to the 2011 DHS report (8). Therefore it is assumed that most women who visit health facilities for delivery care were those that first try to give birth at home but couldn't. They come to health facilities with a complicated difficult labour. The problem here is that women stay long with the complications at home and when they reach a health facility either the fetus is dead or in a great deal of distress, this might have increased the death burden in the health facilities. In addition since the study area is a maternal and child health project intervention area there are a number of trained birth attendants that are able to give clean and safe delivery at a house hold level. Plus the traditional birth attendants were strongly oriented to communicate with the HEWs whenever they are called to attend labour so that the HEWs attend the labour at home. So even if the deliveries took place at home the birth could possibly be attended by a HEW, who had additional training on labour and delivery care or by TBAs who again took additional training as part of the intervention. Obviously, it is limitation of this study not to involve the provider who attended the delivery as one variable to see effect of the provider on the pregnancy outcome and the profile of the mothers who gave birth in a health facility and lost their newborn had to be further studied.

6.3. Causes of perinatal mortality

The verbal autopsy result indicated that the leading causes of perinatal death were infection, birth asphyxia, prematurity, chorioamninitis and obstructed labour. The high prevalence of causes like asphyxia, obstructed labour and infections indicate the low level of skilled care and possibly institutionalized care for the newborn and the mother during labour. In this study area more than ninety percent of the births took place at home. The extended time the mother spends with obstructed labour before going to health facilities, while attempting home

delivery, predisposes the baby for distress leading to asphyxia. Had a mother made it to a health facility on time, her baby may benefit from the facility and trained professionals for neonatal resuscitation to avert the effect of birth asphyxia. If kept properly, sterile procedures that are followed during delivery care reduce the likely hood of the occurrence of infection as a cause of death at least during delivery and early postnatal days. Also the interventions that may take place in the health facilities to prevent obstructed and prolonged labour reduce the chance of perinatal death (43). But distance of the communities from the only hospital that can provide emergency obstetric top of the reluctance to seek institutionalized delivery care contributed to the occurrence of perinatal death secondary to these obstetric complications. A longitudinal study in Bangladesh clearly showed care, on that in circumstances where there was an improved delivery care and increased number of institutional deliveries it was possible to significantly reduce most of the mentioned causes of early neonatal death (44).

According to the VA (Verbal Autopsy) result, Prematurity was one of the commonest causes of perinatal death in this study. In other studies prematurity is often mentioned to take a significant proportion as a cause of perinatal death in areas where there is better delivery care that decreases the deaths due to poor labour and delivery care related factors (7). This gap might be the result of an overall reduction in perinatal mortality in the study area as compared to the regional average perinatal mortality rate (8). The reduction in the number of perinatal mortality cases due to other preventable causes of death may increase the significance of fewer prematurity cases as a cause of death.

6.4. Strengths of the study

Almost all of the studies on perinatal mortality in Ethiopia were hospital based studies except for the EDHS that only focused on determining the national and regional prevalence of perinatal mortality and the contribution of few socio-economic and socio-demographic factors to perinatal mortality. This population-based study involved a number of variables that are assumed to be possible determinant factors for perinatal mortality. In addition it overcame the limitations that may accompany hospital-based retrospective studies; such as the difficulty to calculate for perinatal mortality rate for the source population, data quality and completeness, validity of the data and the availability of only a limited number of variables. In this study a defined number of pregnant mothers were followed till the end of the first seven postnatal

days identifying all the deaths during this period making the perinatal mortality rate calculation more valid. Using primary data obtained from the respondents, unlike hospital based studies, increases the data quality and completeness adding a lot to the validity of the result. And the nested case control study design, which was used in this study, is among the leading designs that are known to be robust in generating evidence on the association between the dependent and outcome variables giving a better assurance about the determinant variables of perinatal mortality than cros-sectional studies.

A total of 4158 pregnant mothers were involved in the study. For a study that covers only three districts this number of study subjects can be considered as large and exhaustive, increasing the external validity of the study. In addition the controls were randomly selected from a well prepared sampling frame which contains the list of all mothers in the cohort. This again enhances a lot to the external validity of the result.

The verbal autopsy data to ascertain the cause of death for the newborns was collected by using the WHO standard questionnaire, with minor adjustments to meet the local context. The tool was repeatedly tested for its reliability in different settings globally.

Wealth, which is one of the possible determinant factors for perinatal mortality was estimated by wealth index which was generated by using principal component analysis. Using wealth index gives a better estimate of the household wealth than just estimating their monthly or annual income or expenditure.

6.5. Limitations of the study

The MaNHEP intervention kebeles where this study was conducted were not randomly selected. The selection was rater depending up on other project related factors, so this could potentially affect generalizability of the result.

The case to contro ratio was only 1:2 decreasing the chance of identifying smaller differences among the cases and the controls.

Mothers were recruited in to the cohort at the 28^{th} gestational week according to the information obtained from the local volunteers and this may affect reliability of the data since

no objective measurement is conducted. The same thing is true in categorizing the cases as still births or early neonatal deaths.

Since the cohort was an open cohort pregnant mothers were being continuously added to it and mothers who were added during the last two months of the follow up time stayed pregnant till the end of the study period. So a total of 1447 mothers were with an unknown pregnancy outcomes, therefore the study was only on the 2700 mothers whose pregnancy outcomes were known. The result would have been more robust if the pregnancy out come to all the pregnant mothers was known.

The WHO standard verbal autopsy tool that was used to identify causes of still birth is the one that was prepared to identify causes of neontal death so the validity of the tool to identify still births is not tested.

6.6. Conclusion

The study revealed a high perinatal mortality burden in the study area, even if it is significantly lower than the national and regional rates. This signifies the need for further interventions in the specific age category to further reduce the mortality.

Newborns who were born in a family of two and those who were born in a family with a relatively low asset ownership showed an increased risk of perinatal death. In addition preterm newborns showed an increased risk of perinatal death as compared to the term babies.

Women who gave birth for their first baby indicated an increased risk of losing their newborns in the perinatal period even though grand multiparity can't be ruled out as a risk factor for perinatal death. Previous history of perinatal mortality and abortion were also one of the risk factors for perinatal mortality. But women who gave birth at home had a low chance of losing their newborns for perinatal death.

Birth asphyxia, infection, prematurity, chorioamnionitis and obstructed labour were the leading causes of perinatal mortality in the study area. Prematurity had an unusually higher proportion for a community with a limited institutional delivery care.

6.7. Recommendations

- Providing additional in service training on maternal and newborn health care for HEWs in the field so as to increase their ability to identify possible risk factors of perinatal mortality in prior.
- Increasing the ANC service utilization by the communities from the already existing health posts and health centers.
- Encouraging institutional delivery and enhancing the availability of quality perinatal and neonatal care at primary health care units to reduce deaths due to labour and delivery related complications and preterm birth.
- An effort need to be in place to improve the economic condition of the community to decrease the perinatal deaths that are associated with poverty.
- Further studies need to be conducted to identify the reasons for the low institutional delivery service utilization in the region in general and the zone in particular.
- The association between place of delivery and perinatal mortality should also be further studied.

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Annex A: Conceptual framework

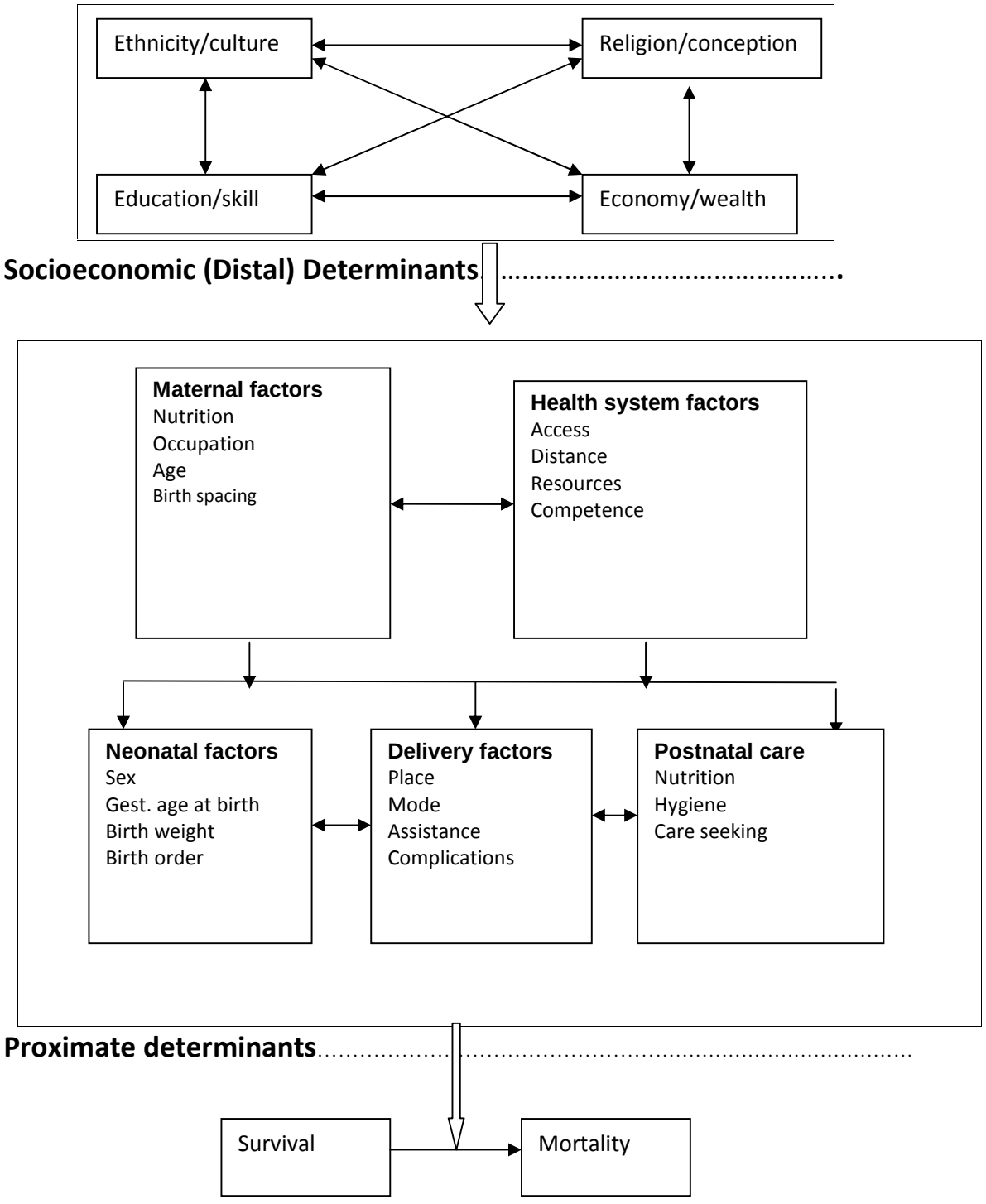

Fig.1.A conceptual frame work for factors that influence perinatal mortality, adapted from mosley and chen (46).

Annex B: Questionnaire

Instructions to interviewer: Introduce yourself and explain the purpose of your visit. Ask to speak to the mother or to another adult caretaker who was present during the illness that led to death. If this is not possible, arrange a time to revisit the household when the mother or caretaker will be home.

INTERNATIONAL STANDARD VERBAL AUTOPSY QUESTIONNAIRE

DEATH OF A CHILD UNDER 4 WEEKS

SECTION 1 INTERVIEWER VISITS Interviewer Put 1 for cases and 2 for referents in the Box ☐

INTERVIEWER VISITS	**1**	**2**	**3**	**FINAL VISIT**
DATE	……	……	……	DAY…… MONTH
INTERVIEWER NAME	……	……	……	YEAR
				INT. NUMBER
RESULT CODE				RESULT……
NEXT VISIT: DATE	……	……	……	TOTAL NUMBER OF VISITS
TIME	……	……	……	……

RESULT CODES

1=COMPLETED 3=POSTPONED 5=PARTLY COMPLETED

2=NOT AT HOME RESPONDENT FOUND 4=RESPONDENT REFUSED 6 =NO APPROPRIATE

7 = OTHER (SPECIFY)_____

SUPERVISOR	FIELD EDITOR	OFFICE	KEYED BY
Name _____ Date _____	Name _____ Date _____	EDITOR	

PLACE NAME/ LOCATION_____

ADDRESS LOCATION TO THE HOUSEHOLD_____

_____

INTERVIEWERS NAME SIGNATURE AND DATE.....	…..…..…..…..…..…..….
SUPERVISOR SIGNATURE AND DATE…..…..…..…..…..…..…..…..…..…..…..….	…..…..…..…..…..…..….
DATA ENTRY SIGNATURE AND DATE…..…..…..…..…..…..…..…..…..…..…..….	

Hello my name is _____

We are collecting information on the causes of newborn death in the community. We would very much appreciate your participation in this effort. We want to ask you about the circumstances leading to the death of the deceased. Whatever information you provide will be kept strictly confidential. No information identifying you or the deceased will ever be realized to anyone outside of this information –collection activity.

Participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. You may also stop the interview completely at any time without any consequences at all. However, we hope that you will participate in this survey since the results will help the government improve service for people. If you have any questions about the study feel comfortable to raise it so that I will try to give you the answers , even if I do not have the answers I will give you the contact address of the research team for you to be enlightened with the details of the study. Your participation in this study doesn't involve any payment on either sides.

At this time, do you want to ask me anything about the purpose or content of this interview?

May I began the interview now?

Signature of interviewer: _____date _____

Respondent Agree to be interviewed…..…..…..…..…..…..1

Respondent do not agree to be interviewed----------2 END THE INTERVIEW

SECTION 2. BASIC INFORMATION ABOUT THE RESPONDENT

201 Record the time at start of interview	Hour		
	Minutes		
202 What is the name of the main respondent:			

203 What is the relationship of the main respondent with (name of the child) child? (Circle relevant number)

1. Father	2. Mother	3. Sibling	4. Grand parent	5. Other relative	6.No relation
6. Other (specify):					

204. Can the respondent read and write?	1. Yes	2. No	→ 206
205. How many years of school did the main respondent complete?	1. Grade-1 6.Grade-6 11.Grade-11 2. Grade-2 7.Grade-7 12.Grade-12 3. Grade-3 8.Grade-8 13.10+Diploma 4. Grade-4 9.Grade-9 14.12+Diploma 5. Grade-5 10.Grade-10 15.University		

206. Were other people present at the interview? ……..	1.Yes	2. No	

	Present during the time of			
	Interview		Illness(if any)	
If the answer is yes who what is their relation with the newborn?	Yes	No	Yes	No
1. Father	1	2	1	2
2. Mother	1	2	1	2

3. Grand mother	1	2	1	2
4. Grand father	1	2	1	2
5. siblings	1	2	1	2
6. Aunt/uncle	1	2	1	2
7. Relatives	1	2	1	2
8. Neighbours	1	2	1	2
9. Others_____				

207. Name of the deceased or the control _____	
208. Age of the deceased or the control (in days)	☐☐
209. Sex of the child	1. Male 2. Female

SECTION 3 - LIVELIHOODS AND HEALTH SERVICES

301. What is the main source income for the family? ***PROBE TWO TIMES 'ANYTHING ELSE?' CIRCLE ALL THAT APPLY HERE IT IS ALLOWED TO ENCIRCLE MORE THAN ONE OPTION***	1 =Farming 2 = Domestic worker/cleaner 3 = Construction work 4 = Petty trader 5 = Dressmaker/hairdresser 6 = Waitress / barmaid 7 = Financial support from families or children abroad 8.= Financial support from children or other families in the country 9 = Making tela, areke, other alcoholic drink 10 =Plumber, elect, carpenter,mechanic, etc. 11 = Professional (health care, teacher, manager, etc.) 12= Pension 13 = Any other source of income? (Specify) ……..
.	

302. Do you rent, own, or are you provided with the place/house that you live?	1 = Owned 2 = Provided by employer 3 = Provided by relatives 4 = Rented from employer 5 = Rented from kebele 6 = Rented from private owners 7 = Rented from other (Specify) ……..
303. How many rooms does the household have?	Number of rooms
304. Is there a separate place for cattle and people?	1=Yes 2=No
305.Is there a separate kitchen from the main household?	1=Yes 2=No
306. Number of windows in the household?	
. 307. What is the main material of the roof?	1=Corrugated iron sheet 2 =Thatch or grass 3 = Other (specify) ……..
. 308. What is the main material of the floor?	1.Earthen floor 2.Cement 3. Straw 4.Plastic tiles 5.Plastic sheet 6.wood
309. How often do you cook in the house?	1. All the time 2. Some times
. 310. What is the main type of cooking fuel?	1 = Mainly collected firewood 2 = Mainly purchased firewood 3 = Charcoal 4 = Kerosene

	5 = Butane gas 6 = Electricity 7 = Leaves/dung cakes 8 = Other (specify) ……..	
311.Is there a toilet facility?	1=Yes 2=No	⟶ 314
. 312. What type of toilet facility does the household have?	1 = Flush toilet, private 2 = Flush toilet, shared with another household 3 = Pit latrine, private 4 = Pit latrine, shared 5 = Container (from household items) 6 = Field/forest 7 = Other (specify) ……..	
313. Does the family use the toilet regularly?	1. Yes always 2. Some times 3. Never	
. 314. What is the main source of drinking water?	1 = Tap water 2 = Protected well/spring 3 = Unprotected well/spring 4= Rain water 5 = River, lake or pond	
I want to talk about the items that a household or individual might own or possess. I will ask you about what your current household own.		
315. Does any member of the household own any land that can be used for agriculture	1 = Yes 2= No	⟶ 317

316. How many (Local Units) of agricultural land do members of household own?	In Local Units_____	
317. Does this household own any livestock, heard, or farm animals?	1 = Yes 2= No	→ 319
318. How many of the following animals does this household own?	Bulls..... Oxen..... Cows..... Donkeys..... Horses..... Mule..... Goat..... Sheeps..... Cock/hens.....	

319. READ EACH ITEM. IF ITEM IS OWNED BY HH CIRCLE '1'. IF ITEM IS NOT OWNED BY THE HH CIRCLE '2'.	Item	Yes	No
	A=Electricity	1	2
	B = Radio	1	2
	C= Television	1	2
	D=Telephone	1	2
	E.=Mobile phone	1	2
	F =Electric Mitad	1	2
	G = Kerosene Lamp	1	2
	H = Bed.	1	2
	I = Plough	1	2
	J = Tractor	1	2
	K = Motor cycle	1	2
	L= Cart	1	2

	M= Cash Crops, such as coffee, sesame, etc..	1	2
	N= Tables	1	2
	O.= Refrigerator	1	2
	P= Stove/electric /gas	1	2
	Q= Car/Van	1	2
	R= Chairs	1	2

320. Do you have any personal cash savings you keep for future plans or in case of emergencies?	1 = Yes 0 = No	→ 323
. 321. Where do you currently keep your savings? ***PROBE TWO TIMES 'ANYTHING ELSE?' CIRCLE ALL THAT APPLY***	1 = Bank 2 = Micro finance organization 3 = Ekub 4 = Mobile bank 5 = At home 6 = With a friend 7 = Other (specify) ……	
322. Approximately how much personal savings do you currently have?	|___|___|___|___| BIRR 98=Non-response	
323. If the family faced a financial problem for health care, is there any source that can lend the HH money ?	1. Certainly 2. I think so 3. I do not think so 4. Never	
324. What is the main income source of the family	----------	
325. Type of health facility in the vicinity	1. Hospital 2. Health centre 3. Private clinic 4. Health post	
326. What is the average distance to a nearest HF	_____ walking distance (in days) _____ walking distance (in hours) _____ in Km	

327. What is the average distance to the nearest hospital	_____ walking distance (in days) _____ walking distance (in hours) _____ in Km

328. Where do you usually seek health care service if someone in the house hold gets sick?

	1. Traditional healer	2. Religious leader	3. Public Hospital	4. Health centre	5.Health post
			6. Private clinic	7. Pharmacy, drug seller	8. Holy water
	Other (specify)				

SECTION 4 MOTHER'S HEALTH AND CONTEXTUAL FACTORS

401 What was the age of the mother at the time the baby was born or died?	YEARS …… 98.DON'T KNOW		
402. What was the marital status of the mother when the baby was born or died?	1.Married 2.Single 3.Divorced 4.Separated 5.Widowed		
403 What is the educational status of the mother?	1. Grade-1 6.Grade-6 11.Grade-11 2. Grade-2 7.Grade-7 12.Grade-12 3. Grade-3 8.Grade-8 13.10+Diploma 4. Grade-4 9.Grade-9 14.12+Diploma 5. Grade-5 10.Grade-10 15.University		
404 What is the educational status of the father?	1. Grade-1 6.Grade-6 11.Grade-11 2. Grade-2 7.Grade-7 12.Grade-12 3. Grade-3 8.Grade-8 13.10+Diploma 4. Grade-4 9.Grade-9 14.12+Diploma 5. Grade-5 10.Grade-10 15.University		
405. Mother's occupation?	1.House wife 2.Factory worker 3.Civil servant	4.Merchant 5.Farmer 6. Daily labourer	

		7.Others specify	
406. What is your family size?	Numbers		
407. Did the mother receive antenatal care?	1.Yes 2.No 98.Don't know		→ 412
408. When did you start attending ANC?	1.First three months 2.Second three months 3.Third three months		
409. Where did you attend ANC service?	1.Hospital 2.Health centre 3.Health post 4.Private clinic		
410. Was there any abnormality identified during ANC?	1.yes 2.No		→ **412**
411. Did you get any advice or help for the abnormality?	1.Yes 2.No 98.Don't know		
412. Did the mother receive tetanus toxoid (TT) vaccine?	1.Yes 2.No 98.Don't know		
413. How many doses?	1.Number of doses …….. 98.Don't know		
414. How is the mother's health now?	1.Healthy 2.Ill 3.Not alive		

	98.Don't know	
415. Have you ever had an abortion?	1.Yes 2.No 98.Don't know	→ 417
416. How many abortions have you had?	Numbers …….…….…….……	
417. Have you had a previous neonatal mortality?	1.Yes 2.No 98.Don't know	
418. How many neonatal deaths did you encounter?	Numbers …….…….…….…… 98.Don't know	
419. Was the child birth preceding your last delivery at the expected time?	1.Term 2.Pre term 3.Post term 98.Don't know	

SECTION 5: PREGNANCY HISTORY

501. How many births, including stillbirths, did the mother has before this baby?	Number of births/stillbirths..... 98.Do not know	
502. How many months was the pregnancy when the (control baby) or the deceased was born?	Gestational age..... 98.Do not know	
503. Did the pregnancy end earlier than expected?	1.Yes 2.No 98.Don't know	

504. During the pregnancy did the mother suffer from any of the following known illnesses:

	Yes	No	DK
High blood pressure?	1	2	98
Heart diseases?	1	2	98
Diabetes?	1	2	98
Epilepsy/convulsion?	1	2	98
Did she suffer from any other medically diagnosed illness?			

505 .During the last 3 months of pregnancy did the mother suffer from any of the following illnesses:

	Yes	No	DK
1. Vaginal bleeding?	1	2	98
2. Smelly vaginal discharges?	1	2	98
3.Puffy face?	1	2	98
4. Headache?	1	2	98
5. Blurred vision?	1	2	98
6. Convulsion?	1	2	98
7. Febrile illness?	1	2	98
8. Severe abdominal pain that was not labor pain?	1	2	98
9 .Pallor and shortness of breath (both present)?	1	2	98
10.Did she suffer from any other illness?	Other illnesses specify _____		

506.Was the child a single or multiple birth? 1.singleton

	2.twin 3.triplet or more 98.don't know	
507. What was the birth order of the child that was born alive or died?	1.first 2.second 3.third 4.fourth 5.Fifth or higher 98.Do not know	
508. How long have you waited to give birth to your last baby after giving birth to the presiding one?	1.One year 2.One and half year 3.Two years 4.More than two years 98.dont know	
509.Have you obtained postnatal care in the seven post partum days that followed your last child birth?	1.Yes 2.No 98.Don't know	

SECTION 6 : DELIVERY HISTORY

601. When did the water break?	1.Before labor started 2.During labor 98.Don't know	
602. How many hours after the water broke was the baby born?	1.Less than 24 hours 2.24 hours or more 98.Don't know	
Question 603 – 607 only for cases		
603. Was the water foul smelling?	1.Yes 2.No 98.Don't know	
604. Did the baby stop moving in the womb?	1.Yes 2.no 98.don't know	→ 606

		→ 606
605. When did the baby stop moving in the womb?	1.Before labor started 2.During labor 98.Don't know	
606. Were fetal heart sounds present?	1.Yes 2.No 98.Don't know	
608- 614 Both cases and controls		
607. Was there excess bleeding on the day labor started?	1.Yes 2.No 98.Don't know	
608. Did the mother have a fever on the day labor started?	1.Yes 2.No 98.Don't know	
609. How long did the labor pains last?	1. Less than 12 hours 2. 12-23 hours 3. 24 hours or more 98. Don't know	
610. Was it a normal vaginal delivery?	1. Yes 2. No 98. Don't know	
612. What type of delivery was it?	1. Forceps/vacuum 2. Caesarean section 98. Don't know Other ……..(specify)	
613. Which part of the baby came first?	1.Head 2.Bottom 3.Feet 4.Arm/hand 98. Don't know Other ……..(specify)	
614. Did the umbilical cord come out before the baby was born during labour?	1. Yes 2. No 98. Don't know	

615. Where did the mother gave birth to the baby?	1.In the house 2.Health center 3.Hospital	4.Health post 5.On the way to a health facility 6.Others_____	

Interviewer section 7 to section 12 is only for Cases (new born who have died and stillbirths only

SECTION 7 INFORMATION ON THE DECEASED AND **DATE/PLACE OF DEATH**			
701 what was the name of the deceased ? **(*interviewer, use NA for stillbirths)***			
702. Sex of the deceased?	1. Male	2. Female	
703. when was the deceased born ? DD/MM/YY…… Record 98 if do not know day or month Record 9998 if do not know year			
704. How old was the deceased when she/he died			
705. When did s/he die …… Record 98 if do not know day or month Record 9998 if do not know year			

706. Where did (name of child) die?.	1. Hospital	2. Health centre	3.Health post
	4. On route to hospital or health facility		5. Home
	6. Other (specify):		

707. For deaths at hospital or health facility, record facility name and address:

_____

SECTION 8: OPEN HISTORY QUESTION

801. Could you tell me about his/her illness that led to her/ his death?

Prompt: Was there anything else?

Instructions to interviewer - Allow the respondent to tell you about the illness in his or her own words. Do not prompt except for asking whether there was anything else after the respondent finishes. Keep prompting until the respondent says there was nothing else. While recording, underline any unfamiliar terms.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

802 Cause of death 1 according to respondent

_____
_____

803 Cause of death 2 according to respondent

_____
_____

Take a moment to tick all items mentioned spontaneously in the open history questionnaire. Use this to guide you through the rest of the questionnaire.

804 Symptom	**Illness day that symptom began**	**Duration of symptom (days)**	**Severity: (Mild-moderate/ Severe)**
804.1			
804.2			
804.3			
804.4			
804.5			
804.6			
804.7			

Note: When possible, use local term for the symptom.

805 What was the length of time the child was ill before he/she died? …….				
806 Was care sought outside the home while he/she had this illness?	1.Yes	2. No	3. Don't know	→ 808

807 (*If yes ask:*) Where or from whom did you seek care when the child was seek ? *(Record all responses)*

1. Traditional healer	2. Religious leader	3. Government hospital	4. Government health centre or clinic	5.Health extension worker
6. Private clinic	7. Pharmacy, drug seller		8. Relative, friend (outside household)	
9. Holy water			Other (specify)	

808. What was the length of time of the illness immediately preceding the child death (days)		999.NK	ILLD

After respondent finishes prompt: **Did you seek care anywhere else?** ***Keep using this prompt until respondent replies that they did not seek care from anyone else.***

SECTION 9 HISTORY OF INJURY/ACCIDENTS

901. Did the baby die from an injury or accident?	1.Yes 2.No 98.Don't know	→ 1001
902. What kind of accident did the baby suffer?	1.Road traffic accident 2.Fall 3.Drowning 4.Poisoning Burn 5.Violence/assault 6.Bite or sting	
903. Was the injury/ accident inflicted by someone else?	1.Yes 2.No 98.Don't know	→ 905

904.What kind of injury was it?	1.Birth trauma 2.Cold injury 3.Suffocation 4.Circumcision	5.Uvelectomy 6.Tonsilectomy 7.Milk tooth extraction 8.Others_____	
905.Did the baby suffer from any insect/animal bite that lead to his death?	1.Yes 2.No 98.Don't know		→ 907
906. What type of animal /insect	1.Dog 2.Snake 3.Insect 4.Other 98.Do not know		
907. Did the baby die at the site where the accident occurred?	1.Yes 2.No 98.Don't know		
908. For how long after the accident or injury did the baby survive?	Days Hrs Minutes		
909. Did the baby receive medical care before death?	1.Yes 2. No 98. Don't know		
910. Did the baby have an ongoing chronic illness or was sick in the month before the accident or injury?	1.Yes 2.No 98.Don't know		→1001
911. What was the illness?	_____		

SECTION 10 CONDITION OF THE BABY SOON AFTER BIRTH

1001. At birth what was the size of the baby?	1.Smaller than normal 2.Normal 3.Larger than normal 98.Don't know	

1002. Was the baby premature?	1.Yes 2.No 98.Don't know	→ 1004
1003. How many months or weeks long was the pregnancy?	Months …… Weeks …… 98.Don't know	
1004. What was the birth weight of the baby? KILOGRAMS	Kilograms …… ☐ 98.Don't know	
1005. Was anything applied to the umbilical cord stump after birth?	1.Yes 2.No 98.Don't know	
1006. What was it? (SPECIFY)	_____ _____	
1007. Were there any signs of injury or broken bones?	1.Yes 2.No 98.Don't know	→1009 →1009
1008. Where were the marks/ signs of injury the body?	_____ _____	
1009. Was there any sign of paralysis?	1.Yes 2.No 98.Don't know	

1010 Did the baby have any malformations at birth?	1.Yes 2.No 98.Don't know	 → 1012 → 1012
1011. What kind of malformation did the baby have?	1.Swelling/defect on the back 2.Very large head 3.Very small head 4.Defect of lip and/or palate 5.Other malformation (specify) 98.Don't know	
1012. What was the color of the baby at birth?	1.Normal 2.Pale 3.Blue/black 98.Don't know	
1013. Was the baby able to breathe even a little after birth?	1.Yes 2.No 98.Don't know	
1014. Was the baby given assistance to breathe?	1.Yes 2.No 98.Don't know	
1015. Was the baby able to cry even a little at birth?	1.Yes 2.No 98.Don't know	
1016. Did the baby ever move, even a little?	1.Yes 2.No 98.Don't know	
1017. Check codes 1013, 1015 and 1016		

All codes 'NO: Baby did not breathe Baby didn't cry Baby did not move'		→1101
1017. If the baby was not breathing, crying or moving. Was it born dead?	1.Yes 2.No 98.Don't know	 →1101 →1101
1018. Was the baby macerated, that is showing the signs of decay?	1.Yes 2.No 98.Don't know	 →1101 →1101

SECTION 11 NEONATAL ILLNESS HISTORY

1101. Was the baby ever able to suckle or bottle-feed?	1.Yes 2.No 98.Don't know	
1102How soon after birth did the baby suckle or bottle-feed?	Hours Days Do not know	
1103. Did the baby stop suckling or bottle-feeding?	1.Yes 2.No 98.Don't know	→ 1105
1104. How many days after birth did the baby stop suckling or bottle-feeding?	Days…… 98.Don't know	
1105. Was the breastfeeding exclusive	1.Yes 2.No 98.Don't know	
1106. Did the baby have spasms or convulsions?	1.Yes 2.No	 1108

	98.Don't know	
1107. How soon after birth did the convulsions start?	Days…… 98.Don't know	
1108. Did the baby become stiff and arched backwards?	1.Yes 2.No 98.Don't know	→ 1111 → 1111
1109.Did the baby have a bulging of the fontanelle?	1.Yes 2.No 98.Don't know	→1111 → 1111
1110. How many days after birth did the baby have the bulging?	Days…… 98.Don't know	
1111. Did the baby become unresponsive or unconscious?	1.Yes 2.No 98.Don't know	→1113
1112. How many days after birth did the baby become unresponsive or unconscious?'	Days…… 98.Don't know	
1113. Did the baby have a fever?	1.Yes 2.No 98.Don't know	→1115
1114. How many days after birth did the baby have a fever?	Days…… 98.Don't know	

1115. Did the baby become cold to the touch?	1.Yes 2.No 98.Don't know	 →1117 →1117
1116. How many days after birth did the baby become cold to the touch?	Days…… 98.Don't know	
1117. Did the baby have a cough?	1.Yes 2.No 98.Don't know	 → 1119
1118. How many days after birth did the baby start to cough?	Days…… 98.Don't know	
1119. Did the baby have fast breathing?	1.Yes 2.No 3.Don't know	 → 1121
1120. How many days after birth did the baby start breathing fast?	Days…… 98.Don't know	
1121. Did the baby have difficulty breathing?	1.Yes 2.No 98.Don't know	 →1126
1122. How many days after birth did the baby start having difficulty in breathing?	Days…… 98.Don't know	
1123. Did the baby have chest in drawing?	1.Yes 2.No	
1124. Did the baby have grunting?	1.Yes 2.No 98.Don't know	
1125. Did the baby have flaring of the nostrils?	1.Yes 2.No	

	98.Don't know	
1126. Did the baby have diarrhea?	1.Yes 2.No 98.Don't know	→ 1130
1127. How many days after birth did the baby have diarrhoea?	Days…… 98.Don't know	
1128. When the diarrhoea was most severe, how many times did the baby pass stools in a day?	Number…… 98.Don't know	
1129. Was there blood in the stools?	1.Yes 2.No 98.Don't know	
1130. Did the baby have vomiting?	1.Yes 2.No 98.Don't know	→ 1230
1131. How many days after birth did vomiting start?	Days…… 98.Don't know	
1132. When the vomiting was most severe, how many times did the baby vomit in a day?	Number of times…… 98.Don't know	
1133. Did the baby have abdominal distension?	1.Yes 2.No 98.Don't know	
1134. How many days after birth did the baby have abdominal distension?	Days…… 98.Don't know	
1135. Did the baby have redness around, or drainage from, the umbilical cord stump	1.Yes 2.No 98.Don't know	

1136. Dd the baby have postural skin rash/ areas of skin that were red, and hot or peeling?	1.Yes 2.No 98.Don't know	
1137.Did the baby have yellow palms or soles?	1.Yes 2.No 98.Don't know	
1138. How many days after birth did the yellow palms or soles begin?	Days…… 98.Don't know	
1139. For how many days did the baby have yellow palms or soles?	Days…… 98.Don't know	

SECTION 12 TREATMENT AND HEALTH SERVICE USE FOR THE FINAL ILLNESS

1201. Did the baby receive any treatment for the illness that led to death?	YES .....1 NO……2	→ Stop the interview	
1202. Can you please list the treatments the baby was given for the illness that led to death? COPY FROM PRESCRIPTION/DISCHARGE NOTES IF AVAILABLE			
1203. Please tell me at which of the following places or facilities the baby received treatment during the illness that led to death:		Yes No DK	
	1 Home?	1 2 98	
	2 Traditional healer?	1 2 98	
	3 Government clinic?	1 2 98	
	4 Government hospital?	1 2 98	
	5 Private clinic?	1 2 98	
	6 Private hospital?	1 2 98	
	7 Pharmacy, drug seller,?,	1 2 98	
	8 Any other place or facility?	1 2 98	

1204.I n the month before death, how many contacts with formal health services did the baby have?	Numbers …….. of contacts	
1205. Did a health care worker tell you the cause of death?	Yes ……..1 No……..2 Don't know ……..98	
1206. What did the health care worker say?	---------- ---------- ----------	

Annex C: Amharic questionnaire

AMHARIC QUESTIONNAIRE

የቃለ መጠይቅ አቅራቢው መመሪያ

በቅድሚያ ራስህን/ሽን ለተጠያቂው በማስተዋወቅ የመጣህበትን/ሽን ምክንያት በግልፅ አሳውቅ/ቂ፣ በማስከተል የህፃኑን እናት ወይም እናቱን በ ርግዝና፣በወሊድ እንዲሁም ከወሊድ በሁላ ባሉት 28 ቀናት ውስጥ በቅርብ የሚያውቃትን ሰው ለማናገር ፍቃደኛ እንደሆኑ ጠይቅ፤ እነሱን ማናገር የማይቻል ከሆነ ሊገኙ የሚችሉበትን ሰአት በመጠየቅ ቀጠሮ ሰጥተህ ሂድ።

አለማቀፍዊ ደረጃውን የጠበቀ ድሜያቸው ከ 4 ሳምነት በች ለሆኑ ህፃናት የሚየገለግል የሞት ምክንያት መጠይቅ

ክፍል- 1:የቃለ መጠይቅ አቅራቢው ጉብኝት መረጃ :- ለሚች መጠይቅ- **1** :- ለተነፃፃሪ መጠይቅ **2** በሳጥን ውስጥ አኑር				
የቃለ መጠይቁ አቅራቢ የመጀመሪያ ጉበኝት	1	2	3	**የመጨረሻ ጉብኝት** (FINAL VISIT)
ቀን **የውጤት ኮድ**	…… ……	…… ……	…… ……	**ቀን** …… **ወር** …… **ውጤት** ……
የሚቀጥለው ጉብኝት ቀን **ቀን** **ሰዓት**	…… ……	…… ……	…… ……	**ጠቅላላ የጉብኝት ቀናት ብዛት** ……

ስለ መጠይቁ መሞላት የውጤት ኮዶች [RESULT CODES]

1= ተጠናቋል	4= ለሌላ ጊዜ ተላልፏል	7= በከፊል
2= እቤት አልተገኙም	5= ፈቃደኛ አይደሉም	8= መልስ መስጠት አይችሉም
3=ረዘም ላለ ጊዜ ወደ ሌላ ቦታ ሄዷል	6= ወላጅ/አሳዳጊ ፈቃደኛ አይደሉም	9= ሌላ (እባክዎ ይጥቀሱ)

ቃለ መጠይቁን ለማካሄድ የተጠቀሙበት ቋንቋ (LANGUAGE USED IN INTERVIEW) 1=አማርኛ 2=ኦሮሚፋ/ኦሮምኛ 3 = ሌላ (እባክዎ ይጥቀሱ)	……..……
የቃለመጠይቅ አቅራቢው ሥም፣ ፊርማና ቀን……. **የሱፐርቫይዘር ሥም፣ ፊርማና ቀን** …… **መረጃውን ወደ ኮምፒዩተር ያስገባ/ች ባለሙያ ስም፣ ፊርማና ቀን** ……	…… ……

<u>በጥናቱ ለመሳተፍ የፈቃደኝነት ስምምነት ቅፅ</u>

ጤና ይስጥልኝ ስሜ ----------ይባላል የ MaNHEP ሰራተኛ ነኝ በአሁኑ ሰዓት የህፃናት ሞት ምክንያቶችን በተመለከተ መረጃ እየሰበሰብን ንገኛለን በመሆኑም ለዚህ ጥናት ሊያገለግሉ የሚችሉ መረጃዎችን ሊሰጡን ቢችሉ ጥናችንን በብዙ ያግዛል፡፡ በማስከተል የሚቹን ህፃን የሞት ምክንያት በተመለከተ ጥያቄዎችን እጠይቅዎታለሁ፡፡ የሚሰጡኝም መረጃ ሙሉ በሙሉ በሚሰጥር ይጠበቃል፡፡ በዚህ ጥናት ውስጥ የሚያደርጉት ተሳትፎ በእርሶ ሙሉ ፈቃደኝነት ላይ የተመሰረተ ነው በመሆኑም መጠይቁን በሙሉ ወይም የማይፈልጉትን ጥያቄዎች ያለመመለስ መብት አለዎት በተጨማሪም ጥያቄና መልሱን በፈለጉት ሰአት የማቆም መብት አሎት ጥያቄዉን ባለመመለስዎ ምንም አይነት ጉዳት አይደርስበዎትም፡፡ ነገር ግን የዚህ ጥናት ውጤት በአከባቢው ብሎም በሀገር አቀፍ ደረጃ ለህፃናትና እናቶች የሚሰጠውን የጤና ግልጋሎት ለማሻሻል ስለሚውል ሙሉ በሙሉ ንዲሳተፉ አበረታታዎታለሁ፡፡ በዚህ ጥናት በመሳተፍዎ እርስዎ የሚከፍሉትም ሆነ ለእርስዎ የሚከፈልዎት ነገር አይኖርም፡፡ ሊጠይቁኝ የሚፈልጉዋቸው ማናቸውም ዓይነት ጥያቄዎች ካሉ መመለስ እችላለሁ፡፡ የሚፈልጉት መረጃ ባይኖረኝም እንደሌለኝ እገልፅልዎታለሁ፡፡ የግድ መልስ ማግኘት ካለብዎ ግን ከዚህ በታች ስማቸዉ ከተጠቀሱት አጥኚ ቡድን አባላት ሊረዱ ይችላሉ፡

1. ደ/ር ምትኬ ሞላ **0911131805**
2. ሮቤል ይርጉ **0911828898**

ሥሜ ከዚህ በታች የተጠቀሰው በዚህ ጥናት ለመሳተፍ እንድችል በቀረበው ጥያቄ መሰረት ይህንን ፅሑፍ ያነበብኩት/የተነበበልኝ ሲሆን ጥናቱ በሚመለከት ግልፅ ያልሆኑልኝን ነገሮች እንድጠይቅና ማብራሪያ እንዳገኝ ዕድል ተሰጥቶኛል፡፡ በዚህ መሠረት በጥናቱ ለመሳተፍ ፈቅጃለሁ፡፡

ፊርማ_____
ቀን_____

የቃለ መጠይቅ አቅራቢው ፊርማና ቀን----------

ተጠያቂው ለመሳተፍ ፈቃደኛ ናቸዉ ---------- *1*

ተጠያቂው ለመሳተፍ ፈቃደኛ አይደለም ---------- *2* (መጠይቁ እዚህ ላይ ያበቃል)

ክፍል -2-

ተጠያቂውን የተመለከቱ መሰረተዊ መረጃዎች

201. ቃለ መጠይቁ የተጀመረበት ጊዜ	ሰአት ደቂቃ		
202 የተጠያቂው ስም:			

203 ተጠያቂው ከ (የህፃኑ ስም) ጋር ያለው ግንኙነት (ትክክለኛዉን ክበብ)

1. አባት .	2. እናት	3. ወንድም(እህት)	4. አያት	5. .ዘመድ
6. ዝምድና የሌለዉ	7. ሌላ ካለ ይጠቀስ ----------			

204. ተጠያቂው መፃፍና ማንበብ ይችላል?	1.አዎ	2.የለም	→ 206
205. ያጠናቀቁት የትምህርት ደረጃ		0 =ከአንድ ዓመት ያነሰ 1 = 1ኛ ክፍል 2 = 2ኛ ክፍል 3 = 3ኛ ክፍል 4 = 4ኛ ክፍል 5 = 5ኛ ክፍል 6 = 6ኛ ክፍል 7 = 7ኛ ክፍል 8 = 8ኛ ክፍል 9 = 9ኛ ክፍል	10 =10ኛ ክፍል 11 =11ኛ ክፍል 12 =12ኛ ክፍል 13=10+ ዲፕሎማ 14=12+ ዲፕሎማ 15= ዩኒቨርሲቲ

206 በጥያቄና መልሱ ወቅት ሌላ ሰው ነበረን?	1. አዎን		2. የለም	
በቃለ መጠይቁ ወቅት የነበሩ ሰዎች (የነበሩትን ሰዎች)	በቃለ መጠይቁ ወቅት የነበሩ		ምሕመም ጊዜ የነበሩ(ታሞ ከነበረ)	
	አዎን	አይደለም	አዎን	አይደለም
1. አባት .	1	2	1	2
2. እናት	1	2	1	2
3. ወንድም(እህት)	1	2	1	2
4. አያት	1	2	1	2
5. ክሰት/አጎት	1	2	1	2
6. ዘመድ	1	2	1	2
7. ጎረቤት	1	2	1	2

8. ሌላ ይጠቀስ _____	1	2	1	2
207. የሚች ወይም ተነባባሪ ስም				
208 . የሚችወይም የተነባባሪው እድሜ (በቀናት)				
209. የሚችወይም የተነባባሪውጾታ	1. ወንድ 2. ሴት			

ክፍል -3-

የኑሮ ደረጃ ና መተዳደሪያዎች

301 ዋነኛው የበተሰቡ የገቢ ምነጭ ምንድነው? ማስተወሻ፡ለጥያቄ ቁጥር (301) ሁለት ግዜ አማራጮቹን በማንበብ ምላሾቹ ከአንድ በላይም ቢሆኑ ሁሉንም ምላሾች አክብብ፡፡	1. ገበሬ 2. የቤት እመቤት 3. የግንባተ ሰራተኛ 4. የንግድ ስራ 3 .የቀን ሠራተኛ 4 .የጥቃቅን ንግዶች ነጋዴ 5 .ልብስ ሰፊ /ፀጉር ሠሪ 6. አስተናጋጅ /የቡና ቤት ሠራተኛ 7. ከውጭ ሀገር በሚላክ የቤተሰብ ገንዘብ ድጋፍ 8.ጠላ፣ ዓረቄ፣ ሌሎች የአልኮል መጠጦች ሻጭነት/ጠማቂ 9. የቧንቧ ስራ ፤አናፂነት ፤መካኒክ ፤ 10 ምሩቅ (የጤና ባለሙያ ፤የህግ ባለሙያ ፤መምህር ፤የግንባታ ባለሙያ ሌሎች 11.ጡረታ 12. የቀን ስራ---------- 13. ሌላ የገቢ ምንጮች ይጠቀስ----------
302. የምትኖርበት ቤት ይዞታ/ባለቤትነት	1. የራሴ 2. መስራቤት ነው የሰጠኝ 3. ዘመዶቼ / ልጆቼ የሰጡኝ 4. ከቀጣሪዬ የተከራየሁት 5. ከቀበሌ የተከራየሁት 6. ከግለሰብ የተከራየሁት 7. ከሌላ ድርጅት ከተከራየ ይጠቀስ----------
303. የምትኖርበት ቤት ምን ያህል ክፍሎች አሉት	የክፍሎች ብዛት
304. ለሰዎችና ለ እንሰሳት የተለያየ ቤት አለ ወይ?	1. አለ 2. የለም
305. የምትኖርበት ቤት የተለያየ ማብሰያ ቤት አለዉን?	1. አለ 2. የለም
306. የምትኖርበት ቤት ምን ያህል መስኮቶችአሉት?	

307. የቤትዎ ጣራ በዋናነት የተሰራበት ነገር/ቁስ ምንድን ነው?	1.ቆርቆሮ 2.የሣር ክዳፍ/ሣር	3.ሌላ (ይገለፅ) …… ……
308. ወለሉ ከምን የተሰራ ነው?	1. አፈረ 2. ሲሚንቶ 3. ጣውላ 4. ሰሌን --	5. ሽክላ- 6. ፕላስቲክ ምንጣፍ 7. ስጋጃ ምንጣፍ 8. ሌላ ይጠቀስ----------
309. ቤት ውስጥ ምን ያህል ግዜ ያበስላሉ?	1. ሁል ግዜ 2. አንድ አንድ ጊዜ 3. እንደውም አላበስልም	
310. አብዛኛውን ግዜ የሚጠቀሙበት ማገዶ አይነት	1. ከጫካ በሚሰበሰብ የማገዶ እንጨት 2. በግዢ የሚገኝ 3. ከሰል 4. ነጭ ጋዝ 5. ኤሌክትሪክ 6. የዛፍ ቅጠል /ኩበት 7. ሌላ ይጠቀስ	
311. ለቤተሰቡ የሚያገለግል ሽንት ቤት አለወይ?	1. አለ 2. የለም	→ 314
312. ቤተሰቡ የሚጠቀምበት የመፀዳጃ/የሽንት ቤት አገልግሎት ምን ዓይነት ነው?	1 = የግል ንብረት የሆነ ዘመናዊ በውኃ የሚሠራ 2 = ከሌላ ቤተሰብ ጋር በጋራ የሚጠቀሙበት ዘመናዊ በውኃ የሚሠራ 3 = የግል ንብረት የሆነ የጉድጓድ ሽንት ቤት 4 = ከሌላ ቤተሰብ ጋር በጋራ የሚጠቀሙበት የጉድጓድ ሽንት ቤት 5 = መያዣ ዕቃ (ከቤተሰብ ቁሳቁሶች አንዱ) 7 = ሌላ (ይገለፅ) ……	
313. ሽንት ቤት ከለ የቤተሰብ አባላት ብዙውን ጊዜ ሽንትቤት ይጠቀማሉ ወይ;	1.አዎ ሁልጊዜ 2.አንድ አንድ ጊዜ 3.አይጠቀሙም	
314. የመጠጥ ውሀ ከየት ያገኛሉ?	1. ከቧንቧ 2. ከተጠበቀ ጉድጓድ 3. ካልተጠበቀ ጉድጓድ 4. ከምንጭ 4. ከዝናብ 5. ከወንዝ(ኩሬ) 6. ሌላ ካለ ይጠቀስ	
315. ቤተሰቡ የእርሻ መሬት አለው ወይ?	1.አዎን 2.የለውም	→ 317
316. መልሱ አለ ከሆነ ምን ያህል ነው?	ጥማድ_____	

	ገመድ_____ ቃዳ_____	
317. ቤተሰቡ የቤት እንሰሳት አሉት ወይ ?	1. አዎን 2.የለውም	→ 319
318. ቤተሰቡ ከዚህ በታች ከተጠቀሱት የቤት እንሰሳት ምን ያክል አሉት?		
	ፈን ..... በሬ..... የወተት ላሞች፤..... ፈረስ..... አህያ..... በቅሎ..... በግ..... ዶሮ	

319. አንድ ቤተሰብ ወይም ግለሰብ በንብረትነት ሊኖሩዋቸው ስለሚችሉ ቁሰቁሶች ላንሳ፡፡ በቤተሰብዎ ባለቤትነት እና በእርስዎ የግል ንብረትነት ስለሚታወቁ ንብረቶች/ቁሳቁሶች ልጠይቅዎት፡፡ *ዝርዝሩን ያንብቡት፡፡ አንድ ዕቃ በቤተሰቡ ውስዋ የሚዎኝ ንብረት ከሆነ 1ን የማይገኝ ከሆነ 2 ያክበቡ፡፡*	የእቃ ዐይነት	አለ	የለም
	1=የኤለክትሪክ መብራት	1	2
	2 = ሬድዮ	1	2
	3= ቴሌቪዥን	1	2
	4=ቴሌፎን/ስልክ	1	2
	5=ሞባይል ቴሌፎን (ተንቀሳቃሽ ስልክ)	1	2
	6=የኤለክትሪክ ምጣድ	1	2
	7=ትራዝ	1	2
	8=አልጋ	1	2
	9=ማረሻ	1	2
	10=የራስ/የግል ማሳ/የእርሻ መሬት	1	2
	11=ሞተር ብስክሊት	1	2

	12=ጋሪ	1	2
	13= ጥሬ ገንዘብ የሚያስገኙ አህሎች (ሰሊጥ፣ ቡና፣ ማር፤ቀቤ፤ጤፍ ወዘተ)	1	2
	14=ጠረጴዛ	1	2
	.15=ማቀዝቀዣ	1	2
	16=በኤለክትሪክ / በጋዝ የሚሰራ ምድጃ	1	2
	17= መኪና	1	2
	18=¨ወንበር	1	2
320. ከሚያገኙት ገቢ ላይ ለወደፊት የሚቆጥቡት ገንዘብ አለ ወይ?	1=አለ 2= የለም	→ 323	
321. የሚቆጥቡት ገንዘብ ካሎ ገንዘብዎን የሚቆጥቡት የት ነው *ዝርዝሩን ኢያንብቡ፡፡ ከአንድ በላይ መልሶች መስጠት ይቻላል፡፡ ተሳታፊው ተጨማሪ መልስ እንዲያቀርቡ 'ሌላስ' እያለ በማግባባት አጥብቀው በመጠየቅ መልሶቹን ይክበቡ፡፡*	1.ባንክ 2.ማይክሮ ፋይናንስ ድርጅቶች- 3.እቁብ 4.በቤት 5.ጓደኛ /ዘመድ ጋር 6.ሌላ ይጠቀስ _____		
322. በአሁኑ ሰአት የቆጠቡት ገንዘብ ምን ያህል ደርሷል	|___|___|___|___| ብር 98=ለመመለስ ፈቃደኛ ካልሆኑ		
323. ቤተሰብዎን ያገንዘብ ችግር ቢገጥመው ሊያበድሮ የሚችል ሰው ወይም ተቋም ያለ ይመስሎታለ ወይ?	1.በትክክል አለ 2.ሚያበድሩኝ ይመስለኛል 3.ሚያበድረኝ አይመስለኝም 4.በፍፁም የለም		
324. የቤተሰቡ ዋና የገቢ ምንጭ ምንድን ነዉ	የገቢ ምንጭ_____		
325. በቅርብ ያለው ጤና ተቋም ምንድን ነው?	1. ሆስፒታል 2. ጤና ጣቢያ 3. ክሊኒክ (የግል) 4. የጤና ኬላ		
326.መኖሪያው በቅርበት ካለው ጤና ተቋም ያለው አማካይ	_____በቀን		

ርቀት፡፡	---------- በኪ.ሚ
327. መኖሪያው በቅርበት ካለው ሆስፒታል ያለው ርቀት	_____በቀን ---------- በኪ.ሚ

328. የቤተሰቡ አባል ሲታመም የጤና ግልጋሎት የሚያገኘው ከየት ነው

	1. ከባህል ሀኪም	2.ከእምነት ተቋማት	3. ከህዝብ ሆስፒል	4. ከጤና ጣቢያ	5. ጤና ኬላ
	6. ግል ክሊኒክ	7. ከፋርማሲ	8. ጠበል	9. ሌላ ካለ ይጠቀስ	

ክፍል-4-	**የእናቶች ጤና እና ተያያዥ ጉዳዬች መረጃ**		
401. ህፃኑ በተወለደ/በሞተ ግዜየእናትዳዋ እድሜ ምን ያክል ነበር?	☐☐ ዓመት አላዉቅም……98		
402. የእናትያው የጋብቻ ሁኔት	1.ያገባች. 2.ያላገባች.	3.የፈታች 4.የተለያየች. 5. ባሏ የሞተባት	
403. የእናትየው የትምህረት ሁኔታ	0 =ከአንድ ዓመት ያነሰ 5 = 5ኛ ክፍል 10 =10ኛ ክፍል 1 = 1ኛ ክፍል 6 = 6ኛ ክፍል 11 =11ኛ ክፍል 2 = 2ኛ ክፍል 7 = 7ኛ ክፍል 12 =12ኛ ክፍል 3 = 3ኛ ክፍል 8 = 8ኛ ክፍል 13=10+ዲፕሎማ 4 = 4ኛ ክፍል 9 = 9ኛ ክፍል 14=12+ዲፕሎማ 15= ዩኒቨርሲቲ		
404. የአባት የትምህርት ሁኔታ?	0 =ከአንድ ዓመት ያነሰ 5 = 5ኛ ክፍል 10 =10ኛ ክፍል 1 = 1ኛ ክፍል 6 = 6ኛ ክፍል 11 =11ኛ ክፍል 2 = 2ኛ ክፍል 7 = 7ኛ ክፍል 12 =12ኛ ክፍል 3 = 3ኛ ክፍል 8 = 8ኛ ክፍል 13=10+3 ዲፕሎማ 4 = 4ኛ ክፍል 9 = 9ኛ ክፍል 14=10+2 ዲፕሎማ 15= ዩኒቨርሲቲ		
405. የእናትየው ስራ?	1. የቤት እመቤት 2. የፋብሪካ ሰራተኛ 3. የመንግስት ሰራተኛ	6. የቀን ሰራተኛ 5. አርሶ አደር	
	6. ሌሎች ይጠቀሱ		
406. የቤተሰቡ ቁጥር ምን ያህል ነው?	☐☐		

407. እናትየው የቅድመ ወሊድ ክትትል ነበራት (	1.አዎን 2.የለም አላውቅም.....98	→ 412
408. የቅድመወሊድ ክትትል ከነበራት ክትትሉን የጀመረችው መቼ ነበር?	1. በመጀመሪያ ያመቹ ሶስት ወራት 2. ቡለተኛወቹ ሶስት ወራት 3. በመጨረሻዎቹ ሶስት ወራት	
409. የቅድመ ወሊድ ክትትሉን ተደርግ የነበረው የት ነበር?	1. ሆስፒታል 3. ጤና ኬላ 2. ጤና ጣቢያ 4. የግል ክሊንክ	
410. በቅድመ ወሊድ ክትትሉን ታደርግ በነበረ ወቅት ያገጠመ ችግር ነበር ወይ?	1. አዎን 2. የለም	→ 412
411. ያጋጠመ ችግር ከነበረ ያገኘሽው ምክር/ድጋፍ ነበር ወይ?	1. አዎን 2. የለም 98. አላውቅም	
412. የቴታነስ ክትባት በእርግዝና ወቅት አግኝታ ነበር ወይ?	1. አዎን 2. የለም 98. አላውቅም	
413.አግኝታ ከነበር ለምን ያክል ግዜ ወስደች?	የክትባት ብዛት ☐ 98.አላውቅም	
414.አሁን የእናትየው የጤና ሁኔታ ምን አይነት ሁኔታ ላያ ይገኛል?	1. ጤናማ 2. ታማሚ 3. በህይወት ያለችም 98. አላውቅም	
415. ውርጃ አጋጥሞሽ ያውቃል ወይ?	1. አዎን 2. የለም 3. አላውቅም	→ 417
416. ምን ያህል ጊዜ አስወረደሽ?	የውርጃ ቁጥ ☐	
417. ከዚህ ቀደም በተወለደ በአንድ ወር ጊዜ ውስጥ ሞቶ የሚያውቅ ልጅ አለሽ ወይ?	1.አዎን 2.የለም	→ 419
418. ሞቶ የሚያውቅ ልጅ ከለዎ በቁጥር ሞን ያህል ናቸው?	ቁጥር ☐	

419. ከመጨረሻ ልጅሽ በፊት የነበረው ርግዝና የተወለደው በትክክለኛው ግዜ ነበረ ወይ?	1. በቀኑ ነው 2. ከቀኑ ቀደም ነዉ 3. ከቀኑ ዘግይቶ ነዉ 98.አላውቅም	

ክፍል- 5					
	ከእርግዝና ጋር ተያያዥ የሆኑ ጥያቄዎች				
501. ምን ያህል ልጆችን ወልደዋል ሞቱ የተወለደ ህፃን ከለ እርሱን ጨምሮ?	☐ ቁጥር 98. አላውቅም				
502. የመጨረሻ ልጅዎ ሲወለድ የስንት ወር ነበር? (ለሚችም ለተነፃፃሪም)	የእርግዝና ወራት ☐ 98. አላውቅም				
503. ርግዝናዉ ከቀኑ ቀደሞ ነበረን?	1. አዎን 2. የለም 98. አላውቅም				
504. መጨረሻ ልጅን ባረገዙ ወቅት ቀጥሎ ከተጠቀሱት ህመሞች ያገጠሞት የጤና ችገር አለን?		አዎን	የለም	አላውቅም	
	1.የደም ብዛት (ግፊት)	1	2	98	
	2.የልብ በሽ	1	2	98	
	3. የስኳር በሽ	1	2	98	
	4.የሚጥል በሽ	1	2	98	
	5.ሌላ ያገጠመዎት ህመም ካለ ይጥቀሰ ----------				
505. በመጨረሻዎቹ ሶስት የርግዝና ወራት ብቻ ቀጠሎ ከተጠቀሱት ህመሞች ያገጠሞት ካለ ይጥቀሱ		አዎን	የለም	አላውቅም	
	1.የማህፀን የደም መፍስስ	1	2	98	
	2.መጥፎ ጠረን ያለው የብልት ፈሳሽ	1	2	98	
	3.የፊት ማበጥ	1	2	98	
	4. .የራስ ምተት	1	2	98	
	5. የእይ መደብዘዝ/ብዥጥ	1	2	98	
	6. የሚጥል በሽተ	1	2	98	
	7. ንዳድ/ትኩሳት	1	2	98	

	8.የሆድ ቁርጠት	1	2	98	
	9. የትንፋሽ ማጠርና መገርጣት	1	2	98	
	10. ሌላ ያገጠሞት ህመም ካለ ይጠቀሰ				
506.ህፃኑ ሲወለድ አንድ ነበር ወይስ መንተ?	1. አንድ 2. መንተ 3. ሶስት/ ከዚያ በላይ 98.አላውቅም				
507. ህፃኑ ስንተኛ ልጅሽ ነው?	1. አንደኛ 6.6 ና ከዛ በላዩ 2. ሁለተኛ 3. ሶስተኛ 4. አራተኛ 5. አምስተኛ				
508. የመጨረሻ ልጅሽን ባረገዝሽና ክሱ ቀደም የነበረውን በወለዱበት መሃል ያለው ግዜ ምን ያህል ነው፡፡	1.አንድ አመት 2.አንድ አመት ተኩል 3.ሁለት አመት 4.ከሁለት አመት በላይ 98.አላውቅም				
509. የመጨረሻ ልጆን ከወለዱ በውሃላ ባሉት ሰባት ቀናት ውስጥ ለድህረ ወሊድ ክብካቤ ባለሞያ አግንተዋል ወይ?	1.አዎን 2. የለም 98.አላውቅም				

<u>ክፍል -6</u>

<u>ወሊድን የተመለከቱ ጥያቄዎች(DELIVERY HISTORY)</u>

601. የሽርት ውሃሽ መች ፈሰሰ	1. ምጡ ከመጀመሩ በፊት 2. ምጡ ከጀመረ በውሃላ 98. አላውቅም	
. 602. የሽርት ወሀሽ ከፈሰሰ ከምን ያህል ግዜ በውሀላ ልጁ ተወለደ? -	1. ከሀያ አራት ሰአት ያነሰ 2. ከሀያ አራት ሰአት በውሀላ 98. አላውቅም	
Question 603 – 607 ለሞቱ ልጆቸ ብቸ (only for cases)		
603. የሽርት ወሀዉ መጥፎ ጠረን ነበረዉን ?	1. አዎ 2. አይደለም 98 አላውቅም	
604. ሕጻኑ በማሕፀን ዉስጥ ያለ መነቀሳቀቀስ አቁሞ ነበርን?	1. አዎ 2. አይደለም 98. አላውቅም	→ 606
605. ሕጻኑ በማሕፀን ዉስጥ ያለ መንቀሳቀቀስ ያቆመዉ መቸ ነበር?	1. ምጥ ከመጀመሩ በፊት 2. በምጥ ወቅት 98. አላውቅም	

606. በቅድመ ወሊድ ክትትል ወቅት የህፃኑ የልብ ምት ይሰማ ነበርን?	1.. አዎ 2. አይደለም 98. አላውቅም	
	608- 614 ለሚችም ለተነባባሪም(Both cases and controls)	
607. ምጥ የጀመረዎት ዕለት ከፍተኛ የሁነ የደም መፈስስ ገጥሞዎት ነበርን?	1.አዎ 2.አይደለም 98. አላውቅም	
608. ምጡ የጀመሮት ዕለት ንዳድ/ ትኩሳተር ነበሮት ወይ?	1. አዎ 2. አይደለም 98. አላውቅም	
609. ምጡ ምን ያህል ቆይቶዎት ነበር?	1. ከ 12 ሰአት በተች 2. ከ 12-24 ሰአት 3. ከ 24 ሰአት በላይ 98. አላውቅም-	
610.ሕፃኑ የተወለደዉ በማሕጸን ነበርን?	1. አዎ 2. አይደለም 98. አላውቅም	→ 613
612. በምን ዐይነት መንገድ ተገለገሉ?	1. ፎርሴፕስ/ ቫኪዉም በመጠቀም ተጎትቶ 2. በቀዶ ጥገና 98. አላውቅም 3. ሌላ ከለ የገለጸ	
613. ቀድሞ የመጣው የህፃኑ አካል ምንድን ነበር?	1. ጭነቅለቱ/ራሱ 2. መቀመጫው /ቂጡ 3. እግሮቹ 4. እጅ 98. አላውቅም 6. ሌላ ይጠቀስ	
614. ህፃኑ ሲወለድ ከህፃኑ እትብቱ ቀድሞ ነበር ወይ?	1. አዎ 2. አይደለም 98. አላውቅም	

<u>ማስታወሻ፡</u>

ከክፍል 7-12 ስር የተዘለዘሩት ጥያቄዎች የሚመለከቱት ከተወለዱ በኋላ ወይም ሲወለዱ የሞቱ ህፃናትን ወላጆች ወይም በቅርብ ሁኔታውን ለሚያዉቅ ሰዉ ብቻ ይሆናል፡፡

ክፍል 7 ፡ **ስለ ሞቱ ህፃናት የሞቱበት ቀንና ቦታን የተመለከተ መረጃ**			
701.**የሞተው ህፃን ስም ማን ይባላል?** **(*interviewer, use NA for stillbirths*)**	**ስም** ----------		
702. **የሞተው ህፃን ፆታ ምንድን ነው?**	1. **ወንድ**	2. **ሴት**	
703 **የሞተው ህፃን የተወለደው መቼ ነው?** - **ቀን/ወር/ዓ.ም** -----/------/--------- ***ቀኑን ወይም ወሩ የማይታወቅ ከሆነ 98 ይሞላ*** ***ዓመተ ምህረቱ የማይታወቅ ከከሆነ 9998 ይሞላ***			
704. **በሞተ ጊዜ ዕድሜው ምን ያህል ቀን ነበር?**			
705. **ህፃኑ መቼ ሞተ?** **ቀን/ወር/ዓ.ም**------/-----/----- ***ቀኑን ወይም ወሩ የማይ ወቅ ከከሆነ 98 ይሞላ*** ***ዓመተ ምህረቱ የማይ ወቅ ከከሆነ 9998 ይሞላ***			
706. **ህፃኑ (ስም) የት ሞተ?**	1. **ሆስፒተል**	2. **ጤና ጣቢያ**	3. **ጤና ኬላ**
	4.) **ወደ ጤና ድርጂት በመጉዋዝ ላይ ያሉ**		5. **ቤት ዉስጥ**
	6. **ሌላ ከለ ይጠቀስ**		

707. **የሞተው ጤና ተቋም ውስጥ ከሆነ የጤና ተቋሙ ስምና አድራሻ ይጠቀስ**

<u>ክፍል 8</u>

<u>ክፍት ጥያቄ</u>

801. ህፃኑ ስለሞተበት ምክንያት (ህመም) ቢነግሩኝ?

<u>ማስታወሻ</u> ፡

መላሹ/ሻ በራሱ/ሳ ቋንቋ ስለሞቱ ምክንያት አንድ ባንድ በቅደም ተከተል ንዲያብራራ ይጠየቅ፡ (ህመሙ የጀመረበትን ሳዐት ይጠይቁ፤ ከዘያስ በማለት ቀጥሎ የተከሰተዉን ህመም ወይንም ሁኔታ በመጠየቅ በቅደም ተከተል የሞቱን ምክንያት ለማጣራት ይሞክሩ) ተናግረው ንደጨረሱም ከተረዳህ በኋላ ሌላስ ምልክት አልነበረውም ወይ በማለት በጥልቀት ንዲያብራሩ አነሳሳቸው መላሹም ምንም ተጨማሪ ነገር የለም ስከሚል ንዲያብራሩ ቀስቅሳቸው በስተመጨረሻም መላሹ የተጠቀመባቸው ያልተለመዱ አይነት ቃላት ላይ ከስራቸው አስምር

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802 መላሹ አንደኛ የሞት ምክንያት ብሎ የሚያስበው ምንድን ነው?

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_____

803 መላሹ ሁለተኛ የሞት ምክንያት ብሎ የሚየስበው ምንድነው?

<u>ማስተወሻ</u>፡ በገጽ 12 የመላሹ ማብራሪያ ውስጥ የተዘረዘሩትን የበሽታ ምልክቶች በሚከተለው ሰንጠረዥ ውስጥ በመዘርዘር አስቀምጡ ይህንንም ቀሪውን መጠይቅ በምትሞሉበት ጊዜ ለማገናዘብ ተጠቀሙበት

804. የበሽታው ምልክቶች	**የበሽታው ምልክት የጀመረበት ቀን**	**የበሽታው ምልክት የቆየበት ቀን**	**የበሽታው ምልክት ጥንካሬ ቀላል/ መካከለኛ/ ከባድ**
804.1	-		
804.2			
804.3			
804.4			
804.5			
804.6			

<u>ማስተወሻ</u>፡ በተቻለ መጠን ያከባቢዉን የህመም ምልክት መጠሪያ ይጠቀሙ

805 ሕመሙ ከጀመረበት ጊዜ ጀምሮ ህጻኑ/ እስከሞተበት/ችበት ጊዜ ድረስ ምን የህል ቀናት ይሆናል ቀናት.----------				
806 ህፃኑ በታመመ ጊዜ ህክምና ተደርጎለት ነበር ወይ?	**1.አዎ**	**2. የለም**	**3.አላውቅም**	→ 808

807. ከቤት ውጭ ህክምና ተደርጎለት ከነበረ ህክምና ያደረገላት/የት /ማን ነበር?----/----

<u>ማስታወሻ</u>፡

መላሹ ዝርዝር እንደጨረሰ ሌላስ ቦታ አልተወሰደም ወይ በማለት የቀረ ቦታ ካለ እንዲዘረዘር አነሳሳ፡፡

1. የባህል ሀኪም	2. የሀይማኖት አባት	3. የመንግስት ሆስፒታል	4. ጤና ጣብያ	5. ጤና ኤክስተንሽን ባለሙያ
6. የግል ክሊኒክ	7. ፋርማሲ	8. ዘመድ/ጓደኛ	9. ጠበል	
10.ሌላ ከለ ይጠቀስ				
808 ሕጻኑ ከመሞቱ በፊት የነበረዉ ህመም ምን የህል ቀናት ፈጀ				

<u>ክፍል 9</u> **<u>የአደጋ/ አካላዊ ጉዳት መረጃ</u>**		
901. ህፃን የሞተው በአደጋ/በአላዊ ጉዳት ነው ወይ?	**1. አዎ**	

	2. አይደለም 3. አላውቅም	
902. በአደጋ ከሆነ የሞተው የገጠመው አደጋ ምንድን ነበር?	1.የመኪና አደጋ 2.የመውደቅ አደጋ 3.የመስጠም 4.መርዝ 5.የሳት አደጋ 6.በመደበደብ 7.በንስሳት/ነፍሳት መነከስ	
903. አደጋው የተከሰተው በሰው ምክንያት ነው ወይ?	1.አዎ 2.አይደለም 98.አላውቅም	→ 905
904. አደጋው የተከሰተው በሰው ምክንያት ከሆነ የደጋው አይነት ምንድን ነው	1. በግርዛት ምክንያት 2. እንጥል መቁርጥ 3. ጉሮሮ መቡዋጠጥ 4. ግግ ማዉጣት 5. ሌላ ከለ ይጠቀስ	
905. አደጋው የደረሰው በ እንስሳት/ነብሳት ንክሻ ምክንያት ነው ወይ?	1.አዎ 2.አይደለም 98.አላውቅም	→ 906
906.የንክሻ አደጋ ከደረሰበት የነከሰው እንስሳ ምንድ ነበር ?	1=ውሻ . 2=እባብ 3=ነብሳት 4=ሌላ ናለ ይጠቀስ 98=አላውቅም	
907. ህፃኑ ያረፈው አደጋው በደረሰበት ቦታ ነውን?	1=አዎ 2=አይደለም 98=አላውቅም	
908. አደጋው ከደረሰበት በውሃኋላ ህፃኑ ለምን ያህል ጊዜ በህይወት ቆየ?	1=ቀናት 2=ሰአተት 3=ደቂቃዎች	
909. ህፃኑ ከማረፉ በፊት የህክምና እርዳታ አግኝቶ ነበር ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	
910. ህፃኑ አብሮት የቆየ ህመም ነበረው ወይ ወይም አደጋው ከማጋጠሙ በፊት ህመምተኛ ነበርን?	1=አዎ 2=አይደለም 98=አላውቅም	→ 1001 → 1001
911. ሕምሙ ምን ነበር?	_____	

<u>ክፍል 10</u> **ህፃኑ እንደተወለደ የነበረውን ሁኔታ የተመለከቱ ጥያቄዎች**		
***1001.* ህፃኑ ሲወለድ የነበረዉ ክብደት**	**1=በጣም ትንሽ** **2= ትንሽ** **3=መከከለኛ** **4=ትልቅ** **5=በጣም ትልቅ** **98=አላውቅም**	
1002. **ህፃኑ የማህፀን ውስጥ እድገቱን ያልጨረሰ ነበር ወይ?**	**1=አዎ** **2=አይደለም** **98=አላውቅም**	→ 1004 → 1004
1003. **እርግዝናው የስንት ወር ነበር?**	**ወራት** ☐☐ **ሳምንት** ☐☐ **998=አላውቅም**	
1004. **ህፃኑ ሲወለድ ክብደቱ ምን ያክል ነበር?**	**ክብደት በኪሎ ግራም** ☐ **አላውቅም ----------98**	
1005. **ህፃኑ ከተወለደ በውሃላ በእትብቱ ጫፍ ላይ የተቀባ ነገር ነበር ወይ?**	**1=አዎ** **2=አይደለም** **98=አላውቅም**	→ 1007
1006. **ከተቀባ ምንድን ነበር የተቀባው?**	_____ _____	
***1007.* ከተወለደ በውሃላ የአከላዊ ጉዳት ምልክት / የአጥነት ስብራት ነበረው ወይ?**	**1=አዎ** **2=አይደለም** **98=አላውቅም**	→1009 →1009
1008. **የአከላዊ ጉዳት ምልክቶቹ በሰውነቱ የትኞቹ ክፍሎች ላይ ነበሩ?**	_____ _____ _____ _____	
1009. **የህፃኑ ሰውነት ላይ የመዛል ምልክት ይተይ ነበር ወይ?**	**1. አዎ** **2. አይደለም** 3. **አላውቅም**	
1010 **ህፃኑ ሲወለድ ያልተስተካከሉ የሰውነት ክፍሎች ነበሩ ወይ?**	**1. አዎ** **2. አይደለም** 3. **አላውቅም**	→ 1012 → 1012

1011. ያልተስተካከለ የሰውነት ክፍል ከነበረው ቀጥሎ ከተዘረዘሩት ምርጫዎች ውስጥ የትኛው እንደሆነ ይጠቀስ?	1=የጀርባ ላይ እብጠት 2=ትልቅ ጭንቅላት 3=ትንሽ ጭንቅላት 4=የከንፈር/የላንቃ መሰንጠቅ 5=ሌላ ጉድለቶች ከለ ይጠቀሰ _____ _____ 98=አላውቅም	
1012. ህፃኑ ሲወለድ የቆዳው ቀለም ምን ይመስል ነበር?-	1=የተለመደ 2=የገረጣ 3=ሰማያዊአማ 4=አላውቅም	
1013. ህፃኑ እንደተወለደ በጥቂቱም ቢሆን ይተነፍስ ነበር ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	→ 1015
1014. ህፃኑ ይተነፍስ ከልነበር መተንፈስ ንዲጀምር ድጋፍ ተደርጎለት ነበር ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	
1015. ህፃኑ እንደተወለደ አልቅሶ ነበር ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	
1016.ህፃኑ እንደተወለደ ጥቂትም ቢሆን ተንቀሳቅሶ ነበር ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	
ለመረጃ ሰበሰቢ ማሳሰቢያ፡ ጥያቄ ቁጥር 1013፣1015 ንዲሁም 1016 ያለው ምላሽን ያሰተዉሉ፤ ሕጻኑ፡ ከልተነፈሰ፤ ናላለቀሰ፤ ትንሽም በሆን ናለተነቀሳቀሰ፤		
1017. ሕጻኑ፡ ከልተነፈሰ፤ ከላለቀሰ፤ ትንሽም በሆን ከልተነቀሳቀሰ ህፃኑ ሞቶ ነበርየተወለደው? -	1=አዎ 2=አይደለም 98=አላውቅም	→ 1101 → 1101
1018 ህፃኑ ሞቶ ከነበር የተወለደወ <u>አከሉ መላለጥና መቆሳሰል</u> ጀምሮ ነበር ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	→ 1101

<u>ክፍል 11</u>

<u>የህፃኑን ህመም የተመለከተ መረጃ</u>

1101. ህፃኑ ጡት ወይም ጡጦ ይጠባ ነበር ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	→ 1106

1102. ተወለደ በምን ያህል ጊዜ ውስጥ ነው ህፃኑ ጡት መጥባት የጀመረው,	ሰአት ቀናት 98.አላውቅም	
1103. ህፃኑ መጥባት ጀምሮ ከነበር መጥባቱን አቋርጦ ነበር ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	1105 → 1105 →
1104. ከተወለደ ከምን ያክል ጊዜ በውላ ነው መጥባት ያቆመው?	1=አዎ 2=አይደለም 98=አላውቅም	
1105. ህፃኑ የእናቱን ጡት ወተት ብቻ ነበር ወይ የሚመገበው	1=አዎ 2=አይደለም 98=አላውቅም	
1106. ህፃኑ ከተወለደ በውሃላ ተንዘፍዝፎ/ተንቀጥቅጦ ያውቃል ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	1109 →
1107. ተንቀጥቅጦ የሚያውቅ ከሆነ ከተወለደ ከስንት ቀን በሁዋላ ነው ምልክቱን ያሳየው?	ቀናት 98=አላውቅም	
1108. የህፃኑ ሰዉነት ተወጥሮ(ተገትሮ) ያውቃል ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	
1109. ህፃኑ ከማረፉ በፊት እርግብግቢቱ አብጦ ነበር ወይ??	1=አዎ 2=አይደለም 98=አላውቅም	1111 →
1110. ህፃኑ ከተወለደ ከስንት ቀን በውሀላ ነው ርግብግቢቱ ያበጠው?	ቀናት 98=አላውቅም	
1111. ህፃኑ ራሱን ስቶ ያውቃል ወይ?	1=አዎ 2=አይደለም	1113 →
1112. ራሱን ስቶ ከነበር ከተወለደ በምን ያክል ጊዜ ውስጥ ነው የተከሰተው?	ቀናት 98=አላውቅም	
1113. ህፃኑ ከተወለደ በውሀላ ንዳድ(ትኩሳት) ነበረው ወይ?-	1=አዎ 2=አይደለም	1115 →

1114. ንዳድ ከነበረው ከተወለደ ከስንት ቀን በውሀላ ነው የጀመረው?	☐☐ ቀናት **98**=አላውቅም	
1115. የህፃኑ ሰውነት ሲነክ ከተለመደው በላይ ቀዝቀዞ ነበር ወይ?	**1**=አዎ **2**=አይደለም **98**=አላውቅም	→ 1117
1116. ከተወለደ ከምን ያህል ቀናት በውሀላ ነው ሰውነቱ የቀዘቀዘው?	☐☐ ቀናት **98**=አላውቅም	
1117. ህፃኑ ያስል ነበር ወይ?-	**1**=አዎ **2**=አይደለም **98**=አላውቅም	→ 1119
1118. ሳል ከነበረው ከተወለደ ከምን ያክል ቀናት በውሀላ ጀምረው?	☐☐ ቀናት **98**=አላውቅም	
1119. የህፃኑ አተነፋፈስ ከተለመደው በላይ የፈጠነ ነበር ወይ?	**1**=አዎ **2**=አይደለም **98**=አላውቅም	→ 1121
1120. ከተወለደ ከምን ያክል ጊዜ በውሀላ ነው አተነፋፈሱ የተቀየረው?	☐☐ ቀናት **98**=አላውቅም	
1121. ህፃኑ መተንፈስ ያስቸግረው ነበር ወይ?	**1**=አዎ **2**=አይደለም **98**=አላውቅም	→ 1126
1122. መተንፈስ ያስቸግረው ከነበር ከተወለደ በምን ያክል ጊዜ ውስጥ ጀመረው?	☐☐ ቀናት **98**=አላውቅም	
1123. ህፃኑ ሲተነፍስ ደረቱ ወደ ውስጥ ይገባ ነበር ወይ?	**1**=አዎ **2**=አይደለም **98**=አላውቅም	
1124. ህፃኑ ያቃስት ነበር ወይ?	**1**=አዎ **2**=አይደለም **98**=አላውቅም	
1125. ህፃኑ ሲተነፍስ አፍንጫው ይንቀሳቀስ ነበር ወይ ? (flaring of the nostrils)	**1.=አዎ** **2=አይደለም** **98=አላውቅም**	
1226. ሕጻኑን ለሞት ባበቃዉ ህመም ወቅት የሳምባ ምች/ኒሞኒያ ይዞት ነበርን?	**1.=አዎ** **2=አይደለም** **98=አላውቅም**	

1127. ህፃኑ ተቅማጥ ነበረው ወይ?	**1.=አዎ** **2=አይደለም** **98=አላውቅም**	→ 1130 → 1130
1127. ተቅማጥ ከነበረው ከተወለደ ከምን ያክል ቀናት ውስጥ ጀመረው?-	☐☐ ቀናት **98=አላውቅም**	
1128. በቀን ስንት ግዜ ያስቀምጠው ነበር?	☐☐ የተቅማጥ ድግግሞሽ በቁጥር **98=አላውቅም**	
1129. በተቅማጡ ውስጥ ደም ነበረበት ወይ?	**1=አዎ** **2=አይደለም** **98=አላውቅም**	
1130. ህፃኑ አስመልሶት ነበር ወይ?	**1=አዎ** **2=አይደለም** **98=አላውቅም**	→ 1133
1131. ያስመልሰው ከነበር ከተወለደ በምን ያክል ጊዜ ውስጥ ነው የጀመረው?	☐☐ ቀናት **98=አላውቅም**	
1132. ብዙ ባስመለሰዉ ጊዜ በቀን ምን ያህል ጊዜ ያስመልሰው ነበር?	☐☐ **98=አላውቅም**	
1133. ህፃኑ ሆዱ ተነፍቶ ያውቃል ወይ?	**1=አዎ** **2=አይደለም** **98=አላውቅም**	→ 1135
1134. ከተወለደ ከስንት ቀናት በውሀላ ነው ሁዱ ያበጠው?	☐☐ ቀናት **98=አላውቅም**	
1135. የህፃኑ እምብርት አባቢ ቅላት/ ነበረወ ወይ?	**1=አዎ** **2=አይደለም** **98=አላውቅም**	
1136. ህፃኑ ቆዳ ላይ የቀሉ ሽፍታዎች ነበሩ ወይ ወይም ቆዳው ይላጥ ነበር ወይ?	**1=አዎ** **2=አይደለም** **98=አላውቅም**	

1137. የህፃኑ ውስጥ እጅ/ እግር ቢጫማ ሆኖ ያውቃል ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	→ 1201
1138. ህፃኑ በተወለደ ምን ያህል ጊዜ ውስጥ ነው እጅ እና እግሩ ውስጥ ቢጫማ የሆነው?	☐☐ ቀናት 98=አላውቅም	
1139. የ እግሩና የእጁ ቢጫነት ለምን ያህል ጊዜ ቆየ?	☐☐ ቀናት 98=አላውቅም	

ክፍል 12

የሕክምና የጤና ግልጋሎትን የተመለከቱ ጥያቄዎች

1201. ህፃኑ ለህመሙ ህክምና አግኝቶ ነበር ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	የሕክምና ግልጋሎት ከላገኘ ጥያቄዉን እዚህ ያቁሙ
1202. ለህክምና የተሰጡት መድሀኒቶች ምንድን ነበሩ? (ከመድሃኒት ማዘዣ ለይ የ ዘዙትን መደሃኒቶች ገልብጭ/ገልብጥ)	የመድሃኒተ ዝረዝር፡	

1203. ህጻኑ የጤና አገልገሎት ያገኘዉ ከየትኛዉ የጤና ድርጂት ነዉ?

1. የባህል ሀኪም	2. የሀይማኖት አባት	3. የመንግስት ሆስፒ ል	4. ጤና ጣብያ	5. ጤና ኤክስተንሽን ባለሙያ
6. የግል ክሊኒክ	7. ፋርማሲ		8. ዘመድ/ጋደኛ	9. በቤት ዉስጥ
10. ጠበል			11.አላውቅም	12=ሌላ ከለ ይጠቀስ ----------

1204. የጤና ባለሙያ የሞቱን ምክንያት ነግሮታል ወይ?	1=አዎ 2=አይደለም 98=አላውቅም	
1206. የጤና ባለሙያው ምን ነገሮት?	---------- ----------	

Annex D: Data tracking format

Table. 9. ምእራብ ሸዋ ዞን ጽህፈ መሪ ጤናና ተያያዥ መረጃወችን መከታተያ ቅፅ 07/04/04.

No	የሕናት ስም	ኣድማ.	የተወለደዉ ህፃን ሁኒታ		አሞላኙ (key)	ደህሪ ወሊዲ		ህፃኑ· የተወለደበት ቢታ·	የህፃኑ· ጾታ·	የተወለደበት ቀን (ቀን/ወር/ኣ.ም)	የሞተበት ቐን (ቀን/ወር/ኣ.ም)	የሰንት ወር ህፃን ኸበር	የናት የመ· የጤ ና ሁኒ ታ·
			-ጢናማ -ቀድሞ የተወለደ -ዘግይቶ የተወለደ - ሞቶ የተወለደ	-ውርጅ			(ኣለት/ የለትም)						
1													
2													
3													
4													
5													
6													
7													
8													
9													

ወረዳ_____ ቀበሌ_____ ጊኡነ ቀበሌ_____ ኮጥ_____ ስም እና ፊርማ_____

Declaration

I the undersigned declares that this is my original work has never been presented in this or any other university and all the source materials used for this thesis work has been duly acknowledged.

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Date of submission:_____

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

Name: Dr. Mitike Molla

Signature: _____

Date: _____