

**ASSESSMENT OF PREGNANCY OUTCOME WITH
EMPHASIS ON PERINATAL AND NEONATAL
MORTALITY IN DIRE DAWA TOWN, ETHIOPIA.**

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List of abbreviations

PMR-----	Perinatal Mortality Rate
NNM-----	Neonatal Mortality Rate
SBR-----	Stillbirth Rate
ENMR-----	Early Neonatal Mortality Rate
LNMR-----	Late Neonatal Mortality Rate
ANC-----	Antenatal Care
TBA -----	Traditional Birth Attendant
TTBA-----	Trained Traditional Birth attendant
EOC-----	Emergency Obstetric Care
CPD -----	Cephalo-Pelvic Disproportion
TT Vaccination-----	Tetanus Toxoid Vaccination
IMR-----	Infant Mortality Rate
LB-----	Live Birth
OR-----	Odds Ratio
COR-----	Crude Odds Ratio
AOR-----	Adjusted Odds Ratio

ABSTRACT

The commonly used pregnancy outcome indicators in developing countries are maternal mortality, abortion, perinatal, neonatal mortality, low birth weight and preterm births. About eight million perinatal deaths are reported annually in the world of which 40-60% is neonatal mortality and almost all are in developing countries. Many hospital based studies were conducted on those problems, while community based are very few. Therefore this community based cross sectional comparative study was conducted to assess the pregnancy outcome with emphasis on peri and neonatal mortality by delivery place and its associated factors in Dire Dawa town. The study was conducted between November 2002 and April 2003. A total of 1462 mothers who had children or had been pregnant for the last five years were participated in the study. Pre tested standardized questionnaires were used to obtain information on socio demographic, obstetric history and the condition of the new born and mothers during labor and neonatal period.

Analyses were made using EP INFO 4.6 statistical package and SPSS version 10.

In the study the following findings were found:

High perinatal mortality rate of 73/1000 live births with 38/1000 and 35/1000 live births being at home and in health institutions respectively.

High neonatal mortality rate of 47/1000 live births with 28/1000 and 19/1000 live births at home and in health institutions respectively.

Mothers who had 2-4 parity had more risk to perinatal mortality than primi Para mothers. (AOR 5.15, 95%CI 1.54, 17.23) and mothers who had 5+ parity had more risk to perinatal mortality than primi Para mothers. (AOR 4.38, 95%CI 0.65, 29.40)

In this study it is found that very small and small (mother's perceptions birth weight) neonates have more risk to neonatal mortality than neonates who had normal birth weight when they were born(AOR 3.61, 95%CI 1.75, 7.43) and also term babies had less risk to perinatal and neonatal mortality than babies born preterm it is statistically significant when it is entered into logistic regression model(AOR 0.28, 95%CI 0.11, 0.70) and (AOR 0.28, 95%CI 0.12, 0.63) respectively.

Mothers whose income were <300 birr per month had more risk to neonatal mortality than mothers whose income were >601 birr per month. (AOR 4.64, 95%CI 1.53,14.01) and mothers whose income were 301-600 birr per month had more risk to neonatal mortality than mothers whose income were >601 birr per month. (AOR 4.29, 95%CI 1.27, 14.50). Based on the above findings of the study the following recommendations were made.

Strengthening of the MCH/FP care unit at each level and encourage mothers to use FP services and improve quality of care , establishing and utilization of emergency obstetric care services with special emphasis of neonatal care and give special attention to empower of mothers and improve economic status and educational level of women.

INTRODUCTION

Pregnancy and childbirth are special event in women lives and in the lives of their families, this can be a time of great hope and joyful anticipation; it can also be a time of fear, suffering and even death. Pregnancy is associated with certain risk to health and survival both for the woman and for the infant she bears. The risks are present in every society and in every setting .In developed countries they have been overcome because every pregnant woman has access to special care during pregnancy and childbirth, in developing countries such is not the case (1).

Every day at least 1600 women die from the complication of pregnancy and childbirth globally.

Women's risk of dying from pregnancy related complications:

In developing countries--- 1:16

In Europe-----1:1400 and

In North America----- 1:3700.

A study found that in developing countries 37% of women had problems during pregnancy, 21% during labor and 6% during the postpartum period. Approximately from 9 to 15% of deliveries require higher-level care for serious complication in the women or her baby. (1, 2)

The most commonly used pregnancy outcomes for new born in developing countries include peri/neonatal mortality, low birth weight and preterm baby. Both peri and neonatal deaths are determined largely by delivery complications and delivery care as well as maturity of the foetus as reflected by birth weight and gestational age. (3)

Large proportions of infant deaths and disabilities have their origin in the perinatal period and are primarily determined by the condition of pregnant women and the circumstances of the birth rather than by the condition of the child itself. The underlined direct causes of these deaths relate to the health and nutritional status of the woman during pregnancy, the quality of care during pregnancy and delivery and the immediate care of the newborn. Maternal health care, female literacy, family planning and social support for women are both as a right and necessity for women themselves and to ensure the safe birth and healthy survival of the newborn. (4).

Neonatal deaths are generally associated with elements linked to maternal care during pregnancy and delivery while socio-environmental factors become more important determinants of infant survival during the post neonatal period.

Despite wide recognition that in rural Africa pregnancy is a hazardous time for both mother and child, there are few data quantifying the degree of risk. Most of the information about maternal and peri/neonatal mortality is related to hospital-based surveys. Although in many rural areas, few women deliver in hospital or health center, on the other hand, even when there have been complications during the pregnancy many women deliver at home, therefore most stillbirths and early neonatal deaths occur at home and information on the outcome of pregnancies can be obtained only by asking these women about their past obstetric history and by observations (5).

Currently more than half of all infants' death occurs during the first week of life largely as a result of poorly managed pregnancies and births, or because of the absence of a few simple life-saving gestures during the first critical moments of life, neither mother

nor infant will need high technology interventions or expensive drugs or equipment. The benefits of ensuring joint care for them both accrue not simply for families but to society as a whole (2).

The problem of perinatal and neonatal mortality is seriously under estimated in developing countries due to poor registration systems and inadequate information on stillbirth in most surveys. Hospital estimates are usually higher than community-based estimates. (6)

Perinatal and neonatal mortality is influenced by several biologic, environmental, socio demographic and socio economic factors. Improvements in prenatal, neonatal and obstetric care, good social conditions, the better environment and the demographic characteristics of mothers have contributed for the declining of perinatal mortality in the developed countries. Perinatal and neonatal mortality can differ by rural, urban and other locations even with in large demographic

Survey (7,8).

Neonatal survival rate as a measure of outcome is regularly used for medical audit purposes. In Kenya neonatal survival rate is still useful as an audit tool since the projected mortality rates are probably still very high. Its knowledge will help determined the broad developmental strategies to adopt for improving the provision of medical care (11).

Important component efforts to reduce the health risk of mothers and children are to increase the proportion of babies delivered under the supervision of trained birth attendant. Proper medical attention and hygienic conditions during delivery can reduce

risk of complication and infections that may cause death or serious illness to either the mother or the baby or both (9).

It is impossible to change socio-economic characteristic and cultural reproductive patterns overnight, good data collection will help to assess need and good coordinated maternity service can provide short-term improvements. The maternity services need to embrace: Primary care, which its emphasis on village & rural obstetric care including the teaching of traditional birth attendants, the training of midwives, doctors and established high-risk hospital care units.(10)

LITRATURE REVIEW

Magnitude of the problems

About eight million perinatal deaths are reported annually in the world almost all 98.0% is in developing countries, and nearly five million neonates die each year in the world of which 96% are in developing countries. (11)

Perinatal and neonatal deaths are the most significant contributors to infant's mortality and reduced life expectancy. Perinatal mortality in the developed world indicates a rate of 10/1000 live births (LB) or less, while in developing countries perinatal mortality range from 35/1000 LB to 100/1000 LB (3,12).

Des Gupta ET. Al. in India found that perinatal mortality (in medical college hospital) is 67. 2/1000 LB and 29. 3% was early neonatal deaths.

It is estimated that neonatal deaths in developing countries can account for nearly 50-60% of all infants' deaths.(13)

In most developing countries approximately half the infant deaths occur in the first months of life (that is the neonatal period). In some developing countries infant mortality rate ranging between 32.8 and 135.0 per 1000 live births. Neonatal death account for between 42 and 63 % of infant mortality and neonatal mortality can differ by rural, urban and other locations even with in large demographic survey. (7)

In Ethiopian context studies about perinatal and neonatal mortality have been conducted since 1970s.

Naeye et al found the perinatal mortality at Tikur Anbessa Hospital 1019 post partum examination were performed for perinatal disease. The overall PNM rate was

65.3/1000LB. The ratio of stillbirth (SB) to neonatal deaths was 2.7:1 indicating that maternal factors were dominant in causing the deaths. One third of the deaths were due to amniotic fluid infections, 15% to obstructed labor, 8% abruptio placenta, & the rest more than 20% were other specific disorder. The arrival of mothers at delivery center earlier in labor & improved obstetrical practices would probably have saved some infants in the categories. (14).

Frost .O in 1984 in Black Lion Hospital (BLH) conducted a study, which showed that: Stillbirth Rate (SBR) 52.6 /1000LB, PNM 8.6/ 1000LB and MMR 7.8 /1000LB Age, parity and socio- economic status of the mother are classical features that epidemiologists associate with perinatal death.(10)

Ghidey et al conducted studies in Addis Ababa & Jima hospitals from 1985-1989 and analyzed 4 251 deliveries and found a perinatal mortality rate 95. 9/1000 LB with the ratio of 3: 1 for stillbirth & early neonatal death. 41% of deaths were due to obstructed labor.(15)

Sahile Mariam Y. and Berhane Y. Studied neonatal mortality rate of 1334 singleton neonates born at three Addis Ababa hospitals prospectively followed during the neonatal period. They found the neonatal mortality rate to be 71.9/1000 LB. with early and late NMR of 50.9 and 20.9/1000 L.B. respectively. The main risk factors for perinatal mortality were being low birth weigh and prematurity.(16)

A Prospective community based study on pregnant women in rural community of south central Ethiopia was conducted and revealed that stillbirth 19 per 1000 live births,

perinatal mortality 45 per 1000 live births and neonatal mortality 37 per 1000 live births. (17)

In south western Ethiopia at Jimma teaching institute hospital a study showed that perinatal mortality rate is 138.9 per 1000 live births which is the highest in the world (12)

Factors Associated with Perinatal and Neonatal deaths.

Preterm birth

Preterm births are defined as a birth before 37 completed weeks of pregnancy.

In developing countries precise information on gestational lengths are scarce since exact dating is difficult because of an availability reliable menstrual data and non attendance to or late booking in antenatal care. It has been estimated that in the poorest countries up to 50% of all infants are born preterm, while in affluent societies the incidence of preterm birth ranges between 4 and 16%. Perinatal survival also depends to a large extent on delivery and new born care. Those infants born premature have higher risk of mental defects and other neurological sequelae, risk of infection and sepsis during neonatal period. (13,)

Low birth weight

UNICEF (1999) estimates that at the global level about 17% of infants are born with birth weight less than 2,500 grams. The prevalence of low birth weight is not uniform through out the world: in low income countries from about 10-30% as compared to developed countries 4-10%. Birth weight is determined mainly by duration of

gestational age and intrauterine growth rate. Low birth weight rate is considered as one of the determinants of perinatal and neonatal mortality. Neonatal illness in general closely related to low birth weight, low birth weight babies also tend to have higher mortalities. (3, 19)

Maternal factors

Maternal factors are known to influence the weight of the new born baby. Among the factors are: parity, birth interval, nutritional status as reflected by weight pre pregnancy weight for height and weight gain, health status of the mother indicated as the presence of anemia, antenatal infections or complication of pregnancy and behavioral conditions like antenatal attendance and physical conditions during pregnancy.(3,4)

Maternal nutritional status is probably the most important determinant of the birth weight and the probability of neonatal survival. Multi gravidity and parity also affects the nutritional status of the mother. If a woman can not recover fully from the effect of her last pregnancy and period of breast feeding before becoming pregnant again, her nutritional status might be expected to deteriorate with each successive pregnancy, which is called “Maternal Depression Syndrome”. This condition increases the risk of premature birth an low birth weight babies with lower chance of survival. (3, 11, 20)

Antenatal Care

Antenatal care is a broad term used to describe the medical procedures and care that are carried out during pregnancy. The over all aim of antenatal care is to produce a healthy

mother and baby at the end of the pregnancy. Planning for a safe delivery is an integral part of antenatal care. A series of health examinations with pre defined content should enable health personnel to identify ailments and other conditions in the mothers and her foetus (es) which may threaten the pregnancy.

There is however considerable variations in the content of antenatal care worldwide and there are no agreed criteria on what exactly constitute antenatal care. Many authors have agreed that it should consist of motherhood education prevention of potential problems, identification of common diseases, risk screening and referral of risk mothers. (3, 11, 20). Absence of health care deprives the pregnant women of timely identification of risk, iron supplementation and dietary advice which are important measures for the health of both the foetus and the mother.

Neonatal deaths are generally associated with elements linked to maternal care during pregnancy and delivery while socio-environmental factors become more important determinants of infant survival during the post neonatal period. It is estimated that neonatal deaths can account for nearly 50-60% of all infants' deaths in developing countries. Low socio economic status reflected by lack of education low utilization of health services and poor environmental sanitation leads to poor pregnancy outcome (stillbirth, low birth weight, early and late neonatal mortalities).(11,20)

Infections –It is one of the leading cause of perinatal and neonatal mortality in developing countries. Basd on hospital data suggest that nearly 7-54% of early neonatal

deaths and 30-73% of late neonatal deaths are associated with infections, (1.5-2 million neonatal deaths per year). (11)

According to WHO 30-40% of all neonatal deaths are explained by neonatal infections. Infections can either be transmitted from mother before birth or would begin after birth.

Rubella and Syphilis are commonly identified as the two important infections occurring before birth in developing countries. However, in several developed and African countries infections prior birth is one of the important determinants of premature and low birth weight babies.

The unhygienic circumstances of delivery and the associated environment are exposed to be a major cause of after birth infections. The major causes of death due to neonatal infections are tetanus, respiratory infections, diarrhea and sepsis. (11)

WHO has estimated that approximately 400,000 cases of neonatal tetanus occur annually. The vast majority of deaths are in developing countries resulting 340,000 neonatal tetanus deaths annually.

Risk factors for neonatal tetanus in developing countries relate to:

- Lack of immunization of mothers with tetanus toxoid
- Unhygienic delivery
- Unhygienic cord care during the first week of life. (11, 18)

Malaria in pregnancy:- pregnant women have an enhanced risk of malaria in regions where transmission rates are high. In low transmission areas, the entire population is at

risk, but pregnant women are especially vulnerable, particularly during epidemics. Pregnant women may be 1.6-4.9 times more likely to be admitted for malaria than other adults in low transmission areas. These results show that malaria is an important cause of malarial illness, poor pregnancy outcome and deaths.

The researchers recommended that

- To apply the available control measures, such as insecticide treated bed nets, in epidemic situations.
- Investigate the usefulness of providing preventative anti malarial drug treatment during pregnancy in low transmissions areas.(31)

Rationale of the study

- Perinatal, neonatal and infant mortality rates are the most important vital statistics used to assess maternal and child health program. They are indicator of the quality of antenatal care, medical services and general health services to the mother and the children.
- Follow up studies based on institutional deliveries are important to detect the magnitude of the problem, however a significant proportion of deaths might occur out side health care facilities and community based studies are limited. Therefore it is very important to initiate a study on perinatal and neonatal mortalities that include home and institution deliveries.
- Ethiopia like the majority of other developing countries has a problem of vital registration system. Moreover there are no attempts to date to estimate the problems in the community where unhygienic home deliveries are widely practiced.
- At present where the health policy of Ethiopia emphasizes the government commitment to improve the health status of the population in general, women and children in particular. This study is intended to provide base line information for planners and decision makers.

Objectives:**1. General objective:**

To Assess Pregnancy Outcome with emphasis on perinatal and neonatal mortality in Dire Dawa town.

2. Specific objectives

1. To assess the perinatal mortality by delivery place.
2. To assess neonatal mortality by delivery place.
3. To assess factors influencing delivery outcome by delivery place.

Methodology

Study Area:-

Dire Dawa is found in the eastern part of Ethiopia, 535 Km away from the capital city (Addis Ababa). It has an area of 1977 km². It has Kola and woina dega climate with a temperature of 20-38C⁰. Dire Dawa has neither zone nor woreda. It has 4 Higher with 24 kebeles and 30 peasant associations and has 341,809 population of which, 24, 8951 (72%) are urban dwellers. There are about 94,347 childbearing age women in the administrative council.

Potential health Service Coverage of Dire Dawa is 95%. There is one Hospital, 5 Health centers, 6 health stations & 12 health posts. There is one hospital, 5 lower, 7 mediums & one higher private owned clinic in the town. The 2 health centers, 6 clinics & 12 health posts are found in the peasant associations. The 2 hospitals, 5 health centers & 6 clinics render delivery services. (Health Office)

The population growth rate is 2.5% & total fertility rate (TFR) 4.5 child/women. IMR is 94/1000 LB and U5 MR is 136/1000LB. The EPI coverage is 40.4%. TT₂ + coverage for pregnant and non-pregnant women are 52.8% and 11.8% respectively. ANC coverage is 45.5% while attended deliveries by trained birth attendants is 22.5%. Institutional delivery coverage is 31%. FP coverage is 64.1% (9, 21, 22)

Study design- Community based cross-sectional comparative study

Source population All women of child bearing age group living in Dire Dawa town.

Study Population- The study was conducted on mother who was pregnant and gave birth in the past five years. The four urban kebeles were included in the study. The time of the study was conducted from December 2002 to April 2003. The total sample size was 1462.

Inclusion criteria: All women who were pregnant and gave birth during the last five year were included.

Exclusion criteria: Mothers, who were critically ill, could not talk or listen, and those who came out of the study area.

Study variables:**Dependant variables**

Perinatal and neonatal mortality rates.

Independent variables:

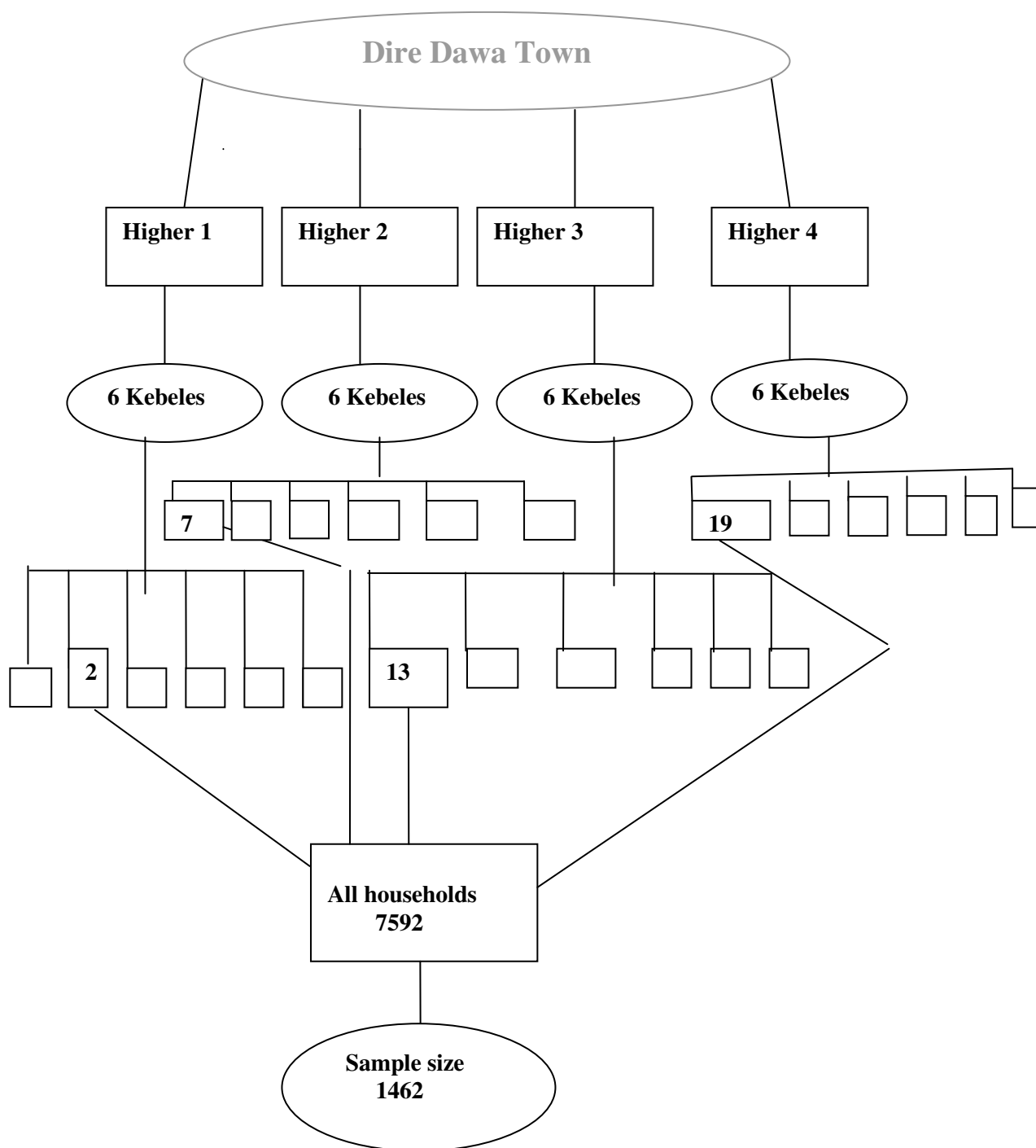
Socio-demographic and socio economic variables (age of the mother, marital status, religion, and number of pregnancies, number of children, ethnicity, gestational age, educational status, occupation, monthly income and place of delivery).

Sampling procedures

Dire Dawa town has four higher that consist of six kebeles each. From each higher one kebele was randomly selected using lottery method. Census method was used to collect data from randomly selected four kebeles.

A total of 7592 households were visited. From each household one mother who had child less than 5 years old or mother who had been pregnant for the past 5 years were interviewed. If there were two mothers in a household one was selected using lottery method. A total of 1462 mothers participated in the study. When respondents were not found at home for some reasons, at least three attempts were made to interview each respondent before skipping.

Schematic presentation of sampling procedure



Data Collection. Data were collected using pre tested structured questionnaire. The questionnaires were prepared in English and translated into Amharic and back translated to English. Fifteen 12th grade completed data collectors who speak Amharic, Oromiffa, and Somaligna were recruited and three nurse supervisors were selected. The data collectors and supervisors were trained using the training guideline on how to interview the respondents. Moreover the Amharic version data collection tools were pre-tested before the actual data collections in one of the kebeles out side of the selected kebeles and necessary adjustments were made.

Data Quality: Data quality was assured through:

- careful design of questionnaire and translation,
- pre-testing of the questionnaires
- proper training of the interviewers,
- Closed supervision of the data collection by principal investigator.
- Proper categorization and coding of the data.

Supervision: During the actual data collection each supervisor were supervising five data collectors. The supervisors were checking the activities of each data collectors by moving with them in each kebele by revisiting 5 percent of households. Every night supervisors were checking the filled questionnaires for completeness, clarity and proper identifications of the respondents. Then the principal investigator randomly checked at least 10 percent of the supervisors work every day. Incomplete and unclear questionnaires were returned to the interviewers the next morning to get them

completed. When data collection for a particular kebele was completed, supervisors made a thorough check up before leaving that kebele.

Operational definitions

1. Perinatal mortality- It is foetal death starting from 28 weeks of gestational age and the death of new born in the first week of life, which comprises late foetal and early neonatal death.

Late foetal deaths- are those deaths occurring before or during delivery of foetus corresponding gestational age Of **28 weeks**.

Early neonatal deaths- are those deaths occurring in the first week of life (**0-6days**). Therefore perinatal mortality rate is usually expressed as the rate of late foetal and early neonatal deaths.

2. Neonatal mortality rate- the mortality of live born newborns that die before reaching **4 weeks** of age or **a month** expressed as a rate per 1000 live birth. (7).

3. Abortion- the termination of the process of gestation after the time when the zygote attaches it self to the uterine wall (14 days after conception), but before the foetus is possibly capable of surviving on its own (28 weeks from conception). (30)

Data management and analysis:

After data collection each questionnaire was coded for institutional and home deliveries separately. All the variables in the questionnaire followed by end coding, that is the use of the right margin of the questionnaires for writing the code numbers and each variable were coded accordingly. The principal investigator and an individual who has a good experience to enter data entered the data using EPI-INFO version 6.04 statistical packages and SPSS version 10. Computer frequencies were checked for missed variables. Any error identified at this time was corrected after revision of the original questionnaire retrieved using the code numbers.

Frequency, proportions, rates, percentages and mean were calculated. The association between the **outcome variables** and explanatory or exposure variables were calculated.

Chi-square test was used to assess the association between variables.

The degrees of association between dependent and independent variables were assessed using odds ratios (OR) with 95% confidence intervals.

Bivariate logistic regression analysis was performed using SPSS version 10 statistical programs to control potential confounding variables.

Ethical considerations

Ethical clearance was obtained from the ethical clearance committee of Addis Ababa University medical faculty. The purposes of the study was explained to Dire Dawa Administrative Council and kebele leaders prior to asking consent and conduct the interview. Verbal consent was obtained from all respondents. Privacy and confidentiality were maintained.

Communication of results

The final report will be presented to Department of Community Health, Addis Ababa University Medical Faculty, to MOH Family Health Department, to Dire Dawa Health office, to Dire Dawa Administrative Council and other interested sectors.

Results

General descriptions

A total of 7592 households were visited from four kebeles. One thousand four hundred seventy two mothers who have children less than five years old or had been pregnant for the past five years were interviewed. Data were collected from 1462 mothers. The response rate was 99.19%. 12 mothers didn't participate in the study.

The reasons for the non responses to the survey questionnaire were:

1. Seven mothers went out of town.
2. Three mother's husbands opposed to conduct the interview because of their fasting.
3. Two mothers refused to be interviewed.

Socio-demographic characteristics of respondents are summarized in Table 1.

The age of interviewees ranged from 15 to 50 years. The mean age was found to be 27.85 years with SD 6.46 $\pm$ and 26.64 with SD 5.82 $\pm$ for home and health facility delivered mothers respectively. The majority of mothers were in the age group of 20-29 years old, of which 467(74.6%) gave birth at home and 675(80.7%) in the health facilities. Out of the total, 1305(89.3%) were in marital union. polygamous and single mothers were 33(2.3%) and 124(8.5) respectively. In regard to literacy, 281(45.6%) and 194(23.2%) of the mother were illiterate those who gave birth at home and in health institutions respectively were illiterate. Moreover, 404 (48.3%) and 173 (28.7%) mothers who had secondary high school and above gave birth in the health facility and at home respectively.

From the study population 684 (46.7%) mothers were Oromo followed by Amhara 546 (37.3%). Out of the total, 711(48.6%) were Muslims and 693(47.4%) were

Orthodox Christian. The mean age of family size for home and institution delivered mothers was 4.93 with SD 1.97 $\pm$ and 4.35 with SD 1.7 $\pm$ respectively. The average family size was found to be 4.6.

Out of the total, 1212(82.9%) were house wives, the rest 187(12.8%) and 63 (4.3%) were private and government workers respectively. From the study population 625(42.7%) had an income of less than 300 Birr per month, while 268(18.3%) mothers had more than 301 Birr per month. The rest 571(39.0%) mothers responded that they don't know their monthly income.

Table 2 summarizes outcome of pregnancy by delivery place.

The outcome included abortions, stillbirth, live births, peri and neonatal deaths.

Out of 1462 mothers 625 (42.7%) gave birth at home and 837(57.3%) in health institutions.

The proportion of mothers who had abortion was 70(4.8%), of which 26(1.8%) and 44(3.0%) mothers had abortions at home and in health facilities respectively.

Perinatal mortality was 107(7.3%) of which was 56(3.8%) at home and 51(3.5%) in health facilities.

Neonatal mortality was 68(4.7%) of which was 41(2.8%) and 27(1.9%) are at home and in health facilities respectively. Mothers perceived the newborns' birth weight were: 116(7.9%) very small, 105(7.18%) small, 491(33.6%) normal, 322(22.0%) big and 149(10.19%) very big.

Obstetrics history of mothers are summarizes in table 3.

Mothers who had antenatal follow up were 1141(78.0%). Mothers who had antenatal follow up 422(28.9%) and 719(49.0%) gave birth at home and in health institutions respectively. From the study population 321(22.0%) mothers had no antenatal follow up. The majority of mothers 1110(97.3%) who had antenatal follow up had more than two times antenatal follow up. From the study population 500(34.0%) were primi gravida and the majority of mothers 724(50.0%) had 2-4 pregnancies, the rest 238(16.3%) mothers had ≥ 5 pregnancies.

Primi Para mothers were 514(35.0%), from those 159(10.8%) and 355(24.3%) gave birth at home and in health institutions respectively. Among mothers who had 2-4 parity 334(22.8%) and 387(26.5%) gave birth at home and in health institutions respectively. The rest who had ≥ 5 births, 132(9.0%) and 95(6.5%) gave birth at home and in health institutions respectively. The majority of mothers 1277 (87.3%) had term delivery, the rest 41(2.8%) and 144(9.8) gave birth at preterm and post term gestational age respectively.

From the study population 701(49.9%) mothers had < 12hours duration of labor and 696(47.6%) had between 12-24 hours duration of labor, the rest 65(4.5%) mothers had > 24 hours duration of labor.

The majority of mothers 1238 (84.7%) had no problems during delivery. 55(3.8%) had history of vaginal bleeding, 122(8.3%) history of prolonged labor, 18(1.2%) history of retained placenta and 29(2.0%) had child trauma during labor.

Table 4. Showed that selected characteristics of mothers. The majority 1150 (78.7%) of mothers had more than 2 doses of Tetanus Toxoid vaccination . Eight hundred sixteen mothers (55.6%) gave birth in health institutions and 585 (40.7%) mothers gave birth at their home and 40(2.7%) gave birth at their parents home only 19(1131) mothers gave birth at health center.

223(35.8%) mothers preferred to deliver where their relatives are around. 174(28.8%) mothers preferred to be Assisted by TTBA and 128(20.5%) mothers respond that they gave birth at home because the labor was fast and there was no transport. 32(5.1%) of mothers report that in the health institution their is miss handling patients while 40 (6.4%) reported that they gave birth at home because of lack of money.

The majority of mothers 360(57.6%) who gave birth were assisted by TBA followed by 65(24.4%) TTBA 11(1.8) mothers reported that there was no body during labor and delivered by themselves. Mothers reported that there were problems during post partum period: 79(51.6%) mothers reported that they had abdominal pain, 27(17.6%) had vaginal bleeding and 2(1.3%) mothers reported that they had after delivery urinary incontinence. The majority of mothers 84(54.9%) were treated by health professionals, while 12(7.8%) were took traditional medicine and 8(5.2%) mothers were treated by themselves.

Table 5 showed that selected characteristics of the new born. Four hundred ninety five (79.2%) newborn umbilical cord were cut with new blade, but only 128(20.5%) of the new born umbilical cord were cut with boiled blade. The majority of neonates were at risk of tetanus infections because of non sterilized instruments. Though the blade is

new it is none sterilized. About 95 (15%) of newborn's umbilical stump were painted with unnecessary materials which could cause tetanus toxoid and other infections. The majority of neonates 347(58.1%) were feed water in the first time. Only 235(39.5%) of neonates were breast milk feed at the first time.

Mothers perceived main cause of death of the neonates were 28(41.1%) shortness of breath, 14(20.5%) fever followed by 13(19.1%) diarrhea diseases.

Table 1 Socio-demographic characteristics of mothers by place of delivery in Dire Dawa town Feb.2003

Variables	home deliveries n=625	institutional deliveries n=837	Total 1462(100%)
n= (%)			
Age (years)			
15-19	30(4.8)	60(7.2)	90(6.1)
20-24	159(25.4)	260(31.1)	419(28.7)
25-29	194(31.0)	250(29.9)	444(30.4)
30-34	114(18.2)	165(19.7)	279(19.1)
35+	128(20.5)	102(12.2)	230(15.7)
Mean $\pm$SD	27.85$\pm$6.46	26.64$\pm$5.82	
Marital status			
Married (monogamous)	551(88.2)	754(90.1)	1305(89.3)
Married (polygamous)	18(2.9)	15(1.8)	33(2.3)
Single	56(9.0)	68(8.1)	124(8.5)
Education			
Illiterate	281(45.0)	194(23.2)	475(32.5)
Primary	173(27.8)	239(28.6)	412(28.2)
Secondary high school And above	171(27.4)	404(48.3)	575(39.3)
Ethnicity			
Oromo	360(57.6)	324(38.7)	684(46.8)
Amhara	190(30.4)	356(42.5)	546(37.3)
Other ethnics	75(12.0)	157(18.8)	232(15.9)
Religion			
Muslims	351(56.2)	360(43.0)	711(48.8)
Orthodox Christian	255(40.8)	438(52.3)	693(47.4)
Others	19(3.0)	39(4.7)	58(3.9)
Family size			
2	18(2.9)	20(2.4)	38(2.6)
3-4	285(45.6)	521(62.2)	806(55.1)
5+	322(51.5)	296(35.4)	618(42.3)
Mean $\pm$SD	4.93$\pm$1.97	4.35$\pm$1.70	4.6
Occupation			
House wives	509(81.4)	703(84.0)	1212(82.9)
Gov. Employee	19(3.0)	44(5.3)	63(4.3)
Private	97(15.5)	90(10.8)	187(12.8)
Family monthly income			
I don't know	286(45.8)	285(34.1)	571(39.0)
<300	255(40.8)	370(44.2)	625(42.7)
301-600	73(11.7)	150(17.9)	223(15.3)
601+	11(1.8)	32(3.8)	43(2.4)

Table 2 Pregnancy Outcomes of Mothers by delivery place in Dire Dawa Town, Feb. 2003, Ethiopia.

	Home deliveries (n=625)	Institutional deliveries (n=837)	Total 1462(100%)
Variables	n (%)		
Abortion			
Yes	26(4.2)	44(5.3)	70(4.8)
No	599(95.8)	793(94.7)	1392(95.2)
Condition of the new borne			
Stillbirths	27(4.3)	40(4.8)	67(4.6)
Live births	598(95.7)	797(95.2)	1395(95.4)
Twin deliveries			
Yes	12(1.9)	15(1.8)	27(1.8)
No	613(98.1)	822(98.2)	1435(98.1)
Weight of the new borne			
I don't remember	193(30.9)	41(4.9)	234(16.0)
Very small	58(9.3)	103(12.3)	161(11.0)
Small	61(9.8)	44(5.3)	105(7.2)
Average	184(20.4)	307(36.4)	491(33.6)
Big	92(14.7)	230(27.5)	322(22.0)
Very big	37(5.9)	112(13.4)	149(10.2)
Neonatal deaths (0-28 days)			
Yes	41(6.6)	27(3.2)	68(4.7)
No	584(93.4)	810(96.5)	1394(95.3)
Life time of the New borne			
0-6 days (early)	29(4.6)	11(1.3)	40(2.7)
7-28 days (late)	14(2.2)	14(1.7)	28(1.9)
Alive	582(93.0)	812(97)	1394(95.3)
Perinatal deaths			
Yes	56(8.9)	51(6.1)	107(7.3)
No	569(91.4)	787(93.9)	1356(92.7)

Table 3 Comparison of Obstetric history of mothers by place of delivery in Dire Dawa town, Feb.2003

	Home delivery (n=625)	Health facility delivery (n=837)	1462(100%)
Variables	n(%)		
Antenatal care visit			
Yes	422(67.5)	719(85.9)	<u>1141(78.0)</u>
No	203(32.5)	118(14.1)	321(21.9)
Gestational period of ANC visit started			
First trimester	221(33.8)	383(45.8)	<u>614(41.9)</u>
Second trimester	149(23.8)	257(30.7)	<u>406(27.7)</u>
Third trimester	62(9.9)	79(9.4)	<u>141(9.6)</u>
Not attended ANC	203(32.5)	118(14.1)	321(21.9)
Frequency of ANC visit			
0	203(32.5)	118(37.0)	321(21.9)
1	18(2.9)	22(2.6)	40(2.7)
2+	<u>404(64.6)</u>	<u>696(83.2)</u>	<u>1100(75.2)</u>
Age at first marriage			
<15	98(15.7)	121(14.5)	<u>219(14.9)</u>
15-19	310(49.6)	374(44.7)	<u>684(46.7)</u>
20-24	156(25.0)	252(30.1)	<u>408(27.9)</u>
25-29	47(7.5)	75(9.0)	<u>122(8.3)</u>
30+	14(2.2)	15(1.8)	29(1.9)
Age at first pregnancy			
<15	39(6.2)	42(5.0)	81(5.5)
15-19	287(45.9)	326(38.9)	<u>613(41.9)</u>
20-24	211(33.8)	337(40.3)	<u>548(37.4)</u>
25-29	67(10.7)	104(12.4)	<u>171(4.8)</u>
30+	21(3.4)	28(3.3)	49(3.3)
Parity			
1	159(25.4)	355(42.4)	514(35.1)
2-4	334(53.4)	387(46.2)	<u>721(49.3)</u>
5+	132(21.1)	95(11.4)	<u>227(15.5)</u>
Gestational age of delivery			
At term	547(87.5)	730(87.2)	<u>1277(87.3)</u>
Preterm	17(2.7)	24(2.9)	41(2.8)
Post term	61(9.8)	83(9.9)	144(31.1)
Duration of labor			
<12 hours	324(51.8)	377(45.0)	701(47.9)
12-24 hours	279(44.6)	417(49.8)	696(47.6)
>24hours	22(3.5)	43(5.1)	<u>65(4.4)</u>

Table 4. Selected characteristics of mothers in Dire Dawa town Feb.2003

Variables	frequency	percent
TT vaccination (1462)		
1 dose	312	21.3
+2 doses	1150	78.7
Place of delivery of the last child (1462)		
Parents home	40	2.7
Home	585	40.7
Hospital	816	55.6
Health center	19	1.3
Clinic	2	0.1
Reasons to deliver at home (625)		
Lack of money	40	6.4
Poor handling of patients in the health institution	32	5.1
I want deliver where my relatives are around	224	35.8
The labor was fast and absence of transport	128	20.5
The health facility is far from my house	27	4.3
I prefer TTBA in my neighbor	174	27.8
Delivery assisted by (625)		
TTBA	165	24.4
Neighbor	34	5.4
TBA	360	57.6
Relative	49	7.8
Health workers	6	1.0
Mothers her self	11	1.8
Post partum problems encountered (153)		
Vaginal bleeding	27	17.6
Vaginal discharge	6	3.9
Abdominal pain	79	51.6
Head ache	18	17.7
Fever	4	2.6
Vomiting	3	1.9
Urinary incontinence	2	1.3
Brest pain	14	9.1
Measures taken to alleviate the problems (153)		
Nothing	49	32.0
Took traditional medicine	12	7.8
Treated by health professionals	84	54.9
Treated my self	8	5.2

Table 5. Selected characteristic of the new born in Dire Dawa town FFeb.2003.

Variable	frequency	percent
Umbilical cord was cut with (625)		
New blade	495	79.2
Boiled blade	128	20.5
Non boiled blade	2	0.4
Umbilical cord stump was painted with (625)		
Nothing	530	84.8
Soil	19	3.0
Butter	73	11.7
Ash	2	0.3
Dung	1	0.2
Type of first feeding		
Breast milk	235	39.5
Butter	12	2.0
Water	347	58.1
Cow milk	1	0.2
Others	2	0.3
Mothers perceived main cause of death of the neonates (68)		
Cough	8	11.7
Fever	14	20.5
Diarrhea	13	19.1
Vomiting	5	7.3
Shortness of breath	28	41.1

To see the relative effect of independent variables logistic regression analysis was carried out using SPSS version 10. This was done to control for the effect of possible confounding factors.

Table 6 shows the association of perinatal mortality with socio demographic characteristics.

Mothers whose age group are 30-34 and 35+ years had more risk to perinatal mortality than mothers whose age group is 15-19 years. (COR=4.71, 95%CI=1.06, 29.29) and (COR=6.85, 95% CI= 1.55, 42.37) respectively.

Mothers who gave birth at home had more risk to perinatal mortality than mothers who gave birth in health institutions, though it is not significant when it is entered in to logistic regression model. (COR=1.51, 95%CI=1.02, 2.25) The rest explanatory variables become insignificant.

Table 7 summarized the association of obstetric history of mothers to perinatal mortality.

Mothers who had antenatal follow up had less risk to perinatal mortality than mothers who had no antenatal follow up. (COR=0.55, 95%CI (0.35, 0.86)

Mothers who had 2-4 and 5+ births had more risk to perinatal mortality than mothers who were primi Para (AOR=5.15 95%CI=1.54, 17.23).

Mothers who delivered at home had more risk to perinatal mortality than mother who delivered in health institutions (COR=1.51, 95%CI (1.00, 2.99), though it is not significant when it is entered in to logistic regression. Other variables were not significant.

Table 8 Summarizes socio demographic factors associated with neonatal mortality.

Mothers who were illiterate had more risk to neonatal mortality than mothers who had secondary education and above (COR=2.78, 95%CI (1.47, 5.32), and women whose monthly income is less than 300 birr and 301-600 birr per month had more risk to neonatal mortality than mothers who earned more than 600 birr per month (OR=4.29, 95%CI(1.27, 14.50) and (OR=4.6, 95%CI(1.53, 14.01) respectively.

Those mothers who delivered at home had more risk to neonatal mortality than mothers who delivered in health institutions (COR=2.10, 95%CI (1.28, 3.4).

Table 9 summarizes obstetric factors of mothers associated with neonatal mortality.

Mothers who had 2-4 and ≥ 5 parity had more risk to neonatal mortality than mothers who were primi para. (COR=4.97, 95%CI 2.00-13.14) and (COR=9.09, 95%CI 3.43, 25.40) respectively.

Babies born at term were less likely to have NNM as compared to pre term babies (AOR= 0.28, 95%CI 0.12, 0.63)

Neonates born with very small and small birth weight were more to have NNM as compared to neonates born with normal weight (AOR=3.6=95%CI 1.75, 7.42).

Mothers who gave birth in health institutions had less risk to neonatal mortality than mothers who gave birth at home. (COR=0.47, 95%CI (0.28, 0.80). the other variable did not show significance when it is entered into logistic regression model.

Table 6. Socio-demographic factors associated with perinatal mortality in Dire Dawa town, Feb.2003

Variables	Perinatal mortality		Crude OR(95% CI)	Adjusted OR(95% CI)
	Yes n=107	No n=1355		
Variables	n (%)			
Age				
15-19	2(1.9)	88(6.5)	1.00	1.00
20-24	19(17.8)	400(29.5)	2.09(0.46,13.23)	0.44(0.10,1.97)
25-29	28(26.2)	416(30.7)	2.96(0.67,13.33)	0.32(0.07,1.42)
30-34	27(25.2)	252(18.6)	4.71(1.06,29.29)	0.23(0.05,1.05)
35+	31(29.0)	199(14.7)	6.85(1.55,42.37)	0.17(0.03,.79)
Marriage				
Married (monogamy)	99(92.5)	1206(89.0)	1.61(0.67,4.17)	0.60(0.23,1.57)
Married (Polygamy)	2(1.9)	31(2.3)	1.27(0.17,7.49)	1.21(0.21,6.75)
Separated	6(5.6)	118(8.7)	1.00	1.00
Education				
Illiterate	50(46.7)	425(31.4)	0.71(0.22,2.51)	1.32(0.43,4.07)
1-6 Grade	36(33.6)	374(27.6)	0.58(0.18,2.09)	1.28(0.41,4.02)
7-12Grade	17(15.9)	532(39.3)	0.19(0.05,0.73)	3.17(0.94,10.71)
12+	4(3.7)	24(1.8)	1.00	1.00
Ethnicity				
Oromo	72(67.3)	612(45.2)	2.36(1.19,4.81)	0.49(0.24,0.98)
Amhara	24(22.4)	522(38.5)	0.92(0.42,2.05)	0.90(0.39,2.04)
Other ethnics	11(10.3)	221(16.3)	1.00	1.00
Religion				
Muslim	68(63.6)	643(47.5)	6.03(0.88,119.01)	0.38(0.05,2.97)
Orthodox Christian	38(35.5)	655(48.3)	3.31(0.47,65.96)	0.34(0.04,2.57)
Others	1(0.9)	57(4.2)	1.00	1.00
Family size				
2	2(1.9)	36(2.7)	1.00	1.00
3-4	40(37.4)	766(56.5)	0.94(0.21,5.85)	1.38(0.26,7.30)
5+	65(60.7)	553(40.8)	2.12(0.48,13.01)	1.05(0.20,5.57)
Occupation				
House wife	91(85.0)	1121(82.7)	1.09(0.58,2.08)	0.73(0.39,1.37)
Gov. Employee	3(2.8)	60(4.4)	0.67(0.15,2.64)	0.93(0.24,3.62)
Private	13(12.1)	74(12.8)	1.00	1.00
Family monthly Income				
I don't know	45(42.0)	526(38.8)	1.75(0.40,10.84)	1.06(0.23,4.80)
<300	52(48.6)	573(42.3)	1.86(0.42,11.45)	0.99(0.22,4.44)
301-600	8(7.5)	215(15.9)	0.76(0.14,5.41)	1.90(0.37,9.65)
600+	2(1.9)	41(3.0)	1.00	1.00
Place of delivery				
Home	56(52.3)	569(42.0)	1.51(1.02,2.25)	0.94(0.62,1.44)
Health facility	51(47.7)	786(58.0)	1.00	1.00

Table 7. Obstetric history of mothers associated with perinatal mortality in Dire Dawa town, Feb.2003

	Perinatal mortality			
	Yes n=107	No n=1355	Crude OR (95% CI)	Adjusted OR (95CI)
ANC visit				
Yes	72(67.3)	1069(78.9)	0.55(0.35, 0.86)	43.92(0.0, 7.14)
No	35(32.7)	286(21.1)	1.00	1.00
Frequency of ANC visit				
Not attended ANC visit	35(32.7)	286(21.3)	1.00	1.00
1	3(2.8)	38(2.8)	0.65(0.15, 2.34)	1.21(0.36, 4.02)
2+	69(64.5)	1031(76.1)	0.55(0.35,0.86)	0.66(0.19,2.27)
Other illness				
Diabetes mellitus	2(1.9)	10(0.7)	1.00	1.00
Hypertension	2(1.9)	2(0.1)	5.00(0.26,139.14)	0.12(0.01,2.28)
Tuberculosis	0(0.00)	3(0.2)	1.67(0.00,46.15)	246.44(0.0,2.10)
Healthy mothers	103(96.3)	1340(98.9)	0.38(0.08,2.57)	2.10(0.40,10.92)
Number of parity				
1	8(7.5)	506(37.3)	1.00	1.00
2-4	51(47.7)	670(49.4)	4.81(2.18,11.07)	5.15(1.54,17.23)
5+	48(44.9)	179(13.2)	16.96(7.55,39.60)	4.38(0.65,29.40)
Gestational age of delivery				
Preterm	7(6.5)	34(2.5)	1.00	1.00
At term	87(81.3)	1190(87.8)	0.36(0.15,0.91)	0.28(0.11,0.70)
Post term	13(12.1)	131(9.8)	0.48(0.16,1.46)	0.85(0.44,1.65)
Birth weight of the baby (Mothers perceptions)				
Normal	36(33.6)	456(33.7)	1.00	1.00
Very small/Small	24(22.4)	251(18.5)	1.21(0.68,2.14)	1.28(0.72,2.26)
Big/very big	30(28.0)	436(32.2)	0.87(0.51,1.48)	1.68(0.92,3.1)
Do not remembe	17(15.9)	212(15.6)	1.02(0.53,1.92)	1.61(0.80,3.21)
Place of delivery				
Home	56(52.3)	569(42.0)	1.52(1.02,2.99)	0.89(0.57,1.38)
Health facility	51(47.1)	786(58.0)	1.00	1.0

Table 8. Socio-demographic factors associated with neonatal mortality, in Dire Dawa town Feb 2003.

Neonatal deaths				
Variables	Yes n=68	No n=1394 n(%)	COR (95 % CI)	AOR (95 % CI)
Age (mother)				
15-19	2(2.9)	88(6.2)	1.00	1.00
20-24	17(25.0)	402(6.3)	1.86(0.40,11.88)	0.51(0.11,2.29)
25-29	21(30.9)	423(30.3)	2.18(0.48,13.74)	0.50(0.11,2.29)
30-34	1(16.2)	268(19.2)	1.81(0.37,12.04)	0.69(0.14,3.39)
35+	17(25.0)	213(15.3)	3.51(0.76,22.49)	0.42(0.08,2.01)
Marital status				
Married (Monogamy)	61(89.7)	1244(89.2)	1.17(0.44,3.36)	0.56(0.17,1.87)
Married (Polygamy)	2(2.9)	31(2.2)	1.54(0.20,9.59)	0.71(0.11,4.60)
Separated	5(7.4)	119(8.5)	1.00	1.00
Education				
Illiterate	35(51.5)	440(31.6)	2.78(1.47,5.32)	0.49(0.23,1.05)
1-6 Grade	17(25.0)	395(28.3)	1.50(0.71,3.15)	0.72(0.33,1.56)
7-12 Grade				
12+	16(23.5)	559(40.1)	1.00	1.00
Ethnicity				
Oromo	46(67.6)	638(45.8)	1.79(0.83,3.98)	0.68(0.31,1.48)
Amhara	13(19.1)	533(38.2)	0.60(0.24,1.56)	1.26(0.47,3.42)
Other ethnics	9(13.2)	223(16.0)	1.00	1.00
Religion				
Muslims	46(67.6)	665(47.7)	1.94(0.44,11.85)	1.27(0.60,2.69)
Orthodox Christian	20(29.4)	673(48.3)	0.83(0.18,5.29)	1.02(0.21,4.88)
Others	2(2.9)	56(4.0)	1.00	1.00
Family size				
2	3(4.4)	35(2.5)	1.00	1.00
3-4	26(36.2)	780(56.0)	0.39(0.11,1.70)	3.42(0.71,17.03)
5+	39(57.4)	579(41.5)	0.79(0.22,3.36)	2.41(0.49,11.90)
Occupation				
House wife	52(76.5)	1160(83.2)	0.60(0.31,1.10)	1.42(0.73,2.76)
Gov. Employee	3(4.4)	60(4.3)	0.67(0.15,2.64)	1.03(0.26,4.08)
Private	13(19.1)	174(12.5)	1.00	1.00
Family monthly income				
Don't know	27(39.7)	554(39.0)	0.38(0.13,1.19)	4.34(1.43,13.16)
<300	28(41.2)	597(42.8)	0.36(0.12,1.12)	4.64(1.53,14.01)
301-600	8(11.8)	215(15.4)	0.28(0.08,1.06)	4.29(1.27,14.50)
601+	5(7.4)	38(2.7)	1.00	1.00
Place of delivery				
Home	41(60.3)	584(41.9)	2.10(1.28,3.46)	0.61(0.36,1.04)
Health facility	27(39.7)	810(58.1)	1.00	1.00

Table 9. Socio-demographic factors associated with neonatal mortality, in Dire Dawa town Feb 2003.

Variables	Neonatal deaths			
	Yes n=68	No n=1394	COR (95 % CI)	AOR (95% CI)
Antenatal care visit				
Yes	47(69.1)	1094(78.5)	0.61(0.35,1.08)	33.005(0.00,2.80)
No	21(30.9)	300(21.5)	1.00	1.00
Frequency of ANC visit				
Not attended ANC visit	21(30.9)	300(21.5)	1.00	1.00
1	2(2.9)	39(2.8)	0.73(0.11,3.42)	1.27(0.30,2.52)
2+	45(66.2)	1055(75.7)	0.61(0.35,1.08)	26.12(0.00,2.30)
Other illness				
Diabetes mellitus	2(2.9)	10(0.7)	1.00	1.00
Hypertension	0	4(0.3)	1.25(0.00,29.5)	562.61(0.00,2.81)
Tuberculosis	1(1.5)	2(0.1)	2.50(0.00,95.87)	0.30(0.02,5.38)
Healthy mothers	65(95.6)	1378(98.9)	0.24(0.05,1.59)	3.44(0.69,17.26)
Number of parity				
1	6(8.8)	508(34.4)	1.00	1.00
2-4	40(58.8)	681(48.9)	4.97(2.00,13.14)	0.11(0.001,14.14)
5+	22(32.4)	205(14.7)	9.09(3.43,25.40)	0.04(0.00,8.43)
Gestational period of delivery				
Preterm	4(5.9)	37(2.7)		1.00
At term	58(85.3)	1219(87.4)	0.44(0.14,1.51)	0.28(0.12,0.63)
At post term	6(8.8)	138(9.9)	0.40(0.09,1.81)	1.00(0.41,2.47)
Birth weight of the baby (Mothers perceptions)				
Normal	13(19.1)	479(34.4)	1.00	1.00
Very small/small	23(33.8)	252(18.1)	3.36(1.60,7.15)	3.61(1.75,7.42)
Very big /big	23(33.8)	443(31.8)	1.91(0.92,4.04)	1.83(0.97,3.45)
Don't remember	9(13.2)	220(15.8)	1.51(0.58,3.83)	3.61(1.58,8.25)
Place of delivery				
Home	41(60.3)	584(41.9)	1.00	1.00
Health facility	27(39.7)	810(58.1)	0.47(0.28,0.80)	1.70(0.99,2.89)

Discussion

The community based cross sectional comparative study tried to assess the pregnancy outcome with emphasis on perinatal and neonatal mortality by delivery place and factors associated with it. 1462 mothers were interviewed using census methods. From the total study population 625(42.7%) mothers gave birth at home and 837(57.3%) mothers in the health institutions. This study finding is not consistent with the DHS 2000 in Ethiopia in the respective region, which showed that institutional delivery and home delivery were 31.0% and 68.3% respectively.(9) The reason should be that DHS was conducted in rural areas and town where as our study was limited to Dire Dawa town. The study conducted in India is almost similar, which was 74.6% and 26.3% institutional and home delivery respectively. (23)

The study identified that the prevalence rate of perinatal mortality to be 73 per 1000 live births with stillbirths 46 per 1000 live births and early neonatal mortality 27 per 1000 live births. Our finding is similar to the previous study conducted in Pakistan, which showed that neonatal mortality was 60-80/1000 live births(4) and it is much lower than the study findings conducted in Jimma referral hospital PMR 138.9/1000 live births (12).

This finding is also not similar with the DHS in Ethiopia 2000 finding in the respective region, which showed that perinatal mortality is 48/1000 live births with stillbirth and early neonatal deaths 24.3/1000 and 23.3/1000 live births. (9) The reason might be that the sample size they took in the DHS was so small, which might decrease precision of the result.

Neonatal mortality in the study subject was 47/1000 live births with early and late neonatal mortality of 27.3/1000 live births and 19.2/1000 live births respectively which is similar with the study done in south of Ethiopia NMR was 45.5/1000 LB. (2,17)

The prevalence of perinatal and neonatal mortality at home and in health institutions were as follows:

Perinatal mortality rate at home was 38/1000 live births and in health institutions 35/1000 live births. Neonatal mortality rate were at home 28/1000 live births and in health facilities 18.5/1000 live births.

This study showed that statistically significant association between maternal age and perinatal mortality. Mothers whose age group is thirty five and above years had less risk to perinatal mortality than mothers whose age group is 15-19 years. This finding is similar with the study in India the relationship between age of the mother and perinatal and neonatal mortality is considered to be a 'U' shaped one. The evidence is that teenage girls who have yet to complete their height and weight growth has not completed the growth of the reproductive system and therefore could result in a low birth weight baby and higher neonatal mortality. At the same time this study did not find an increase in mortality level for children born to mother at age 35 & above. (11)

Babies born to single mothers were considered as high risk for perinatal and neonatal mortality compared to those babies who are born to married mothers; the explanation is that single mother are less likely to feed adequate and balanced diet for them selves and their babies. In the polygamous marriage there is a chance of having more children

and extension of the family which result in the sharing of resources and this leads to ill health of both the mother and the children.

Maternal education is considered as one of the determining factors for a better outcome of pregnancy and child survival. It is also suggested as a way of reducing child mortality, since it provides the mother with the necessary skill for child care. Educational level can also affect child survival by influencing her reproductive behavior and also increasing her skill in health care practices resulted to contraceptive use, nutrition, hygiene, preventive care and disease treatment. (4, 24, 25). In this study population 65.5% mothers had primary, secondary high school and above education, but it is not statistically significant when it is entered into logistic regression model.

This study found out those babies born to families who had low income had more risk to neonatal mortality than babies born to mothers who are from higher income groups. It is statistically significant when it is entered into logistic regression model. It is also similar to the previous study done in Addis Ababa, which revealed that higher education promotes participation in modern sector and enables a woman to acquire better occupation and hence a higher income level. High income will guarantee a house to provide babies to a sufficient nutritious food, to pay for preventive services including for physician, hospitalization, drugs and also maternity care during child birth. (24)

The study revealed that mothers who had multiple parities had more risk to perinatal and neonatal mortality and it is statistically significant when it is entered in to logistic regression model. Other studies in India and Malawi proved that mothers who had more than three births had more risk to neonatal mortality than mothers who had less

than three births. The reason is that family size affects the demand for family resources (foods, housing, maternal care and attention, medical and health care for the children within the family). Sharing of the meager resources among closely spaced children may affect the health of younger and elder siblings. The nutritional status of the mother is eroded by a rapid sequence of pregnancy and period of lactation, so that the health of younger siblings may be affected, therefore poor maternal nutritional status increase the risk of premature and low birth infants with lower chance of survival.(3,11)

Low birth weight and prematurity are the most powerful determinant factors of neonatal mortality. In this study it is found that very small and small (mother's perceptions birth weight) neonates have more risk to neonatal mortality than neonates who had normal birth weight when they were born. (AOR 3.61, 95%CI 1.75, 7.43) and also term babies had less risk to perinatal and neonatal mortality than babies born preterm it is statistically significant when it is entered into logistic regression model. (AOR 0.28, 95%CI 0.11, 0.70) and (AOR 0.28, 95%CI 0.12, 0.63) respectively.

The study revealed that to deliver at home had greater association with perinatal and neonatal mortality than to deliver in the health facilities. It is obvious that giving birth in the health institution is safer than to give birth at home, because in the health facilities there is clean and safe delivery which can protect the mother and the neonate from infections, and there is a promotion of family planning services, counseling about STD & HIV/AIDS, breast feeding and psychological support for the mother.

The study found that mothers who had no antenatal care more likely to have higher perinatal mortality than mothers who had frequent antenatal care follow up, though it is not significant when it is entered into logistic regression model. Other studies showed that antenatal care follow up had positive effect to perinatal and neonatal mortalities. (3, 28)

Strength of the study

The reliability of the data was maintained by:

- Prior training of the interviewers and the supervisors
- Regular supervision by principal investigator and
- Using pre tested questionnaire.

The result is assumed to be valid as a relatively large sample size was used to minimize the role of chance and information was obtained on standard formats. It is generalizable to urban areas where there is access to health services.

Limitation of the study

- Un able to use the recorded birth weight, because mothers perceived birth weight is un accurate measurement and they do not have birth certificate at their hand therefore they should have to have their children birth certificate when they are discharged from the maternity ward.
- The study did not include the rural population, which might affect its generalizebility.

Conclusions and Recommendations

The study revealed that:

- High perinatal mortality rate of 73/1000 live births with 38/1000 and 35/1000 live births being at home and in health institutions respectively.
- High neonatal mortality rate of 47/1000 live births with 28/1000 and 19/1000 live births at home and in health institutions respectively.
- Mothers who had 2-4 parity had more risk to perinatal mortality than primi Para mothers. (AOR 5.15, 95%CI 1.54, 17.23) and mothers who had 5+ parity had more risk to perinatal mortality than primi Para mothers. (AOR 4.38, 95%CI 0.65, 29.40)
- In this study it is found that very small and small born (mother's perceptions birth weight) neonates have more risk to neonatal mortality than neonates who had normal birth weight when they were born(AOR 3.61, 95%CI 1.75, 7.43) and also term babies had less risk to perinatal and neonatal mortality than babies born preterm it is statistically significant when it is entered into logistic regression model(AOR 0.28, 95%CI 0.11, 0.70) and (AOR 0.28, 95%CI 0.12, 0.63) respectively.
- Mothers whose income were <300 birr per month had more risk to neonatal mortality than mothers whose income were >601 birr per month. (AOR 4.64, 95%CI 1.53, 14.01) and mothers whose income were 301-600 birr Per month had more risk to neonatal mortality than mothers whose income were >601 birr per month. (AOR 4.29, 95%CI 1.27, 14.50). As we see from the above

statements there are high PNM, NMR and IM while physical health service coverage is better from these we can conclude that there is poor quality of service at each level .

The study revealed that mothers who delivered at home had more likely to have peri/neonatal mortality as compared to mothers who delivered in health institutions. (COR= 2.10, 95%CI 1.28, 3.4)

Recommendations

Based on the above findings of the study the following recommendations were made.

- Strengthening of the MCH/FP care unit at each level and encourage mothers to use FP services.
- Improve quality of services in the region especially prenatal, maternity care and neonatal care and encourage mothers to give birth at health institutions.
- Give to all mothers birth certificate when they are discharged from maternity ward after delivery.
- Establish and utilize emergency obstetric services with special emphasis of neonatal care.
- Give special attention to empowerment of women and improve economic status and educational level of women.

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Assessment of Pregnancy Outcome with Emphases on Peri/Neonatal Mortality in Dire Dawa Administration Council at Community Level.

First ask weather there are mothers who had children less than five years of age or who had been pregnant during the last five years in the household or not.

If the answer is NO stop asking the question further and go to the next household.

Consent form

How do you do?

My name is _____

As this time there is assessment of pregnancy outcome with emphases on peri/neonatal mortality in Dire Dawa town at community level. It is conducting with the cooperation between Addis Ababa University Medical Faculty Department of Community Health, Ministry of health and Dire Dawa health office. I am also the member of this study group.

The aim of the study is to assess the peri/neonatal mortality among home and institutional delivery. The result of the study will help planners, policy makers and program managers to make an intervention plan for the reduction of peri/neonatal mortality in general to improve maternal and child health therefore your correct answer (respond) will help us a lot for the successful completion of the study. Your name and your identity will not be written on this paper (document) the confidentiality will be secured.

You will be asked about your socio-economic, last pregnancy, last delivery history, last child and your last post partum period. You will not be forced to respond for the question which you do not to respond, but the information which you will give will contribute a lot, I thank you for your cooperation, are you willing to participate in the study?

1. Yes _____

2. No _____

3. If the answer is **Yes**-- pass to the next page

4. If the answer is **No**-- pass to the next house

5. Interviewer name and signature _____ Date _____

Interviewer visiting schedule

Date		Visiring 1	Visiting 2	Visiting 3
Result	1. All the questionnaires are completed 2. The mother is not around 3. Appointed for another time 4. The mother is not willing to participate 5. The questionnaire is partially completed			

1. Interviewer Name_____Signature_____ Date_____
2. Supervisor Name_____Signature _____Date_____
3. Date of interview _____
4. Time started to interview _____Time finished the interview _____

Part one

Information on socio- demographic characteristics of the mother.

Circle the answer number and write the number under the code column

Ques.N ^o	Questions	Choice of answers	Code	Skip to Ques.N ^o
101	How old are you?	-----		
102	Are you married?	1. Yes, I am the only wife of my husband. 2. Yes, my husband has also other wives. 3. Divorced. 4. Separated 5. Widowed		
103	What grade have you completed?	1. Illiterate 2. read and write 3. complete (1-6)grade 4. completed 7-8grade 5. completed 9-12grade 6. 12+		
104	What is your ethnicity?	1. Oromo 2. Somali 3. Amhara 4. Tigre 5. Gurage 6. Adere 7. other ethnics		
105	What is your religion?	1. Muslim 2. Orthodox Christian 3. Catholic 4. Protestant 5. Other specify -----		
106	What is your job?	1. House wife 2. factory worker 3. Civil servant 4. Trader 5. Farmer 6. Daily laborer 7. Other specify -----		
107	What is your family size?	1. -----		
108	What is your estimated monthly income?	1. ----- 2. I do not know		

Part two

Information on antenatal care attendance

The following questionnaires refer to the last pregnancy that you had?

Circle the answer number and write the number under the code column

Ques. No.	Questions	Choice of answers	Code	Skip to ques.no.- -
201	Have you ever been pregnant?	1.Yes 2.No		
202	When was your last pregnancy?	1.befor one year 2.befor 2 years 3.between 3 and 5 years		
203	Have you ever attended ANC during the last pregnancy?	1.YES 2.NO		If "no" skip to qn.210
204	If yes, at which gestational period did you start attending?	1. at first trimester 2. at the 2ndtrimester 3. at the third trimester		
205	If you attend ANC to which health institution did you go?	1. Dilchora hospital 2. Dire dawa health center 3. Rail way hospital 4. Private clinic 5. Biyo awale health center 6. Wahil health center 7. Other clinics		
206	Why did you go to that particular health institution?	1. because it close to where I live 2. Little or no Expense 3. I like the way how the health workers handle clients. 4. convenient time of service 5. high quality care 6. other specify-----		
207	How many ANC visit have you attended?	-----		
208	Did you have TT vaccination?	1. Yes 2. No		
209	If yes how many doses have you been vaccinated?	1. one dose 2.two doses 3.3+doses		

210	If you did not attended ANC clinic, why not?	1. I do not know there is such a service 2. the health unit is far away from my house 3. I had no any health problem 4. I don't like that how the health workers handle clients 5. my belief doesn't allow me 6. Too busy to attend ANC clinic 7. expense for ANC is unaffordable 8. other specify		
211	Did you have diseases like----	1.diabets mellitus 2.hypertntion 3.tuberculosis 4.healthy		

Part three

The following questionnaires refer to the **last deliveries** that you had?

Circle the answer number and write the number under the code column

Ques.no.	questions	Choice of answers	code	Skip to ques.no
301	Have you ever given birth?	1. yes 2. no		
302	What was your age when you were married for the first time?			
303	What was your age at first pregnancy?			
304	Number of pregnancy (gravidity)?			
305	Number of deliveries(parity)			
306t	Number of live births?	.-----		
306a	Number of live births in male	-----		
306b	Number of live births in female	----		
307	Number of stillbirths(after seven) months of gestational age)	1. I had no stillbirth 2. 1 child 3. 2+children		
308	Number of abortions (less than 28 weeks of gestational age)	1.Ihad no abortion 2.1abortion 3.2abortions 4.3abortions 5.4+abortions		
309	Number of Neonatal death (deaths within four weeks or a month)	1. I had no death 1. one child has died 3. two children died		
310	Number of home deliveries			
311	Number of Institutional deliveries			
312	When did you deliver your last child?	1)with in 30 days 2) b/n 1& 6months. 3) b/n 6 & 1year 4) b/n 1& 5years		
313	Was the delivery at the expected time?	1. Term 2. Pre term 3. Post term		
314	Where did you deliver your last child?	1. Parents home 2. Home 3. Hospital 4. Health center 5. Clinic 6. Private clinic 7. Health post		If it is 1&2 skip to ques.no 317

315	If it is in health institution, why did you choose to deliver in Health institution?	1) Because it is close where I live 2) Because I like the way that the health workers handle clients 3) Because it is not expensive 4) Because there is high quality of cares 5) Other specify		
316	How far is approximately located the health facility from your house?	1. 2 kms (30minuts walk) 2. 5kms (one hour walk) 3. 10kms (two hours walk) 4. more than 10kms 5. Other specify-----		
317	If it is at home, why did you choose to deliver at home?	1) Because it is expensive to deliver in the health unit 2) Because the health workers do not handle clients properly 3) Because I want deliver where my relatives are around 4) Because there was no transport facility during labor 5) Because the health facilities are far from my House 6) There was no need to go to health unit because there is TTBA in may neighbor.		
318	At the time of delivery at home, who assisted your delivery?	1. TTBA 2. Neighbor/friend/ 3. TBA 4. Relatives 5. Health worker 6. CHA 7. Other Specify		

319	How long the labor last?	1. One day (12 hours) 2. Day and night (24 hours) 3. Two day and one night (36hours) 4. Two days and two nights (48 hours) 5. less than 12 hours		
320	Have you had any problem during delivery/labor/?	1. Yes 2. No		If it is 2 skip to ques.no 323
321	If yes, what kind of problem was there?	1. Excessive vaginal bleeding 2. Prolonged labor /more than 24 hours/ 3. Retained placenta (more than 30 Minutes) 4. The child was traumatized		
322	What action did you take for the problem which was occurred during delivery?	1. Nothing was done 2. Took traditional medicine 3. Consulted health worker 4. Other specify		
323	Do you get ambulance service when you are in need of it?	1. yes 2. no 3.I have never asked ambulance service		

Part four

The following questionnaires refer to **the last child** that you had?

Circle the answer number and write the number under the code column

Ques.no.	Questions	Choice of the answers	Code	Skipto ques.no---
401	What was the status of the baby at birth?	1. Alive 2. Stillbirth		If 2&3skip to ques. no 407.
402	If the child born alive what was used to cut the umbilical cord?	1 New blade 2. Boiled blade 3. Non-boiled blade 4. New knife 5. Boiled knife 6. Non- boiled knife 7. Other specify-----		
403	What did you apply to the umbilical stump?	1. Nothing 2. Soil 3. Butter 4. Ash 5. Dung		
404	What was the weight of the baby at birth (as mother)?	1.dont remember 2.very small 3.small 4. normal (average) 5.big 6.very big		
405	Was it twin delivery?	1. No 2. yes 3. Triples		
406	What did you give to the baby right after birth?	1.breast milk 2.butter 3. water 4.cows milk 5.other specify -----		
407	Did your child receive vaccination?	1.yes 2.no		
408	If not vaccinated, what was the reason?	1. I do not know there is such a service 2. The health unit is far from my house 3. Too busy to take to the health unit 4. Other specify		
409	If she/he died, at what age did she/he died?	1. Before seven days (0—6days) 2. after seven days (7__28days) 3.from 29days –one year		

410	What is the main cause of death?	1.cough 2. fever 3. diarrhea 4.vomiting 5.shortness of breath 6.other specify -----		
411	What was the duration of the illness?	1.0-6 days 2.1-4 weeks 3.more than 4weeks		
12	What action was taken to solve the problem?	1.nothing 2.used traditional medicine 3.treated by health worker 4. other specify -----		

Part five

Information on complaint of the mother during puerperal period

The following questionnaires refer to the last post partum period that you had?

Circle the answer number and write the number under the code column

Ques.no	Questions	Choice of the answers	Code	Skip to ques.no--
501	Was there any problem until 42days of the delivery of the last child?	1. Yes 2. No		
502	If yes what kind of problems was there?	1. Vaginal bleeding 2. Vaginal discharge 3. Abdominal pain 4. Headache 5. Fever 6. Vomiting 7. Urinary/fecal/incontinence 8. Breast pain		
503	What measure was taken to alleviate the problem?	1. Nothing 2. Look traditional medicine 3. Treated by health professionals 4. Other specify		
504	What was the outcome of the treatment?	1. Cured 2. Improved 3. No change 4. Worsened 5. Other specify ____		