

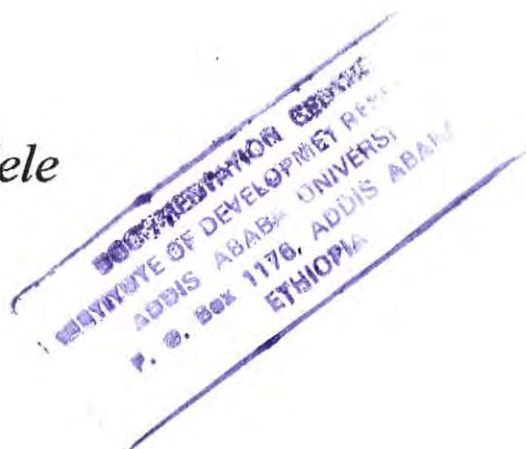


ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

*Infant Mortality and Maternal Health Care Services in
Limu-Seka Wereda, Oromiya Region*

By
Tefera Taddele



Addis Ababa
June, 2010

THE
T316
2010

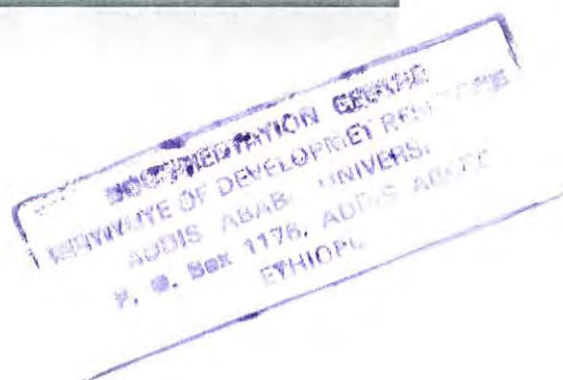
ADDIS ABABA UNIVERSITY
COLLEGE OF POPULATION STUDIES

Infant Mortality and Maternal Health Care Services in
Limu-Seka, Jimma Zone, Oromiya Region

By
Tefera Taddele

A Thesis submitted to:
Institute of Population Studies
Addis Ababa University

Thesis Advisor
Dr. Negatu Regassa(Phd)

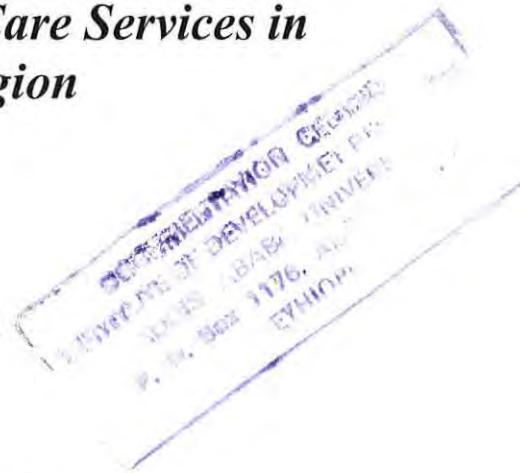


Addis Ababa
June, 2010

**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

***Infant Mortality and Maternal Health Care Services in
Limu-Seka Wereda, Oromiya Region***

By
Tefera Taddele Tesema



**Institute of Population Studies
College of Development Studies**

Approved by the Examining Board

Dr. Eshetu Gurmu

Chairman, Department Graduate Committee


Signature

Dr. Negatu Regassa

Advisor


Signature

Dr. Eshetu Gurmu

Examiner


Signature

THE
TIC
2010

Acknowledgement

I would first and for all like to thank the almighty God for being on the side of me in the efforts towards my completion of the study. This paper would not have been in its final form without the help of various individuals and institutions.

I would like to say deep and honest thanks to my advisor, *Dr. Negatu Regassa*, who has given me his substantive advice, comments and support and enriching criticism throughout the study time. His great interest, encouragement, unreserved and timely support, in checking, commenting and giving constructive comments all along my activities is most appreciated.

I also extend my gratitude to the staff of institute of population studies and my classmates for their unconditional assistance, especially to *W/o Sara, Ato Chalachew* and my classmate *Seman Kedir*.

My heart felt thanks goes to my best friends *Solomon Kebede* and *Gedefaw Kassie* for their editorial and technical assistance in the preparation of this thesis.

My special thanks also go to my friends *Wondeson Balcha, Ayelign Abdela* and *Henok Nigatu*, who gave me material and financial support along with their psychological and moral support.

Finally, my gratitude goes to all individuals whose names are not mentioned here, who helped me for their psychological, material and financial support along with their love and devoted motivation all the way throughout my study time.

Last but not least, I would like to acknowledge *AAU*, for its assistance in funding the whole research work and giving this chance.

Lists of Acronyms and Abbreviations

ANC	Antenatal Care
ARI	Acute Respiratory Infection
CEB	Children Everborn
CSA	Central Statistical Agency
DC	Delivery Care
DHS	Demographic and Health Survey
EDHS	Ethiopia Demographic and Health Survey
FGD	Focus Group Discussion
FIGO	International Federation of Gynecology and Obstetrics
FP	Family Planning
FPP	Family Planning Program
GHWa	Global Health Workforce Alliance
HEW	Health Extension Worker
HF	Health Facility
HI	Health Institution
HIV	Human Immunodeficiency Virus
IBFAN	International Baby Food Action Network
ICM	International Confederation of Midwives
IEC	Information Education and Communication
IMR	Infant Mortality Rate
IPDP	Integrating Population and Development program
LB	Livebirth
MCH	Maternal and Child Health
MOFED	Ministry of Finance and Economic Development
MOH	Ministry of Health
NFFS	National Family and Fertility Survey

NGOs	Non-Governmental Organizations
PASDEP	Plan Action for Sustainable Development to End Poverty
PMTCT	Prevention Mother to Child Transmission
PNC	Postnatal Care
PRB	Population Reference Bureau
RC	Reference Category
RH	Reproductive Health
S.E	Standard Error
Sig	Significant
SPSS	Statistical Package for Social Science
SSA	Sub-Saharan Africa
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNFPA	United Nations Fund for Population Activities
UNICEF	United Nations Children's Fund
UNS	United Nations Secretariat
UNSD	United Nations Statistics Division
USAID	United State Agency for International Development
VIF	Variance Inflation Factor
WHO	World Health Organization

Lists of Tables and Figures

Table2.1. Numeric and percentage distribution of Limu-Seka woreda According to Their Ethnicity-----	33
Table2.2. Numeric and percentage distribution of Limu-Seka woreda According to their Religion-----	33
Table 2.3. Variables Included In the Study-----	34
Table3.1. Percentage distribution of Infant Death by selected Socio-Demographic Characerisics of the Respondents Limu- Seka, southwest Ethiopia, Oromiya Region-----	37
Table3.2. Percentage distribution of Infant Death by selected maternal Health Care variables, Limu-seka, southwest Ethiopia, Oromiya Region-----	38
Table 3.3. Percentage Distribution of Infant Survival status by different Socio- Demographic Characteristics of the Respondents, Limu-seka southwest of Ethiopia, Oromiya Region-----	40
Table 3.4. Percentage Distribution of Maternal Health Care Services and Obstetrics Characteristics of Respondents, Limu-seka, southwest of Ethiopia, Oromiya region-----	42
Table 3.5. Percentage and Numeric Distribution of Infant survival status with Maternal Health care Variables, Limu-seka, southwest of Ethiopia, Oromiya region-----	44
Table 3.6. Percentage and Numeric Distribution of ANC services, Limu-seka Southwest Ethiopia, Oromiya region-----	46
Table 4.1. Association of some selected Socio-Demographic variables with Infant Mortality situation in Limu-seka woreda, Southwest Ethiopia, Oromiya Region -----	50
Table4.2. Association of some selected Maternal Health Care Variables with Infant Death, Limu-seka woreda, Southwest Ethiopia, Oromiya Region-----	52
Table4.3. Logistic Regression Model for Infant Death with selected socio-demographic and maternal Health care variables Limu-seka woreda,southwest Ethiopia,Oromiya Region-----	54
Lists of Figures	
Figure 1:- Conceptual Framework-----	18
Figure2:- Map of Limu-seka woreda-----	

TABLE of CONTENTS

	page
Acknowledgement-----	I
List of Acronyms and Abbreviations-----	II
List of Tables and Figures-----	IV
Table of Contents-----	V
Abstract-----	VII
Chapter one:1. Introduction-----	1
1.1. Background of the study-----	1
1.2. Statement of the problem-----	4
1.3. Review of Related Literature-----	7
1.3.1. Socio-economic Characteristics-----	7
1.3.2. Demographic Factors of Infant Mortality-----	9
1.3.3. Maternal Health Care factors-----	12
1.3.4. Environmental Factors-----	16
1.4. Conceptual Framework-----	17
1.5. Objectives of the study-----	18
1.5.1. General objective-----	18
1.5.2. Specific objectives-----	18
1.6. Research Hypothesis-----	19
1.7. Operational definition of terms/concepts-----	19
1.8. Significant of the study-----	20
1.9. Study Variables-----	21
1.9.1. Dependent variable-----	21
1.9.2. Independent variables-----	21
1.10. Strengths and Limitations of the study-----	21
1.10.1. Limitations of the study-----	21
1.10.2. Strengths of the study-----	22
Chapter Two: 2. Data Sources and Methodology-----	23
2.1. Study Population-----	23
2.2. Sources of Data-----	23
2.2.1 Quantitative-----	23
2.2.2. Qualitative-----	23
2.3. Study Design-----	24
2.4. Sample size determination-----	24
2.5. Sampling Procedures-----	25
2.6. Measuring Instruments-----	26
2.6.1. Quantitative-----	26
2.6.2. Qualitative-----	26
2.7. Data collection process-----	26
2.7.1. Recruiting, Hiring and Training of data collectors-----	26
2.7.2. Pre-testing-----	27
2.7.3. Study Procedures-----	27
2.7.4. Supervision-----	28
2.8. Data Quality Assurance-----	28
2.9. Ethical Issues-----	29

2.10. Data Processing and Method of Data Analysis-----	29
2.10.1. Data Analysis-----	29
2.11. Brief Description of the Study Area-----	31
2.12. Variables included in The Analysis-----	34
Chapter Three: 3. Background Characteristics of the Study Population-----	35
3.1. Socio-Demographic Characteristics of Respondents-----	35
3.2. Obstetrics Characteristics of Respondents-----	41
3.3. Respondents Knowledge about ANC Services-----	44
3.4. Health Service Barrier Factors for Maternal Health Care Utilization in the study Area-----	45
3.5. Main Reasons for home delivery-----	45
3.6. Main Reasons of respondents attending Postnatal Care-----	47
3.7. Respondents Attitude and Practice of Infant care-----	47
Chapter Four: 4. Analysis, Results and Discussion-----	49
4.1. Bivariate Analysis-----	49
4.1.1. Association of some selected Socio-Demographic Variables with Infant Mortality-----	49
4.1.2. Association of selected Maternal Health Care Factors on Infant Mortality-----	51
4.1.3. Multicollinearity Effect and Model Goodness of Fit-----	52
4.2. Multivariate Analysis-----	54
4.3. Discussion-----	56
Chapter Five: 5. Conclusion and Recommendations-----	61
5.1. Conclusion-----	61
5.2. Recommendations-----	63
References-----	i-v
Annexes-----	vi-xxv

Abstract

The purpose of this study is to identify the important health factors that influenced infant death in Limu-seka woreda, Oromiya region. Data were collected through a structured questionnaire from February 13 to February 28, 2010.

The study was cross-sectional design at household level which consisted of a sample of 403 eligible women in the reproductive age. The eligible women 403 were selected through multi-stage sampling techniques. Well known statistical tools Chi-square (χ^2) test, logistic regression and descriptive statistics were used to analyze the data.

The study results revealed that maternal health related variables such as postpartum visit, place of treatment of infant and vaccination receipt of infant among a set of selected variables which affected infant mortality. The χ^2 -test result showed that place of treatment, breastfeeding, vaccination receipt, postpartum visit and parity had statistically significantly associated with infant mortality. Multivariate analysis results revealed that infant death is 88% lower for an infant who got treatment from health institute compared to an infant who got treatment from traditional source.

It is evident from the study that infants had 47% lower risk of death who were born to mothers of parity 4 and above than infants who were born to mothers of parity 3, and also the risk of an infant death who was born in the period less than 24 months following the preceding birth was 3.5 times higher than an infant being a first child or born after 36 months following the old sibling.

Hence, the local health bureaus should give attention to the expansion of MCH services in order to reduce the risk of infant mortality in the woreda. It is important to encourage women to limit their off springs and to take their infants to health institution for treatment rather than traditional healer. Moreover, HEWs should work closely with women of reproductive age to address the problem.

Chapter one

1.INTRODUCTION

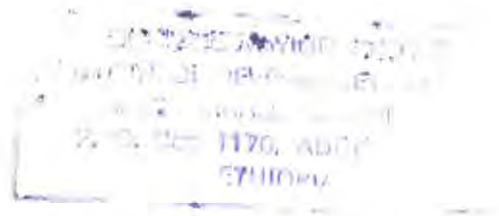
1.1 BACKGROUND OF THE STUDY

Four decades ago African delegates joined the representatives of others nations in endorsing the Alma Ata declaration, this committed all governments throughout the world to the common goal of achieving 'Health for All' by the year 2000. It is acknowledged that this goal is ambitious, even for the well-established health services in industrial countries, which have access to powerful health technologies and abundant resources of money, health personnel, and institution. For developing countries, particularly those in sub-Saharan Africa, this goal is daunting. To meet these objectives health planners need information on which to base policies and programs: they need information on the extent of mortality in their countries and its causes, both pathological and social, and on the interventions most likely to prove effective (Feachem & Jamson, 1991).

Often, there are not sufficient data to permit calculation of the common indexes of community health on a national basis. In the absence of a system for registering births and deaths, national estimates of infant mortality and of child, maternal, and other death rates are based on extrapolations of data gathered from a few isolated studies (Feachem & Jamson, 1991).

Improving health conditions is a national priority virtually elsewhere. Mortality levels and their trends in the recent past provide the most fundamental and widely used measure of health status of population. Reducing infant and childhood mortality more generally, together with increasing life expectancy, are universally accepted goals for public policy (Feachem & Jamson, 1991).

Mortality levels and trends are strongly influenced by the level and course of socioeconomic development. So accepted is this fact that mortality indicators



such as infant mortality rates and life expectancy at birth are commonly used as social indicators of development (Feachem & Jamson, 1991)

Worldwide about 8 million infants die annually before their first birthday (PRB, 2006). Each year, 10.7 million children under the age of five years die, out of them 4 million die during the first month of life. In the less developed countries, this account for 98 percent of reported neonatal deaths (Zupan, 2005). Not surprisingly, of the twenty countries that the UN (2002) recently identified with the poorest infant mortality rate in the world, only East Timor was outside SSA. While Ethiopia's current IMR of 77 per 1000 live birth is among the highest of in the SSA. Infant mortality thus continues to be a major public health concern in much of the regions and for the implementation of efficient programs, knowledge of its determinants is required.

The levels of mortality are higher in sub-Saharan Africa than in other developing regions of the world. Levels of mortality among children are such that 20 percent die before they reach the age of five. Women in Africa face two to three times the risk of dying in childbirth as women in Asia (Feachem & Jamson, 1991).

Although the risk of death in each pregnancy is higher in western than in east Africa, higher fertility levels mean that a woman in east faces a lifetime risk of maternal death similar to that in the west (Feachem & Jamson, 1991).

Antenatal care that women receive during pregnancy is a unique opportunity to provide the pregnant woman with a vaccination to prevent tetanus, screening for anaemia, and enrolling women in prevention of mother to child transmission of HIV (PMTCT), counselling for safe delivery – all factors that help ensure that the mother remain healthy through childbirth and gives her child the best start in life. Antenatal care also increases the likelihood of a skilled attendant, who can detect and manage complications being present at birth. This can often mean the difference between life and death for both mother and baby (WHO, 2004b).

Antenatal care is the monitoring of mother and foetus by trained health personnel throughout the whole pregnancy with the necessary examination and recommendation by regular intervals. According to WHO(2006) recommendation, for normal pregnancy a minimum of four visiting (at least 20 minutes for each) is needed to accomplish the essential level of ANC(Overbosch et al.,2002). Thus, ANC and delivery services are potentially one of the most effective health interventions for preventing infant mortality, maternal morbidity and mortality in areas where health services and health status of women is poor. ANC and delivery care give opportunity for delivering health information and services that can significantly foster the health of mothers and their infants. But, in developing countries like Ethiopia, the potential to deliver health information and services using ANC and DC remain underutilized.

Infant mortality is the number of deaths of children below age one per 1000 live births. At current mortality levels, one in every 13 Ethiopian children dies before reaching age one. Infant mortality in urban areas is 66 deaths per 1000 live births compared with 81 deaths per 1000 live births in rural areas and 77 per 1000 livebirth for the total of the country (CSA & ORC Macro, 2006).

According to EDHS of 2005, the infant mortality rate of Oromiya is 76 per 1000 live births nearly close to the country's level (77per 1000LB) (CSA & ORC Macro, 2006). In rural areas where there is shortage and lack of health centre for antenatal and delivery cares the problem is serious and infant mortality level is higher than the expected one.

Infant mortality reflects the quality and utilization of antenatal, delivery, and postnatal care available to women and their infants. Infant mortality, comprising of early neonatal and postnatal deaths is one of the sensitive indices of the quality of antenatal, obstetric and infants care available to women and infants. Infant health is a good indicator of both maternal health status and the level of socioeconomic status attained in any community. Infant mortality remains a

challenge in the care of pregnant women worldwide, particularly for developing countries and the need to understand contributory factors is crucial for addressing appropriate infant health. Hence, further reductions in infant mortality will largely depend on improving maternal health care services. Improvements in the coverage and particularly in the quality of antenatal and delivery care are urgently needed.

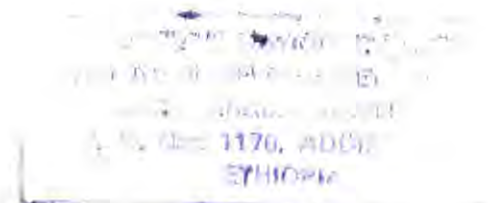
Given that this paper used child level retrospective data, only variables existing before pregnancy and those relating to pregnancy (ANC & DC services utilization) would be considered as well as selected delivery-related variables such as place of delivery, the person assisted at delivery and infants characteristics at birth. This paper tried to see the factors associated with infant mortality and maternal health care services utilization in Limu-seka woreda.

1.2. Statement of the Problem

Improving maternal health and reducing maternal and infant mortality have been major concerns of many international summits, conferences and conventions since the late 1980s, including the Millennium summit in 2000. One of the eight Millennium Development Goals (MDGs) adopted at Millennium Summit is improving maternal health and reducing infant mortality (MDG 4 and MDG 5) (WHO, 2004b).

An estimated 500,000 women die each year from complications of pregnancy and child birth that could be prevented. Every minute, nearly 17 children under 5 die—almost 8.8 million each year. Of these, 3.7 million are newborn infants who die within the first month of life. Up to two-thirds of these can be prevented if mothers and newborns received care from known, effective interventions (USAID, 2009).

Each year, approximately 4 million newborn infants die during the first month of life. And an additional 4 million are stillborn—most of these deaths are infection, asphyxia (suffocation as a result of physical blockage of the airway or inhalation



of toxic gases) and birth injuries, and complications of premature birth. Low birth weight contributes to newborn death in about 40-80% of cases. Nearly all of these newborn deaths occur in developing countries, and most of these can be prevented if good qualities of maternal health services are available (WHO, 2007).

Infant mortality is expected to be high in society where the contraceptive prevalence rate is low. According to Guttmacher Institute report (2002), the likelihood of babies dying before their first year is affected by the age at which women have their children and the length of interval between births.

Based on Ethiopia DHS 2005, neonatal mortality in the most recent period (2000-2005) was 39 per 1,000 live births, post neonatal deaths was 38 per 1,000 live births similar to neonatal mortality during the same period; that is, the risk of dying for any Ethiopia child who survived the first month of life is the same in the remaining 11 months of the first year of life. Thus 50% of infant deaths in Ethiopia occur during the first month of life. Infant mortality rate in the five years preceding the survey was 77 per 1,000 live births (CSA & ORC Macro, 2006).

ANC coverage of the world is 72% (98% in industrialized countries, 68% in developing countries) (WHO, 2003). The ANC coverage of women in Ethiopia has stagnated going from 27% in 2000 to 28% in 2005. Regional differences in the source of ANC are quite significant; 26.5% of mothers in Amhara received ANC from a health professional, compared with 24.8% in Oromiya. ANC is potentially one of the most effective health interventions for preventing maternal and child morbidity and mortality in places where the general health status of women is poor (CSA & ORC Macro, 2006).

According to Macro (2007), about 28% of pregnant women receive antenatal care, and about 5% deliver at health care facilities in Ethiopia. The proportion receiving ANC, for example, is very low when compared with sub-Saharan Africa countries like Ghana (92%), Kenya (88%), Eritrea (70%), and Tanzania (78%).

Non utilization of ANC and delivery care may result in missed opportunities to identify and manage conditions that may threaten the life of mother and baby and improve maternal and child health.

The Ethiopia government targets to reduce infant mortality and maternal mortality rate from 71/1,000 live births and 871/100,000 LB in 2004/05 to 45/1,000LB and 600 /100,000 LB in 2009/10 respectively. Furthermore health targets include enhancing deliveries attendant by skilled attendants from 9% in 2004/05 to 32% in 2009/10 (MOFED, 2006).

In Ethiopia, there are significant differences in access to maternal health services. For example, according to United Nations Statistic Division report on Millennium Development Goal 5 in 2005 indicate that the rich are 28 times more likely than the poor to have a skilled attendant at delivery (UNSD, 2005). Ethiopia is one of the 57 countries with a critical shortage of health workers at every level, and rural areas , in which 85% of the population live, have been particularly chronically underserved (GHWA & WHO, 2006).

A large majority of births (94%) in Ethiopia are delivered at home; where health care operators served less than 6% of birthing mothers. Moreover, only 6% of births are delivered with the assistance of trained health professional and 28% by traditional health practitioners. In Oromiya region only 4.8% of births were delivered in a health facility (public and private sectors), 32.5% by a traditional birth attendant and a 57.7% of births are attended by a relative or some other person. 95.2% of live births deliveries were undertaken at home. Only 4.7% of all births in rural areas were assisted by a trained health professional, compared with 45% in urban areas (CSA & ORC Macro, 2006).

During delivery, proper medical attention and hygienic conditions will help in reducing the risk of complications and infections that may cause the death or serious illness of the mother and the baby or both (CSA&ORC Macro, 2001;

2006). One fourth of rural women and one out of ten urban women were found to have self-assisted during delivery (MOFED, 2006).

Infant mortality rate in Oromiya in the period 200-2005 was 76 per 1000 live births. TFR for the period 2000-2005 is 6.2 and mean number of CEB to women age 40-49 is 7.1 (CSA & ORC Macro, 2006).

It was known that Jimma zone among all zones in Oromiya had the highest IMR and the lowest life expectation at birth. There was 150 infant deaths per 1000 live births in rural area and 103 per 1000 live births in urban area (CSA, 1998). That is why investigating and identifying the relationship between infant mortality and maternal health care services factors are so important to improve the health status of both mother and baby in Jimma zone at Limu Seka woreda. Moreover the finding may help policy makers of Oromiya health bureaus to take appropriate health intervention program in the study area.

1.3. Review of Related Literature

In this section the socio-economic, demographic, maternal health care factors, environmental and behavioural practice of infant care (breastfeeding & vaccination) were reviewed in relation to infant mortality.

1.3.1. Socio-economic Characteristics of Infant Mortality

Various studies have shown that the level and trends of infant mortality vary from country to country, depending on the socio-economic development of each country. Among the socioeconomic factors, mother's education, father's education, place of residence (urban/rural), mother's ethnicity and religious affiliation, work status and occupation of parents are considered to be important.

The negative relationship between the extent of mother's education and child mortality was confirmed by the studies in Ethiopia (Assefa, 1991; Mekonnen, 1993; Meaza, 1997; Amhare et al., 2007; Mustefa, 2008). But Tesfu (2006) in his

study in Afar zone four found that mother's education has no significant relation with infant death. Mother's education and high economic status, two variables which are usually highly correlated, has a positive effect on infant and child survival. In fact, these "advantaged" households are more likely to have access to piped water and to latrine or flush toilet, and in addition pay more attention to hygienic norms, like washing hands (Makonnen , 2000).

Education of the mother has been found in various other countries to be more important than education of the father as a determinant of use of ANC and delivery at a health facility (Swedish Save the Children Federation, 1984). These indirectly influence the level and trend of infant mortality.

In the case of ANC, education of the mother has a stronger association with receipt of tetanus toxoid compared with education of the father. Both primary and secondary level education of the mother is more equally significant, but for the father only secondary education is significant. Mothers with secondary education and above are four time more likely to have received TT compared with women who have no education (Shakya & McMurray, 2001)

Illiterate women have higher infant deaths. Maternal education has substantial negative effect on infant death (Kumar et al., 2006). A similar result was obtained in Ethiopia. A study done in Ethiopia at Gilgel Gibe field research centre revealed that higher underfivemortality was observed among mothers whose educational level were elementary and below as compared to mothers who were above elementary school. Furthermore, the study revealed that socio-demographic variables did not show statistically significant association with infant mortality except maternal education (Amare et al,2007). Study in Kenya revealed that mothers with no schooling have the highest infant mortality compared to those have some schooling(Mustefa, 2008).

Father's education is usually considered as a proxy for the standard of living/economic status of a household because educated fathers are likely to earn



more than uneducated ones and thus be able to provide better services and care to their children. Studies have shown that child mortality is lower among children where fathers had some education than among those where fathers had no education (Gubhaju et al., 1991). Children who were born to mothers whose educational level is below elementary were 25 times more likely to die compared to children who were born from mothers whose education is above elementary school (Amare et al., 2007).

Studies have revealed that IM varies significantly among religious and ethnic groups. Lower infant mortality among Christians was also observed in studies done in different regions of Ethiopia (Mekonnen, 1993; Assefa, 1991).

The survival prospects of children during infancy depend on the level of nutrition, hygiene and health care, educated mothers are more likely to provide better services and care than uneducated mothers even if both have the same economic resources (Gubhaju et al., 1991) for education provides the mother with the necessary skills for child care.

1.3.2. Demographic Factors of Infant Mortality

Infant mortality is influenced to a considerable extent by demographic characteristics of mothers and children which include the sex of the child, mother's age at birth, birth order, length of the previous birth interval, and the size of the child at birth. Studies in developing countries, most of them using data provided by the World Fertility Survey, have found that age at maternity, birth order and birth spacing are the major determinants of infant mortality (Ogunlade & Mezue, 1987; Majumder, 1988).

It has generally been assumed that factors that affect foetal and neo-natal deaths are primarily endogenous (i.e. biological or demographic), while those which affect post-neonatal deaths are primarily exogenous (i.e. socio-economic) (Kumar et al., 2006).

The relationship between maternal age at birth and child mortality is U-shaped, being relatively higher among children born to mother under age 20 and over age 40 than among mothers in the middle age groups (CSA & ORC Macro, 2006). Study done in Amhara Regional State at Maqdella and Tenta (South Wollo districts) also revealed that infant born to teenage mothers and older mothers (35-49) die proportionally high compared to those born to mothers of ages 20-34 (Gashaw, 1996). Study in India shows that maternal age plays significant role in infant survival. Reduction of teenage child bearing would lower infant mortality. Furthermore, it revealed that mother's age at the time of childbirth association significantly negative with infant mortality (Kumar et al., 2006). Early age, late age, and too closely spaced pregnancies are associated with high risks for the mother and child (USAID, 2009).

Studies have revealed that infant mortality is higher for the first and higher birth order (Majunder, 1988; Gubhaju et al., 1991; Kumar et al., 2006). The negative effect of the first order and higher order births was also confirmed in the study done in Oromia Regional State at Sebeta town (Mekonnen, 1993). But Gashaw in his study at Maqdella and Tenta districts revealed that first order birth had a lower chance of dying. He also confirmed that the proportion of dying is higher for birth orders 2-3 compared to first order births and the proportion of dead is highest for six and above birth orders (Gashaw, 1996). Mekonnen (1993) in his study found that births of higher order are about 1.5 times more likely to die during infancy than birth of order four. A study found that a child born three to five years after birth of a sibling is about 2.5 times more likely to survive than children born at shorter intervals (USAID, 2009).

Furthermore, length of the preceding birth interval is found to be the most important variable affecting infant mortality as compared to maternal age or birth order (Majunder, 1991). Studies in Bangladesh (Majunder, 1988; Ahmed, 1991) and in Nigeria (Ogunlade & Mezue, 1987) have shown that infant born after a

relatively short interval experience considerably higher mortality than those born after long intervals of two and three years are found to be associated with lower mortality rates. Gashaw (1996) in his study found that babies born in a short birth interval (less than 24 months) die proportionally higher compared to the other interval categories (b/n 24-36 & more than 36 months). He also investigated those infants born after 36 months showed lower chance of dying versus infants born in the interval 24-36 months. A study in Ethiopia revealed that death risks were significantly higher among infant born to mother with old age and short birth interval (Tesfu, 2006).

Infant mortality is generally higher for males. Higher IM of boys has been recorded nearly every where, except where girls are discriminated against (UN, 1985). Studies in Ethiopia (Assefa, 1991; Mekonnen, 1993) also confirmed with the general findings. Studies in Kenya and India are also consistent with this finding; the probability of infant death is more likely for male infants (Mustafa, 2008; Kumar et al, 2006). The infant mortality rate is higher among boys than among girls (Uthman, 2008). A study in Nepal also showed that child sex has a strong influence because of the physiological advantage of female infants compared with male infant (Shakya & McMurray, 2001). But the studies done in Ethiopia at Gilgel Gibe field research centre and Afar zone four showed that there was no significant difference of death between males and females (Amare et al, 2007; Tesfu, 2006).

A child's birth weight at birth is an important indicator of the child's vulnerability to the risk of childhood illnesses and the chances of survival. Children whose weight less than 2.5 kilograms, or children reported to be 'very small' or 'smaller than average' are considered to have a higher than average risk of early childhood health. According to EDHS 2005 findings, only 3% of children in Ethiopia weighed at birth. Among children born in the five years preceding the survey with a reported birth weight, 14% weighed less than 2.5Kg at birth. Twenty-three percent of births in rural areas compared to 10% in urban areas have a reported

birth weight less than 2.5Kg. In Oromiya region 20.5% of births reported weight less than 2.5Kg (CSA &ORC Macro, 2006). A study in Nigeria shows the infant mortality rate is very high among the children with low birth weight – 138 per 1000 live births compared with 95 per 1000 live births among the children born with normal weight (Uthman, 2008). It was also confirmed in a study done in Afar region that babies born with low birth weight were significantly associated with higher risks(Tesfu, 2006).

1.3.3. Maternal Health Care Factors of Infant Mortality

Maternity care is the physical monitoring and emotional support provided to families in order to ensure a safe and satisfying outcomes of childbearing cycle. It is obvious that maternal health care during pregnancy and professional delivery are key factors in reducing maternal and neonatal mortality, because they help to identify high-risk cases and make deliveries safer(Shakya &McMurray, 2001).

In Ethiopia 28% of babies are delivered by a health professional assistance and 5% at a health facility. There is considerable variation by residence. Two in five urban births have had a health profession in attendance during delivery compared with about 3% of rural births. In A.A, more than three in four babies are delivered at a health facility. In contrast, only 5% of babies in other regions are delivered in a health facility. In Oromiya, only 4.3% mothers delivered in health facility whereas the majority (95.2%) at home. Births delivered at home are usually more likely to be delivered without assistance from a health professional, whereas births delivered at a health facility are more likely to be delivered by a trained health professional. Only 4.8 percent of births are delivered with the assistance of a trained health professional, that is, a doctor, nurse, or midwife, and 32.5% are delivered by a TBA. The majority (57.7%) are attended by a relative or some other person in the region (CSA &ORC Macro, 2006). A study in Afar shows identical result; the great majority of births were delivered at home assisted by untrained TBA and relatives(Tesfu, 2006). He also found that place of delivery was not significantly associated with infant death.

There is substantial evidence that health care during pregnancy is crucial components of ensuring a safe delivery and a health mother and baby. The World Health Organization has published fundamental practices for a successful pregnancy, which include visiting a skilled health care worker at least four times during pregnancy, maintaining a healthy diet, knowing the signs of labour so as to seek delivery care at the appropriate time, and understanding the danger signs during pregnancy (WHO, 2006). Study in Nepal reveals that antenatal care, receipt of tetanus toxoid, preceding birth interval, sex of the child and mother's age all have statistically significant relationship with neonatal death. It also shows that place of delivery and delivery assistance are insignificant (Shakya & McMurray, 2001). In line with this, a study in India reveals that a high proportion of hospital based deliveries, high utilization of ANC services, high acceptance of TTI and iron/folic acid tablets and high proportion of births attended by trained medical persons during delivery lower infant mortality (Nair et al., 2000). But study in Ethiopia at Afar zone four showed that antenatal care and TTI were found not significantly associated with infant death (Tesfu, 2006).

Mothers in rural areas are less likely to received ANC during pregnancy than those in central region (Urban), largely due to scarcity of health facilities and low economic status. Likewise, in urban areas there are more health facilities and services compared with rural areas, but economic status and education appear to be more important determinants of which urban mothers use these facilities. But urban residence itself does not seem to be significant (Shaky & McMurray 2001).

There are a strong association of mother's education with ANC, and a weaker association with education of father (Thapa, 1996; Shakya & McMurray, 2001) which indirectly affects infant mortality. There is a highly significant relationship between tetanus toxoid injection and household assets. This indicates that women who are poor in terms of ownership of assets are likely to receive tetanus toxoid compared with those who are better off (Shakya & McMurray, 2001).

Antenatal care coverage can be described according to the type of provider, number of ANC visits, as well as content of services and information provided during ANC. According to Ethiopia DHS 2006 reports ,28% of mothers received ANC from health professionals for their most recent birth in the five years preceding the survey ,and less than 1% of mothers received ANC from a traditional birth attendant(trained or untrained). More than seven in ten mothers (72%) received no ANC for births in the preceding five years. In urban areas, health professionals provide ANC for 69% of mothers, whereas they provide for only 24% of mothers in rural areas. Three in four mothers in rural areas, receive no ANC at all. Furthermore, only 24.8% mothers in the Oromiya region receive ANC from a health professional. It was also observed that pregnant women who did not use the ANC services were likely to be those who think that ANC service has low/no effect in reducing death and illness in the mothers and babies. (Challi & Tefera, 2005).

Utilization of maternal health care services in Ethiopia is inadequate with much worsened conditions in the rural parts of the country. It indicated that only 27% of women who had at least one birth in the period 1995-2000 received ANC from health personnel for their most recent birth. The finding further indicated that education, place of residence and religion as determinants of ANC utilization (Yared &Asnakech, 2000). Indirectly it affects infant survival particularly in the rural areas with low access of maternal health care services.

Antenatal care is more beneficial in preventing adverse pregnancy outcomes when it is sought early in the pregnancy and is continued through to delivery. In Oromiya region, 26.1% of pregnant women were informed of signs of pregnancy complications (CSA &ORC Macro, 2006). According to World Bank (1993), about one third of the total disease burden that women face is linked to pregnancy, child birth, abortion and various reproductive tract disorders. One of

the important reasons for high rates of infant mortality is the limited use of health care services by mothers (Kabir & Amin, 1993).

Tetanus is an important cause of death among neonates. Neonatal tetanus is caused by infection of the newborn with tetanus organisms. Neonatal tetanus is most common when the delivery takes place in unhygienic environment and non-sterilized instruments are used for cutting the umbilical cord. It is preventable. Two doses of TT vaccine given to the pregnant woman one month apart during early pregnancy is nearly hundred percent effective in preventing tetanus among the newborn and among mothers (Nair et al., 2001).

From the standpoint of infant survival and health of mother, the first priority for delivery care is that it is safe and cleans (WHO, 1994). The majority of maternal and infant deaths and chronic morbidity resulting from child birth are due to the failure to get timely help for complications at delivery (NFFS,1993). It essential that delivery can be conducted under proper hygienic conditions with the assistance of a trained medical person.

Studies in Britain as early as 1660 reported 54% infant mortality in artificially fed babies versus 19% in breastfed babies. The global revival of breastfeeding through the multi organizational 'breast is best' campaign in the past 25 years has been credited with remarkable gains in maternal and child health (Grenier, 1998 cited in Burns, 2001).

A study done in Ethiopia shows that children who were not breastfed were 6 times more likely to die compared to those who were breastfed (Amare et al, 2007). Infant death were more likelily among never breastfed relative to ever breastfed (Mustefa,2008).

Breastfeeding, especially in the least developed countries of Africa, is credited by the International Baby Food Action Network (IBFAN) of Africa as the single

biggest influence on decreasing infant mortality and malnutrition (IBFAN Africa, 1999). IBFAN Africa further states that there is 14 times greater risk of death from diarrhea and 3 times greater risk due to acute respiratory infection (ARI) in babies not breastfed (IBFAN Africa, 1999). A study in Kenya shows that those who were never breastfed babies were at a significant higher risk for not surviving their first year of age (Mustafa, 2008).

Study done in Bangladesh (2009) shows that the child had 62.5% lower risk of death who were immunized than that of who were never immunized, and also the risk of infant mortality was 95.10% lower among those who had to take their treatment from a specialist doctor (Hossain & Mondal, 2009).

1.3.4. Environmental Factors

Among various environmental factors, housing structure, toilet facility and source of drinking water are the most common determinants of infant mortality.

Availability of drinking water is considered to be one of the items necessary for the good health of infants. The IMR for those who have access to safe drinking water was observed to be slightly lower, compared to those who do not. In Jimma zone, 38.41% of the households got drinking water from protected well/spring, 17.19% from unprotected well/spring and 10.34% from river/lake/pond (CSA, 1998). Yohannes (1990) (as cited in Mekonnen, 1993) has reported, in Addis Ababa, women who use tap water in their house or within their compound experience lower child mortality than women who use tap water outside their compound. A study in rural villages of Arisi zone, Ethiopia found that a significant association of tap water development initiative with a decline in infant mortality (Yemane, 2006). A similar result was obtained in a study done at Afar zone four that, family who used water for drinking from pipe line source which include hand pump were associated with lower risk of infant death (Tesfu, 2006).

Studies done in Ethiopia showed that access to toilet facility reduce the risk of infant mortality (Assefa, 1991; Mekonnen, 1993). In rural area of Jimma zone, almost 80% has no toilet and only 19% has toilet. Whereas in urban areas, nearly 71% has toilet and 28% has no toilet (CSA, 1998).

1.4. Conceptual Framework

Based on the stated objectives of the research and review of literature, the framework of the study was prepared in advance. The conceptual framework consists of four groups of variables: dependent, independents, and intervening variables.

The dependent variable is infant mortality. The independent variables are categorized into three as demographic, maternal healthcare services, socio-economic and environmental variables. The intervening variables are knowledge, attitude and perception of ANC, delivery care services and PNC.

The overall relationship among variables is depicted in figure 1

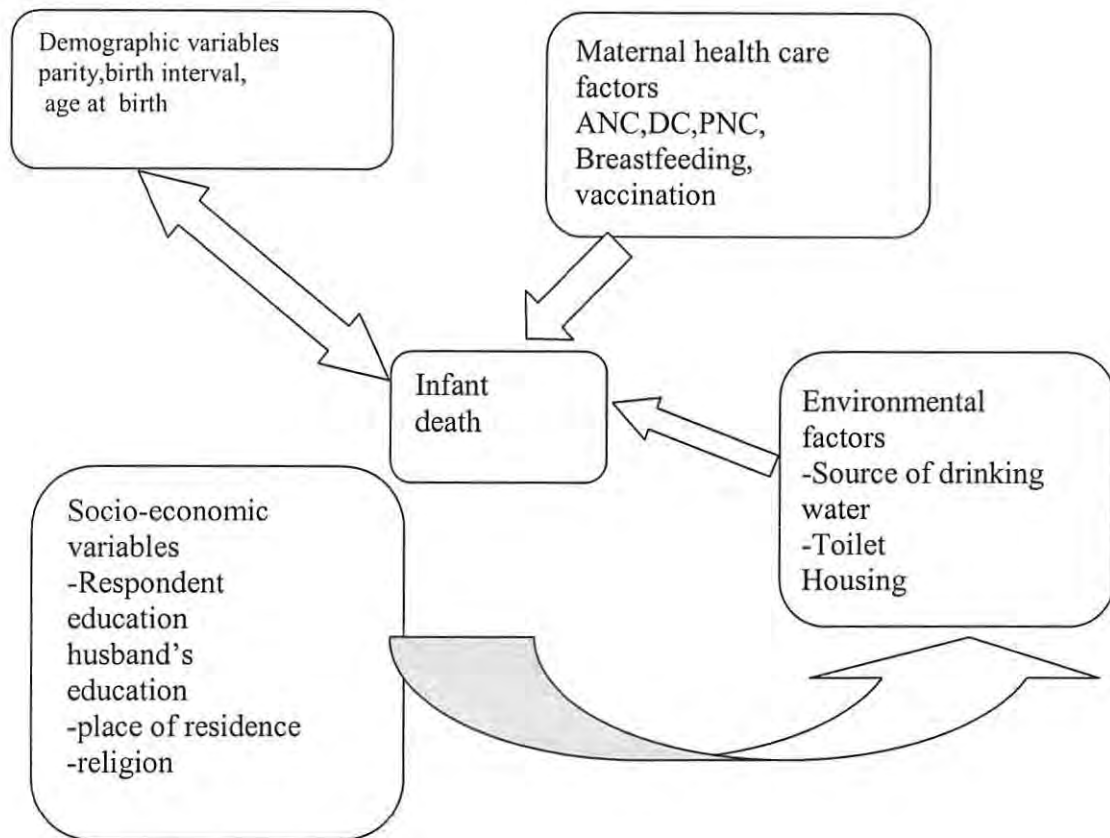


Fig1. Conceptual frame work of the study adopted from Mosley and Chen Analytical framework(1984)

1.5.Objectives of the Study

1.5.1. General objective

The main objectives of this study are to investigate factors of infant mortality by different health related characteristics of the woreda and to identify the health related factors which are associated with infant mortality in the study area.

1.5.2. Specific Objectives

The specific objectives of the study were the following:

1. To examine the demographic factors affecting IM in the study area.
2. To assess the impact of maternal health care service factors on infant mortality
3. To investigate the impacts of selected household level factors on IM.

1.6. RESEARCH HYPOTHESIS

This study tried to investigate the following research hypotheses:

1. Mothers who received ANC service experienced lower IM than those who did not receive.
2. Infant mortality rates in rural area are higher than in urban area.
3. The lower the access of ANC and delivery care services the higher IMR.

1.7. Operational Definition of Terms

1. Infant mortality (IM) is the probability of dying between birth and the first birthday.
2. Antenatal care (ANC):-is health care received by mothers at the time of their pregnancy from health professionals.
3. Antenatal care attended: pregnant women who had attended antenatal clinics during the recent pregnancy at least once.
3. Delivery care (DC) :-the services given for pregnant women during labour, management of normal delivery and detection of complications, management of risk cases, care given to women's birth assisted by trained health personnel at health facility or at home.
4. Skilled attendance: to individuals with midwifery skills (doctors, midwives, nurses and TTBA's) who have been trained in the skills necessary to manage normal delivery, diagnose and refer obstetric complications.
5. Traditional Birth attendants (TBAs): A birth attendant who initially acquired the ability by delivering babies herself or through apprenticeship to other TBAs.
6. Trained Traditional Birth attendants (TTBAs): those TBAs who have undergone subsequent training and are integrated in the formal health care system.

1.8. Significant of the study

One of the targets of the MDGs is a two-third reduction in infant and child mortality by 2015, to be achieved through upgrading the proportion of births attended by skilled health personnel, increasing immunization against the six vaccine preventable diseases, and upgrading the status of women through education and enhancing their participation in the labour forces. Based on MDG 4 report, Ethiopia has shown insufficient progress towards MDG4 (WHO & UNICEF, 2010), hence it is important to assess the level and trend of infant mortality in Jimma zone at Limu-seka woreda as it had the highest infant mortality among all the zones in the region (CSA, 1998).

Like most sub Saharan African countries the level of IM is quite high in Ethiopia. The same situation also prevails in Oromiya region. More children in Jimma zone (twice as much in Borena) die before their first birth day followed by Arsi and Misrak showa than the remaining zones. The zone showed the lowest expectation of life at birth (CSA, 1998).

In developing countries like Ethiopia, childbirth is associated with a number of serious problems. For many of new born infants and mothers, it is experienced with morbidity and mortality. Hence examining the different socioeconomic, demographic and maternal health care factors that affecting IM is of great importance for professionals in the field of population studies to address and effectively design strategies through which the policies are going to be implemented. The outcome of the study will be helpful in understanding and describing the main correlates of infant mortality or survival in the study area. These outcomes may help the woreda health office, Oromiya Regional health Bureau and non-governmental organizations in understanding, planning and implementation of different maternal and infant health cares related services. The outcomes may also be helpful in policy making, monitoring and evaluation of infant and maternal health care services in the study area. Moreover, this study

may serve as spring board for others who want to conduct further investigation on similar topic.

1.9. STUDY VARIABLES

1.9.1. Dependent variable

**Infant Mortality (IM)*

1.9.2. Independent variables

The independent variables are factors influencing or explaining variations in the dependent variable. The independent variables are categorized into four as socioeconomic, demographic, maternal health care related factors and environmental factors.

**Socioeconomic factors* (mother's occupation, father's occupation, education of respondent, education of husband place of residence)

**Demographic factors* (Age at last birth, parity, birth interval, number of pregnancies in the last five years and months of conception)

** Maternal Health Care Factors* (place of treatment, ANC check up status, number of ANC visits, person assisted at delivery, TT injection , number of tetanus injections, Breastfeeding, vaccination DC and PNC)

** Environmental variables:* source of drinking water, type of toilet and housing conditions

1.10. STRENGTHS AND LIMITATIONS OF THE STUDY

1.10.1. Limitations of the study

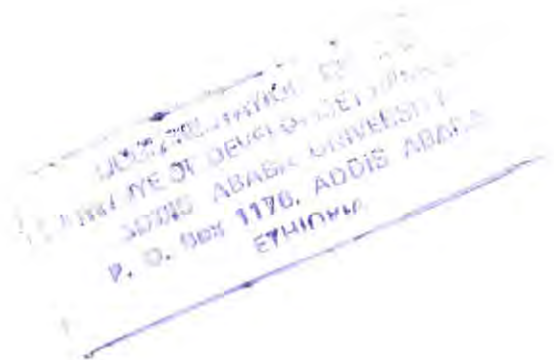
The study includes five years retrospective cross-sectional data, hence, the possibility of recall bias and misreporting of events was likely to occur. Retrospective birth history data collection is a problematic- many women fail to report unsuccessful pregnancies and early infant death(CSA,2000). The factors, those not included in this study, like infant feeding practices and receipt of iron and folic acid tablet during pregnancy, might have significant associations with IM. Since this study is cross-sectional, the importance of the variables was determined by comparing infant survival status at a specific point in time and

some variables like religion, ethnicity, place of residence, etc obviously preceded the outcome or knowledge of maternal health cares services could either follow or precede the outcomes of interest. The qualitative data result was not as designed and the number of FGDs was so small. So the above mentioned points are the main limitations of the study.

1.10.2. Strength of the study

The reliability of the data was maintained by:

- ❖ Selection bias was minimized since it was household level survey with probability sampling procedures and female interviewers were used who were non-health workers and unaware of the desired answers.
- ❖ The qualitative data was used to complement the findings



CHAPTER TWO

2. DATA SOURCES AND METHODOLOGY

2.1. Study Population

Women in the reproductive age groups(15-49) who were residents of Limu Seka woreda and who had at least one live birth in the past five years preceding the survey were included in the study.

Inclusion Criteria: Women in the reproductive age group who were residents of randomly selected rural kebeles and purposely included urban kebele, who had at least one live birth in the past five years preceding the survey. If a woman had more than one live birth in the past five years, only the most recent live birth would be taken into account.

Exclusion Criteria: Women outside the age range 15-49 and/or who didn't give live birth in the past five years preceding the survey were excluded.

2.2. Sources of Data

2.2.1. Quantitative

A face to face interview was conducted using structured questionnaire that was developed for the study purpose. Using the questionnaire data were collected on socio-economic, demographic characteristics, and health services accessibility, affordability, environmental factors and health care barriers (cost of health service, distance from home to HF) and knowledge of dangerous health problems related to maternity and infancy, maternal health care utilization (ANC, PNC and DC) by using home-to home interviewing of the the selected respondents.

2.2.2. Qualitative

Semi-structured open ended and non-directive focus group discussion guideline was prepared on the factors of infant mortality and maternal health care services. There was also discussion on knowledge, attitude and perception of ANC and delivery care (DC) services related to infant's survival status. A total of two FGDs

had been formed from women who were not included in the house to house interview.

2.3. Study Design

The study was household based cross-sectional study design that employed quantitative data collection method that were carried out to assess maternal health factors which have impacts on infant mortality in the study area.

The investigator also collected basic demographic and socio-economic data of the subject population. The questionnaire consisted primarily of knowledge-based, multiple-choice questions.

2.4. Sample Size Determination

The sample size was determined by the formula:

$$n = \frac{[z_{\alpha/2}]^2 \times p(1-p)}{e^2}$$

Where

n= is the sample size without considering non respondents

p=the proportion of women who experienced Infant mortality

Z = level of confidence and

e = margin of error.

In the absence of previous prevalence data on the study population and to get the maximum sample size, p has taken to be 0.5 (50%).

Margin of error e = 5% = 0.05.

Level of confidence was taken to be 95% (z= 1.96).

Therefore, n=384

Adding 5% allowance for non-respondents, absenteeism and refusal to participate in the study has been taken into account.

Hence, the final sample size N was,

$$N = n + 5\% \times n = 384 + 19 = 403.$$

2.5. Sampling Procedures

The proportion of women aged 15-49 in Oromiya was 0.22 (CSA,2008). From this census report, it is expected that the proportion of women aged 15-49 at Limu Seka woreda was to be 0.22 of the total population. Hence, the number of targeted women population, at the time of the survey, was approximately 41,189.

The total population of the woreda, according to the 2008 CSA report, was 205,000 of which 101,248 were females. 97.5% of the population (182,605) live in rural area. Moreover, there were 90,245 female populations living in the rural part of the woreda. The remaining 2,223 live in the urban part of the wereda.

After calculating the sample size, taken into account the spatial distribution of targeted population and the geographical area to be covered, out of 35 rural kebeles, four rural kebeles were selected using simple random sampling technique and one urban kebele in the town was included in the survey purposely. Following this, an attempt was made to adopt a three stage sampling.

Initially, the selection of four rural kebeles made using simple random sampling. Secondly, in each selected rural kebele three villages (gote) were selected using simple random sampling technique. To this end listing of households in each selected village was made to prepare the sampling frame from which 298 households were selected using probability proportion to size which was the second stage. Moreover, in the selected villages, all households were registered and assigned house numbers. Finally eligible women in each sampled household were selected using SRS technique. Moreover, in the urban setting first all eligible households were registered. To get the required sample size 105, the investigator used systematic sampling technique. The house number and kebele were used for coding purposes. The sampling frame was listing of eligible respondents in the study area. However, the actual number of eligible women successfully interviewed during the survey was 400 giving 99.3 percent of response rate.

2.6. Measuring Instruments

2.6.1. Quantitative

After reviewing of related literatures, the objectives of the study were designed and adapted from previous similar studies and other materials. The questionnaire was adapted from different sources such as EDHS (2005) and census of Ethiopia. The questions and statements were grouped and arranged according to their type and importance in addressing the objectives of the study. After a number of revisions, the final English version questionnaire was developed. The English version was translated into Oromifa by a translator who had a very good ability of both languages. Another translator translated the Oromifa version back to English to see any inconsistency and to correct it. Finally, another translator translated the Oromifa to Amharic.

2.6.2. Qualitative

A total of two FGDs were formed ,one group from the rural area and the other group from Atnago town of women in the reproductive age. In each group the participants were nearly in similar social and economic status and who speak the same language to facilitate the discussion comfortably and easily. The rural FGD group consisted 10 members and the urban one consisted of 8 members as recommended by WHO (1994).

2.7. Data Collection Process

2.7.1. Recruiting, Hiring and Training of data collectors

Ten female who completed secondary education and who speak both Amharic and “Afan Oromo”, were selected. Two male supervisors, who have been working as data collectors for CSA in the Jimma zone, were hired as supervisor. Both the supervisors and data collectors were given a half day training regarding the aim of the survey, procedures and methods of data collection techniques one by one going through each question in the questionnaire and clarification was given for

every question raised at the time of the training. Pilot Survey was conducted before the actual data collection process started.

The interviewers were selected based on:-

- * Being residents and know the selected kebeles very well.
- * Speaking both Amharic and Afan Oromo languages

The supervisors were responsible for:-

- *Controlling the activities of data collectors,
- *Supplying materials for interviewers,
- *Checking the questionnaire whether filled correctly and
- *Rechecking answers by interviewing 5% of the interviewed households.

The investigator was responsible for the whole activities in the field:-

- Checking supervisors' and data collectors' work
- Spot checking in the field for the work of data collectors
- Checking the filled questionnaires every night and return back for the incomplete questionnaire back to data collectors for correction next morning before the actual field work started.
- Giving every day feedback about the previous day work
- Coordinating all activities in the field in the survey period.

2.7.2.Pre-testing

The pre-test of the questionnaire was carried out in “Koma” kebele of the woreda outside of the selected ones. A total of 20 respondents were interviewed. The questionnaire took 30 to 40 minutes to complete the interview. Both the supervisors and the interviewers assessed clarity and completeness of the questions, and then the results were edited and coded.

2.7.3.Study procedures

The survey was administered to the selected women from February 13 to February 28, 2010. If the selected woman was not available, appointment was

taken through discussion with family members or neighbours. A maximum of two more visits were paid if a selected woman was not at home. Supervisors and interviewers were working all the days of two weeks in the survey period.

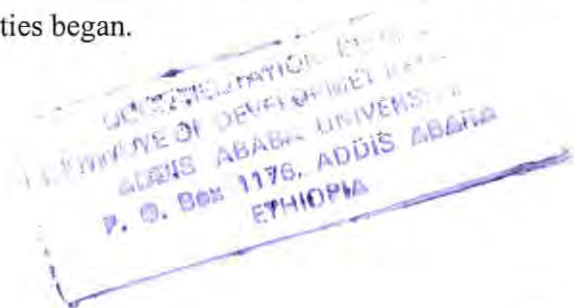
An effort had been made to secure privacy during interview. Supervisors were around every day to control as well as to support data collectors. Study subjects who were not permanent residents of the kebele were excluded from the survey in the study area.

2.7.4. Supervision

In each of kebele there were one supervisor and five data collectors. The supervisors had checked the activities of each data collector in there given kebele and sometime random spot-checking of the household to ensure reliability of the data collected. Every night the supervisors checked the filled questionnaires for clarity, completeness and proper identification of the respondents. Next, the researcher checked all the supervisors work each day for completeness and relevancies. Unclear and incomplete questionnaires were returned back to the interviewers next morning to correct it.

2.8. Data Quality Assurance

The quality of the data was assured by using properly designed and pre-tested questionnaire, and giving proper training for both interviewers and supervisors of the data collection procedures, proper categorization and coding of the questionnaire. Every day the filled questionnaires were reviewed and checked for completeness and relevance by the supervisors and the investigator and the necessary feedback had been given to the data collectors in the next morning before the actual data collection activities began.



2.9. ETHICAL ISSUES

The study got permission from Addis Ababa University with the approval of the Institute of Population Studies. Letter of permission was given to the concerned body in the study area. Permission was obtained from the concerned bodies (Woreda administration office) and woreda health office. Hence, the study was conducted with the knowledge and approval of the local administration. Data collectors requested for respondent's consent before interview. Before every interview, each respondent had been informed about the objective of the study, and requested to participate. Only after respondent's agreement to participate, then the interview was administered. There was informed consent with each participant in verbal form. Only consented participants were participated in the study.

2.10. Data Processing and Method of Data Analysis

2.10.1. DATA ANALYSIS

After collecting and organizing the necessary data in the field, the questionnaires were edited, classified accordingly, coded and the data entered into computer using statistical package for social science (SPSS) and processed by version 15. The unit of analysis was women of reproductive age who had at least one live birth in the past five years preceding the survey, if a woman gave more than one birth in the period, only attention was taken to for the most recent birth.

Data cleaning was carried by using frequencies and cross tabulations to check accuracy, outliers, consistencies and missing values. Then incorrect entries were identified and re-entered.

Descriptive analysis like percentage, mean, and standard deviations were used to describe the study population in relation to socio-economic, demographic and maternal health care variables. The methods of analysis were thematic analysis for

qualitative data and bivariate and multivariate logistic regression for quantitative data.

Bivariate techniques of data analysis were held to see relationship between the dependent variable infant death and independent variables by using chi-square test and p-value. The chi-square test was used to identify independent variables, which could explain the dependent variable (IM) for further analysis at the multivariate logistic regression. More over multivariate technique of data analysis was used to determine the most important variable which influenced infant mortality. Three different models were analyzed; one model only for socio-demographic variables, the second model for only maternal health care factors and the final model used for some selected variables from socio-demographic and maternal health care related factors.

Multivariate analysis was used to identify predictors of infant death. The multivariate analysis was made using the logistic regression. The response categories were collapsed to create a binary variable on the basis of whether or not the women experienced infant death in the last five years preceding the survey, the outcome variables were coded as 1 if the woman had faced infant mortality and as 0 if she didn't face infant death. The logistic model considers the relationship between the binary dependent variable and a set of independent variables. The logistic model for n independent variables ($x_1, x_2, x_3, \dots, x_n$) is given as

$$\text{Logit } P(x) = \ln(p/1-p) = \alpha + \sum \beta_i x_i, \quad 1 \leq i \leq n$$

**EXP (β_i) = odd ratio for a women having characteristic i
Versus not having characteristic i**

Where β = Regression coefficient
 α = constant

The bivariate test was to see the association of each independent variable with the response variable. To investigate the influence of the independent variables on the

dependent variable, logistic regression analyses were applied in order to identify the influence of one independent variable by controlling the effect of others.

2.11. Brief Description of the Study Areas

Limu Seka is one of the 180 woredas in the Oromiya Region. It is named in part after the former kingdom of Limmu-Ennarea, whose territories included the area this woreda now covers. Part of the Jimma zone, Limmu Sekka is bordered on the southwest by the Didessa river which separates it from the Illubabor zone, on the northwest by the Misrak Welega zone, on the northeast Gibe river which separates it from the Mirab Shewa zone, and on the southwest by Limmu Kossa. The administrative center of the woreda is Atnago.

A survey of the land in the woreda shows that 57.3% is arable or cultivable, 22.8% pasture, 4.9% forest, and the remaining 15% is considered swampy, degraded or otherwise unusable. Teff, oranges and bananas are important cash crops. Coffee is also an important cash crop for this woreda; over 5,000 hectares are planted with crop. Industry in the woreda includes 61 grain mills, one coffee pulping and one coffee hulling mill (Wikipedia).

Limu Seka has 42 kilometers of dry-weather and 64 all-weather road, for an average of road density of 43.9kms per 1000 square kilometres. About 54.6% of the urban and 10.9% of rural population have access to drinking water (Wikipedia).

Based on the 2009 woreda official report, two health stations and 14 health posts were ready for service. At current time there are some 35 health posts and five health stations.

The 1994 national census reported a total population for this woreda of 122,370, of whom 60,099 were men and 62,271 women; 3,400 or 2.78% of its population

were urbandwellers at the time. The two largest ethnic groups reported in the woreda were the Oromo (95.19%) and the Amhara (3.4%). The majority of the inhabitants were Muslim with 57.7% of the population having reported they practiced that belief, while 32.44% of the population said they professed Ethiopian Orthodox Christianity and 9.72% were protestant(Wikipedia).

The study was conducted in Limu Seka woreda in Jimma zone of Oromiya Regional State. It is the second largest woreda in the zone. It is located in the northwest of the Jimma inhabited by more than 187,222 people reside over an area of 2, 507.05 square kilometres with a population density of 81.8 persons per square kilometre. Moreover,the urban area Atnago is 110killometre far from Jimma town. Out of this 94,754 are male and 92,468 are female (CSA, 2008). Limu Seka is located some 495km west of Addis Ababa in Jimma zone. It has only one urban kebele and 35 rural kebeles. According to the woreda official report, there are five health stations and 35 health posts. The Limu- Seka woreda, where its most parts are rural area, was purposefully selected because of the lack and shortage of health services like maternal health cares.

In the woreda only 10.62% were literate where as the majority (90.71%) were illiterate. Out of this only, 3.74% female population aged ten and above were literate (CSA, 1998). In Jimma zone, among the population aged ten years and over 930,126 were economically active of which 914,211 (98.3%) were employed and only 15,915(1.7%) were unemployed. Moreover, in the zone the percent economically active males were relatively higher than females (CSA, 1998).

Table2.1.Numeric and percentage Distribution of Limu-seka woreda according totheir Ethnicity(1994)

Ethnic group	Both sexes(N)	Percentage (%)
All persons	122,370	100
Oromo	11,6484	95.19
Amhara	4,155	3.39
Sebatbet Guragie	98	0.08
Sodo Guragie	94	0.08
Silitie	384	0.31
Tigray	241	0.2
Welaita	17	0.04
Goffa	6	0.005
Kulo	234	0.19
Mello	1	0.008
Others	656	0.54

Source:(CSA,1996: 191)

As far as the ethnic composition of the wereda's population is concerned, the Oromos are the single most dominant ethnic group which comprises almost 95.19% of the total population followed by the Amhara (3.39%). Regarding the religious affiliation of the wereda's population, Islam is the dominant religion which constitutes 57.7% of the total population followed by Christians 42.2%.

Table 2.2.The numeric and Percentage distribution of the population of Limu Seka Woreda According to their Religion (1994)

Religion	Total number	Percentage(%)
Christian	51,622	42.2
Orthodox	39,702	32.4
Protestant	11,896	9.7
Catholic	24	0.02
Muslim	70,609	57.7
Others	4	0.003
Traditional Religion	13	0.01
Not stated	122	0.1
Total	122,370	100

Source:(CSA, 1996:340)

2.12.Variables included in the Analysis

Table2.3.Variables for the study

Variables	Categories
Dependent	
Infant death	Died(1), Survived(0)
Independent Variables	
<u>Socio-economic variables</u>	
Education of respondent	Illiterate, Literate
Education of husband	Illiterate, Literate
Occupation of respondent	Fulltime house wife, farmer, other
Occupation of husband	Farmer, employed, other
Religion	Muslim, Christian
Ethnicity	Oromo, Amhara, Others
Place of residence	Rural, Urban
<u>Demographic Variables</u>	
Age	15-19, 20-34, 35-49
Age at last birth	15-19, 20-34, 35-49
Parity	Parity 1 &2, parity 3, parity 4+
Birth interval	Less than 24months, 24-36, more than 36 months ,first child
Total number of pregnancies	One, two, three+
Family size	1-4 members, 5-6 members, 7+ members
Months of conception	Expected month, earlier than, latter than
<u>Maternal Health care Variables</u>	
ANC status	Yes, no
Person provided ANC service	Health personnel, TBA/TTBA
TTI	No, yes once, yes 2+
Place of delivery	Home, health institute
Postpartum visit	No, yes once, yes more than once
Breastfeeding	Yes, no
Vaccination	Yes(at least one), no
<u>Environmental Variables</u>	
Type of toilet	None, dry pit/hole, pit flush
Source of drinking water	Well, hand pump/tap water, river/pond/stream/lake
Material for the wall of house	Thatch/bamboo/reed/wood, mud&wood mud &stone/cement/concret
Material for the roof	Thatch/reed/bamboo, corrugated iron/cement/concret

CHAPTER THREE

3. Back ground Characteristics of the Sampled Population

In the study area, a total of 403 women who have had at least one live birth in the last five years preceding the study and were permanent residents of Limu-Seka woreda were selected from the four randomly selected kebeles (three villages from each kebele) and one purposely included urban kebele. From all eligible women in the selected samples, 400 women responded to the questionnaire which made the response rate be 0.993.

3.1. Socio- Demographic Characteristics of the Respondents

About 48.5% respondents were in the age group 20-34, 13.8 % in 15-19 and the remaining 37.8 % were in 35-49 age group, with mean age of 30.61 ± 9.82 . Out of all 400 respondents about 76.3% were illiterate, 20.3% had some primary schooling the rest 3.5% had some secondary and above education. All of the respondents were ever married. The overwhelming majority (89.3%) were Oromo ethnic group followed by Amhara 4.3% and the rest 6.5% in other ethnic groups. Regarding religious affiliation, the majority constituted Muslim (79%) and the rest 21% were Christians(Orthodox Christians, Protestant and Catholic). But this find is not consistence with the 1994 census finding.

Regarding the respondent's occupation, nearly 56% were fulltime housewives who work the household chores, 40.3 % were farmers and 3.8% were employed or worked in other economic activities. About the respondents' husbands occupation, almost 73.3 % were farmers, 14.5 % were employed and the rest 12.3 % were in other economic activities: - merchants, weavers, handicraftsman, etc. Nearly 65 % of the respondents husbands were illiterate and 35 % had some schooling.

The average family size of the respondents' household was 5.21 ± 1.243 ; the median number of people usually live in the house was five. From all house holds,

59.3%, 26.3%, and 14.5% were in the medium (5-6 members), in the small (1-4 members) and large (7+members) family groups respectively.

Availability of drinking water is considered to be one of the items necessary for the good health of infants. Nearly 71% of the households in the study area obtained drinking water from well, 12% from hand pump or tap and the rest 17% from river/stream/ lake or pond. In the study area, almost 62.8 % households had no any type of toilet, 31.5% had dry pit type of toilet and the rest 5.8 had pitflush toilet.

Characteristics of the housing units are taken as proxy determinants of infant's health. From all housing units in the study area, the material used for the wall of the housing was assessed. The overwhelming majority 70.5% housing unit's wall was made from wood/thatch/ reed or bamboo and the remaining 29.5% housing units wall was made from wood and mud/stone/ cement. About 55% of the housing unit roof was made from thatch/reed/bamboo and the remaining 45% from either corrugated iron or cement/concrete. From all respondents, 91 % (364) had their own houses and 9% had no their own houses. Out of all respondents, nearly 73.8% (295) lived in rural area and the remaining 26.3 % (105) in urban area of the woreda.



Table 3.1.Percentage Distribution of Infant Death by selected Socio-Demograph Characteristics of the Respondents, Limu-seka,southwestEthiopia, Oromiya Region February 13 to February 28.

Variables	Categories	No.cases(35)	Percent
Respondent's Occupation	House wife	22	62.9
	Farmer	9	25.7
	Other	4	11.4
Literacy status of respondent	Illiterate	33	94.3
	Literate	2	5.7
Source of drinking water	Well	19	54.3
	Hand pump/Tap	6	17.1
	Stream/river/pond/lake	10	28.6
Type of Toilet facility	None	28	80.0
	Dry pit/hole	7	20.0
	Pit flush	0	0.0
Age at birth of the indexed child	15-19	8	22.9
	20-34	8	22.9
	35-49	19	54.3
A previous birth interval	First child	7	20.0
	24-36 months	6	17.1
	Less than 24 months	16	45.7
	More than 36 months	6	17.1
Parity of respondent	Parity 1 &2	21	60.0
	Parity 3	6	17.1
	Parity 4+	8	22.9
The child was born	At the expected month	11	31.4
	Earlier than expected mon.	14	40.0
	Later than expected mon.	5	14.3
	I don't know	5	14.3
At birth the size of the baby	As usual	11	31.4
	Less than usual	11	31.4
	Larger than usual	6	17.1
	I don't know	7	20.0

Source:- Author's Field Survey,2010

(N=35)

The descriptive statistics results show that 60% of infant death encountered by respondents of parity 1 and 2. Moreover, it reveals that less number of death occurred to mother of parity 3. The percentage of infant death is high for an infant born in short period following the preceding birth. Nearly 46% of all infant deaths occurred to infants born with a period less than 24 months next to the older sibling. Regarding the age of respondents, more than 50% (54.3%) deaths to mothers in the age group 35-49 year. Hence, this indicates that old age birth is highly associated with child death as many researches proved this general facts (UNAID, 2009).

The result also revealed that 80% of infant deaths occurred in households without toilet facility. In line with, no infant died in household with pit flush type of toilet. The remaining 20% deaths were in households with dry pit or hole type of toilet available. More than 94% of deaths were encountered by illiterate respondents. In addition, nearly 63% of deaths to fulltime house wives respondents and 25.7% for respondents whose work was farming. The rest 11% for those who were in other economic activities.

Table 3.2. Percentage and Numeric Distribution of Infant Death by selected Health- Related Variables, Limu-seka, southwest Ethiopia, Oromiya Region February 13 to February 28, 2010

Characteristics	Categories	Number of cases(35)	Percent
Place of treatment of infant	Non- health institution	32	91.4
	Health Facility	3	8.6
ANC check up of respondent	No	31	88.6
	Yes	4	11.4
Number of TTI	None	32	91.4
	One	1	2.9
	Two+	2	5.7
Place of delivery	Home	27	77.1
	Health facility	8	22.9
Person assisted at delivery	Non- health personnel	33	94.3
	Health Personnel	2	5.7
Postpartum visit	No	16	45.7
	Yes once	10	28.6
	Yes more than once	9	25.7

(N=35)

Source:- Author's Field Survey, 2010

The above Table 3.2 shows that 91.4% of infant deaths were encountered by infants who got treatment when they were sick from traditional sources. Only 8.6% infants died among those who got treatment from health facilities. Nearly 87% of deaths to respondents who never attended ANC services during their pregnancy period. Above 91% of deaths encountered by mothers who did not receive TT injection during pregnancy. Those mothers who delivered at home are at higher risk compared to mothers who delivered at health facilities. To put in other words, 77% for home deliveries and nearly 23% for health facility delivery. More than 94% deaths to mothers who were assisted at delivery by non-health personnel and only 6% occurred to mothers who were assisted by health personnel. Nearly 46% of deaths were encountered by mothers who did not attend PPC within 45 days after livebirth delivery. 28.6% for those who attended the service only once and the rest 25.7% for those who received two and more times.

Table 3.3.Percentage Distribution of Infant survival status by different Socio-Demographic Characteristics of Respondents, Limu-Seka woreda, southwest Ethiopia, Oromiya Region, 2010

variabl	categories	Survival status of infant			
		Survived		Died	
		number	Percent(%)	number	Percent(%)
Age at last birth	15-19	47	85.5	8	14.5
	20-34	186	95.9	8	4.1
	35-39	132	87.4	19	12.6
Literacy status of respondent	Illiterate	272	89.2	33	10.8
	Primary	79	97.5	2	2.5
	Secondary+	14	100	0	0
Work status of respondent	House wife	202	90.2	22	9.8
	Farmer	152	94.4	9	5.6
	Other*	11	73.3	4	26.7
Religious of respondent	Muslim	288	91.1	28	8.9
	Christians	77	91.7	7	8.3
Ethnicity of respondent	Oromo	323	90.5	34	9.5
	Amhara	17	100	0	0
	Others	25	96.2	1	3.8
Source of Drinking water	Well	264	93.3	19	6.7
	Stream/river/pond	59	85.5	10	14.5
	Hand pump/tap	42	87.5	6	12.5
Type of toilet	None	216	88.5	28	11.5
	Dry pit/hole	101	93.5	7	6.5
	Pitflush	48	100	0	0
Place of residence	Rural	265	89.8	30	10.2
	Urban	100	95.2	5	4.8
Total number of pregnancies	Two	136	95.8	6	4.2
	One	121	85.8	20	14.2
	Three+	108	92.3	9	7.7
Parity of respondent	Three	152	96.2	6	3.8
	4+	114	93.4	8	6.6
	One & two	99	82.5	21	17.5
A previous birth interval	First child	118	94.4	7	5.6
	< 24 months	118	95.2	6	4.8
	24-36 months	97	85.8	16	14.2
	>36 months	32	84.2	6	15.8
Respondent's Husband occupation	Farmer	263	89.8	30	10.2
	employed	56	96.6	2	3.4
	Other**	46	93.9	3	6.1

EA*= economic activities, hh-household

Source:- Author's Field Survey, 2010

3.2. Obstetrics Characteristics of Respondents

From all respondents 34.5% have had child death at least once in the preceding five years before the survey, from all deaths, 8.8%(35) in infancy period. 140(35%) of the respondents gave birth in the last twelve months preceding the survey. Out of all last births of respondents', 50.38% were males and the rest 49.8% were females. Out of all respondents, 35.5% gave two births, 35.3% gave three and more births and 29.3% gave one births in the preceding five years before the survey with mean number of birth 1.94.

Nearly 28.8% respondents received ANC at least one during their last pregnancy, from all sources of ANC services. Of which 12.8% of respondents visited for less than four times and the rest 16% visited at least four times during their last pregnancy. The major source of ANC service was health post followed by health centre. Out of all women who attended ANC, above 90% received from health personnel and only 9.6% from TBA/TTBAS. More over, 17.4% of respondents attended the service in 4-6 months of gestation period, 66.1% in the 7-9 months of pregnancy and 16.5% attended in the first three months of gestation. It is recommended that a pregnant woman should attend ANC at least four times during pregnancy at health facility (WHO, 2006). But, in the study area nearly 44% of ANC attendees, received the service less than four times.

About 89% respondents delivered their last child at home and only 11% in the health facilities. Out of all home deliveries, only 17% (68) were assisted by health personnel. The overwhelming majority (83%) were assisted by non-health personnel or self-assisted. About 59% of mothers faced health problems during labour, of which 41% of the labour lasted for less than half day, 37% of labour lasted for one day or one night (12hours) and the rest 11% lasted for more than one and half day. The remaining respondents did not exactly remember duration of labour in their last pregnancy.

About 28.8% of respondents at their last pregnancy period received ANC services and only 12.3% respondents had received tetanus toxoid injection during their visits in health facilities. It is clear that the majority (71.3%) respondents did not attend ANC. More over, most of the respondents in the study area did not received TTI, which is useful in preventing tetanus among the newborn and among mothers (Nair et al., 2001). These might be one of the possible causes of infant mortality in the area.

From all pregnant mothers in the study area, who received ANC services, only 49 (38%), had received TT injection. Almost 4.3% (5) respondents took the injection only once and the rest 38.3% (45) received it twice or more times during their visits in the health posts and health centre. More than half of the respondents (57.4%) did not receive the injection in their visit at health facility.

Table3.4.Percentage Distribution of Maternal Health care Services andObstetrics characteristics of Respondents,Limu-seka,Southwest Ethiopia,Oromiya region February 13 to February 28, 2010.

Maternal health care factors	Categories	Number	Percent
ANC services	No	285	71.2
	Yes(<4)	51	12.8
	Yes(4+)	64	16.0
Place of ANC services	TBA/TTBAs	9	7.8
	Health facilities	106	92.2
Place of delivery	Home	355	88.8
	Health institute	45	11.3
Tetanus toxoid injection	No	351	87.8
	Yes only once	5	1.3
	Yes more than one	44	11.0
Gestational age at ANC visit	1-3 months	22	19.1
	4-6 months	22	19.1
	7-9 months	71	61.7
Postpartum visit	no	273	68.3
	Yes once	80	20
	Yes more than once	47	11.8

Source:- Author's Field Survey, 2010

The above table shows that most of respondents did not attend ANC services. In line with, only 16% of respondents received the services for at least four times which is recommended by WHO. About 92.2% of ANC attendees got the services from health facilities and only 7.8% attended from traditional sources such as TBA/TTBAs. From all respondents in the study area, 87.8% of respondents did not receive tetanus toxoid injection in their last pregnancies. Only 1.3 % of respondents received the injection only once; while 11% took at least twice during the last pregnancies. Moreover, 61.7% of respondents attended the services for the first time in the last trimester of pregnancy, 19.1% in the first trimester and the same 19.1 % of ANC attendees in 4-6 months of gestation.

Almost 89% of deliveries took place at home and 11% took place at health facilities. After delivery, about 32% of respondents attended for postpartum visit in 45 days. Among this 20% respondents attended this service once and 12% for more than once.

In the study area most of infants deaths (88.6%) occurred in households where the respondents did not receive ANC services and 11.4 deaths took place in respondents who attended the services. In line with this, again the majority deaths (91.4%) encountered to respondents who did not receive TTI in their last pregnancies. The overall relationship of infant survival status with maternal health care factors are depicted in table 3.5 below.



Table 3.5. Percentage and numeric distribution of infants survival status with Maternal Health care variables, Limu-seka woreda, southwest Ethiopia Oromiya region, February 13 to February 28, 2010

Variables	Classification	Infant survival status			
		survived		Died	
		number	percent	number	percent
ANC services status of respondents	No	254	89.1	31	10.9
	Yes(<4)	51	100	0	0
	Yes(4+)	60	93.8	4	6.3
Tetanus toxoid injection	No	319	90.9	32	9.1
	Yes once	4	80.0	1	20.0
	Yes more than one	42	95.5	2	4.5
Place of delivery	Home	328	92.4	27	7.6
	Health facility	37	82.2	8	17.8
Person assisted at delivery	Non- health person	299	90.1	33	9.9
	Health personnel	66	97.1	2	2.9
Postpartum visit In 45 days after birth	No	257	94.1	16	5.9
	Yes once	70	87.5	10	12.5
	Yes more than once	38	80.9	9	19.1
Place of treatment of infant	Non-health person	240	88.2	32	11.8
	Health person	125	97.7	3	2.3

Source:- Author's Field Survey, 2010

3.3 Respondents' knowledge about ANC Services

Almost 77% of mothers had some knowledge about place and services of antenatal care. Only 21% had no any knowledge about ANC for pregnant women. The majority of the respondents 60.5% who were ANC users and non-users reported that ANC check up has benefits to the health of both mother and infant, where as 89 (22.3%) mentioned its benefit only for the health of pregnant mother.

Among different reasons given by ANC users for ANC visits for their last pregnancy 55.7% were for regular check up but 44.3% were for sickness and need of treatments. So the above figures show that the benefits and uses of ANC services in the study area were not well understood.

About 236 of the respondents had experienced some health problems during their last pregnancy in the preceding five years before the survey, while 164(41%) did not have any illness related with pregnancy.

3.4. Health Service Barrier Factors for Material Health Care Utilization in Study area

Out of the 115 women who attended ANC services in their last pregnancy 11(9.6%) ANC-users paid for ANC service but 104 (90.4%) users did not pay. More over, ANC attendees were asked about the perception of distance from home to health facility, and the majority 71 (62%) answered as too far from home, 11.3% (13) said it was near and the rest 31 (27%) of respondents responded as average. It was also identified that “there are no enough and efficient health personnel at health posts” which were common in the rural areas as mentioned by most of the rural participants in FGD1. The poor health delivery care systems remain an important barrier in rural area due to lack of means of transport and distance to medical facilities to get better services at health centre.

3.5 Main reasons for home delivery

Out of all women who delivered at home; 255 (71.8%) reported that home is where all relatives and friends are near by than health institute, 53(13.3%) reported that they had more trust on TBAs than health personnel and 47(11.8%) were being totally healthy during delivery. The main reasons deter to deliver in the health facility was the distance and transportation cost as answered by the majority of the respondents. From all respondents who delivered either at home or at health facilities 41.6% women reasoned out that it was expensive to deliver at health facility and the rest 58.4% said it was not expensive.

Table 3.6 Percentage and Numeric Distribution of ANC services, Limu-Seka woreda, Southwest Ethiopia, Oromiya region February 13 to February 28, 2010

Variables		Number(N)	Percentage (%)
ANC check up Status	Yes	115	28.8
	No	268	71.2
	Total	400	100
Place of ANC Services	Health institute	106	92.2
	Non-health institute	9	7.8
	Total	115	100
Preference to Place of ANC services	Health institute	323	80.8
	TBA/TTBA/relatives	77	19.3
	Total	400	100
Opinion about benefits of ANC	For both health	242	60.5
	For mothers health	89	22.3
	For foetus health	69	17.3
	Total	400	100
Reason for to follow up ANC	To start regular check up	64	55.7
	I was sick	51	44.3
	Total	115	100
Distance from home to health facility	To far	71	61.7
	Average	31	27
	Near	13	11.3
	Total	115	100

Source: - Author's Field Survey, 2010

3.6 Main reason of respondents attending postnatal care

About 31.8 % (127) respondents attended postnatal care within 45 days after delivery. The majority 68.3% did not receive the service. Of which 63% respondents visited only once while the rest 37% attended more than once in their last pregnancies. Out of all women who attended postnatal care at health facilities, nearly 70.1% (89) respondents reported that they were sick and 29.9%(38) answered that their babies were sick. No one answered as the reason to follow up her and her baby health.

3.7 Respondents Attitude and Practice of Infant Care

The over whelming majority mothers 88.3% fed their babies breast milk. Out of all breast feeder mothers, almost 46.5% of them fed their babies more than a year (13 and above months), 31.3% fed for 7-12 months and 10.5% fed for six and less months.

Out of all non-breast feeder mothers, 42.6% respondents answered that the baby was sick as reason not feeding their baby breast milk. The reason not fed breast milk the baby due to respondent's sickness was responded by 31.9% of non-breast feeders and the rest 25.5% respondents said that the baby refused to take breast milk as the reason why they did not feed their baby.

Among all infants born to respondents at their last births in the preceding five years preceding the survey, 55 % of babies encountered health problem while 45% did not. From all infants of respondents who were ill, 69.1% received treatment but 30.9% of respondents' infants did not get any type of treatment. Out of all infants of respondents' who got ill , nearly 85% infants got medical treatment at the health institutions attended by health personnel and 15% of infants got treatment from traditional healers. It indicates that child care practice was poor in the study area. In addition, the health facilities were far from respondents' village as indicated by the respondents about the perception of distance from home to health facility.

Concerning vaccination immunization of the infants, 92% infants took vaccination at least one type of vaccination during their infancy period; only 8% infants yet did not received any vaccination due to different reasons responded by their respective mothers. From all reasons, 37.5% (12) respondents answered that baby was too young; 28.1% respondents responded that it was too far to go, nearly 25% mothers said that they did not know when to do it. The remaining 3% said that it did not help.

About 56.5% mothers perceived that the infant was born at the expected month, 12% said before expected month, and 17% said later than expected month and the rest 14.5% responded that they did not know. About 46% of mothers perceived that the weight of the baby at birth was as usual, 18% perceived that smaller than usual and 17% responded that it was larger than usual. The remaining 19% answered that they did not know.

CHAPTER FOUR

4. Analysis, Results and Discussion

4.1 BIVARIATE ANALYSIS

4.1.1. Association of selected Socio-Demographic Variables with Infant Deaths

To see the association between each independent variable with the dependent variable, cross-tabulation and significant level (p-value) were used. First the dependent variable infant's survival status was cross-tabulated with age at birth, birth interval, parity, literacy status of the respondents, literacy status of husbands, occupation of mother and husband, type of toilet, characteristics of housing units, source of knowledge of ANC, number of children died, months of conception.

Chi- square (χ^2) statistic showed that IM is significantly associated with some of the independent variables. Infant mortality was significantly associated with for example, source of knowledge of ANC, number of children died, months of conception of the last child, parity and age of respondent. The over whole relationship of each independent variable with the response variable (Infant death) was depicted below in Table 4.1

Table. 4.1. Association of some selected Socio-Demographic variables with Infant Death, in Limu-seka woreda, south west of Ethiopia, Oromiya Regional State February 13 to February 28, 2010.

Variables	Classification	p-value	Chi-square (χ^2)
Respondent's occupation	House wife	.015*	8.366
	Farmer		
	Other*		
Respondent's Husband occupation	Farmer	.194	3.279
	Employed		
	Merchant/private EA*		
Material used for the roof of housing	Thatch/reed/bamboo	.016*	5.764
	Corrugated iron/concret		
Type of toilet	None(no)	.023*	7.569
	Dry pit(hole)		
	Pitflush		
Source of knowledge of ANC	Health institute	.000***	40.078
	Media/women group		
	Both sources		
Birth interval	First child	.015*	10.429
	24-36 months		
	<24 months		
	>36 months		
Literacy status of Respondent	Illiterate	.030*	6.981
	Primary education		
	Secondary+		
Parity	Parity 3	.000***	17.095
	Parity 4+		
	Parity 1and parity2		
Age at birth	20-24	.006*	10.292
	15-19		
	35-49		
Family size	1-4 members	.017*	8.164
	5-6 members		
	7+ members		
Child death in the past 5 years	No	.000***	72.821
	Yes		
Total pregnancies in the last 5 years	2	.011*	9.020
	3+		
	1		
	No		
Months of conception of infant(Child was born)	At expected month	.000***	29.494
	earlier than expected Month		
	Later than expected Month		

*= P<0.05, **=p<0.01, ***=p<0.001

*EA= economic activities

Source:- Author's Field Survey,2010

Table 4.1 shows that age at last birth, parity, birth interval, material for the roof, type of toilet, literacy status of respondents and family size had statistically significant bivariate relationship with infant mortality, except literacy status of husband. Moreover, source of knowledge of ANC ($\chi^2=40.078$), parity ($\chi^2=17.095$), months of conception ($\chi^2=29.494$) and child death in the past five years ($\chi^2=72.821$) were highly significant with 0.000 significant level. But these simple cross-tabulation Chi-square results may not show the exact influence of the independent variable on the dependent variable, because the influences of other variables were not controlled. Hence, these variables further would be analyzed in the binary logistic regression after checking multicollinearity and model goodness of fit test.

4.1.2. Association of selected Maternal Health Care Factors on Infant Death

To see the relationship of maternal health care factors with infant death, Chi-square test was used. The variables: status of ANC check up, reception of vaccination for infant, TTI of mother during pregnancy, breastfeeding, main reason for home delivery and place of treatment for infant were analyzed. The over whole associations with significant level (P-value) were presented (Table 4.2)



Table4.2. Association of some selected Maternal Health care Factors with Infant death, Limu-seka woreda, southwest Ethiopia, Oromiya region, February 13 to February 28, 2010.

Maternal care variables	Classification	p-value	Chi-square (χ^2)
ANC check up statu	No	.030*	7.007
	Yes(<4)		
	Yes(4+)		
Place of treatment	Non-health institute	.002*	9.675
	Health institute		
Postpartum visit in 45 days After birth	No	.005*	10.467
	Yes only once		
	Yes more than once		
Vaccination status of infant	Yes	.000***	140.917
	No		
Breastfeeding	Yes	.001*	10.467
	No		
Place of delivery	Home	.023*	5.176
	Health facility		
Main reason for home Delivery	Where relatives&friends are near by	.039*	6.469
	Trust on TBA than health personnel		
	Being healthy during pregnancy		

*=p<0.05, **=p<0.01, ***=p<0.001

Source:-Author's Field Survey, 2010

Table4.2 shows that all health related variables have significant bivariate association with infant mortality. On line with this vaccination status of infant($\chi^2=140.917$ with significant level of .000)had high statistical significant association with infant death. These simple cross-tabulations did not show the exact influence of each independent variable on IM, since the influence of each variable was not controlled. So these chi-square results were further analyzed by the binary logistic regression method after checking multicollinearity effects and model of goodness fit test using the Hosmer Lemeshow test and tolerance and VIF statistics.

4.1.3 Multicollinearity Effect and Model Goodness of Fit

Before fitting the logistic regression model, the first step to be done is to examine the existence of inter-correlation among independent variables. The existence of this effect in the model can be checked by using **tolerance** or **variance inflation factor (VIF)**.

Tolerance is $1-R^2$ for the regression of that independent variable on the other independent variables, ignoring the dependent variable (IM). The higher inter-correlation of the independents, the more the tolerance will approach zero. As a rule of thumb, if tolerance is less than 0.20, a problem with multicollinearity is indicated. From Annex E ,TableE1, Tolerance for the model is highly greater than 0.20. Hence, multicollinearity effect does not influence the model (Schwarz, 2007).

Similarity, the VIF, which is the reciprocal of tolerance shows whether or not the explanatory variables are related with each other. When VIF is high there is high multicollinearity and instability of the beta (β) coefficients. $VIF > 4$ is an arbitrary but common cut-off criterion for deciding when a given independent variable displays “too much” multicollinearity: a value above four suggests a multicollinearity problem (Schwarz, 2007). So here, age group was removed from the model since its tolerance and VIF are quite different from the remaining independent variables (Annex E, TableE1). Hence, the multicollinearity problem in the model was solved.

Regarding the goodness of fit of the model, there are different methods to assess the extent to which the model fits the data. One way of assessing how well the model fits the data is by using the Hosmer and Lemeshow goodness fit test. Insignificant value of this test indicates the goodness of the model. In this survey, the value of Hosmer and Lemeshow test for the last model was 0.596.

Hence, the model was fitted well with the data (**Annex F, TableF**). The Wald estimates give the “importance” of the contribution of each variable in the model. The higher the value, the more “important” it is(Chan, 2004). In the model the Wald estimated values are high except for birth interval 24-36(significant 0.274) and parity 4+ of mother(significant 0.530). Hence, the parameters are useful to the model.

On line with multicollinearity, a simple but sometimes subjective technique is to inspect the magnitude of the standard error(SE) of each variable. The SEs in the Table 4.3 are between 0.491 and 0.928. These are not such large implying there is no multicollinearity and the model is statistically stable. The magnitude of the SEs hover around 0.001-5.0. There is no fixed criterion on how small the SE should be but a matter of judgment(Chan,2004).

4.2 Multivariate Analysis

In this section the results of multivariate analysis was discussed.After a number of steps using enter method the final model for the data was obtained.

Table4.3.Logistic Regression Model for Infant Death with selected Socio- Demographic and Maternal Health care Factors, Limu-seka woreda,Southwest Ethiopia, Oromoya region February 13 to February 28, 2010

Variables	Categories	β	S.E	Sig	Exp(β)
Birth interval	First child (R.C)				1.000
	24-36 months	.690	.631	.274	1.994
	Less than 24 months	1.706	.568	.003*	5.508
	More than 36	3.066	.928	.001*	21.455
Parity	Parity3 (R.C)				1.000
	Parity4+	-.635	.768	.408	.530
	Parity 1&2	1.837	.531	.001*	6.281
Postpartum visit	No(R.C)				1.000
	Yes only once	1.239	.491	.012*	3.453
	Yes more than once	1.155	.566	.041	3.174
Breastfeeding	Yes (R.C)				1.000
	No	1.661	.521	.001*	5.267
Place of treatment	Non health institute(R.C)				1.000
	Health institute	-2.143	.674	.001*	.117
Constant		-4.563	.689	.000	.010

*=p<0.05, **=p<0.01, ***=p<0.001

Source:-Authors Field Survey, 2010

(R.C)- means reference category

The interpretations of the results of the the above logistic regression of the model of the study were presented as follow.

The relative risk of dying of an infant born within 24 and 36 months following the preceding birth was twice more than that of a first child($OR=1.994$) eventhough it was not significant. An infant born less than 24 months next to the preceding birth was 5.5 times more likely to die than that of the reference category. The relative risk of dying of an infant born after 36 months following the older sibling was 21 time more likely than a first child.

The relative risk of dying of an infant born to mother of parity 4 and above was 47% less than an infant born to mother of parity 3. The relative risk of dying of an infant born to parity mother of parity 1 or 2 was 6 times more likeliy than that of the reference category($OR=6.281$, 95% CI 2.2 to 17.8).

Those mothers who attended postnatal care were relatively in higher risk of encountering infant deaths than that of who did not attended it. One of the reasons might be that respondents sought treatment for their sick infants rather than following postnatalcare in health facilty. In line with this, the relative risk of encountering of an infant death to respondent who attended the service once was 3.4 times higher that that of respondent who did not receive postnatal care. Moreove, the relative risk of encountering an infant death to mother who attended postnatal care more than once was 3.2 times higher than that of the reference category($OR=3.174$).

An infant who did not feed breastmilk during infancy was at higher risk of dying that his counter part. The relative risk of dying of an infant who did not take breastmilk was 5.27 times higher that of an infant who fed breastmilk. In other word, a non-breastfeeder compare to breastfeeder respondent is 5.3(95% CI 1.9 to 14.6) times more likely to encounter infant death. This finding is consistence with

the finding in Kenya. Infant death were more likely among never breastfed relative to ever breastfed (Mustefa,2008).

Those infants who received medical treatment from health institutes were relatively in lower risk than those who received from non-health institutes(TBA, traditional healers). This finding is consistent with the finding in study in Bangladesh at Rajshahi district, that place of delivery at hospital/clinic have 80.5% lower risk of infant mortality than place of delivery at home (Hossain & Mondal, 2009). The relative risk of dying of an infant who received treatment from health facility was 88% lower than his counterpart (OR=0.117). This implies that an infant who receives medical treatment from health facility is 0.01(95% CI 0.03 to 0.44) times less likely to die than that of his counterpart.

4.3. DISCUSSION

This house hold level cross sectional retrospective survey tried to assess factors influencing infant survival status in the four randomly selected rural kebeles and one purposely included urban kebele in Limu-seka wereda of Jimma Zone in Oromiya regional state. Up to now, studies and surveys, on the subject have been very few in the zone and with little information on the subject.

There is substantial evidence that health care during pregnancy is a crucial component of ensuring a safe delivery and a healthy mother and baby. The WHO has published fundamental practices for a successful pregnancy, which include visiting a skilled health care worker at least four times during pregnancy, maintaining a healthy diet, knowing the signs of labour so as to seek delivery care at the appropriate time, and understanding danger signs during pregnancy (WHO, 2006). But most of the respondents in the study area did not attend ANC at least four times during pregnancy. Only 28.8% of respondents attended ANC of which 16% visited at least four times. The remaining 12.8% visited less than four times which is not recommended. In line with this, almost 40% of ANC attendees received TTI during their visits in the health institute. That means out of all

respondents only 12.3% took the injection, of which 11% of them took at least twice and the remaining 1.3% only once. These clearly indicate that women in the reproductive age and their infants in the woreda were at risk regarding their health, particularly to neonatal tetanus which is the cause of neonatal death. The poor health delivery care systems remain an important barrier in rural area due to lack of means of transport and distance to medical facilities to get better services at health centre as seen from the data. Most of the respondents (61.7%) said that the distance from home to health post was too far. In the rural FGD the participants agreed that the health facilities were far from their villages and there is no means of transport in case of emergency.

MCH services were at low level; according to the 2009 woreda official health report it was near to 34.5% ; this may lead to high maternal and infant morbidity and mortality in the area. Low use of ANC (28.8%), DC (11%) and PNC (31.8%) related to infant mortality in the area.

The level of infant survival is one of the key indicators of the improvement of the quality of life of the population. It is obvious from the data that the general status of the study population in general is low (low education level, poor and rare health facility services). Particularly women in the reproductive age in the study area were in relatively poor socio-economic status. Most of them were illiterate, house wives or farmers, and did not attend maternal health care services (ANC, PNC and DC). Moreover, most of them regularly delivered at home. It is important to improve the quality and accessibility of maternal and child health care services that indirectly or directly lower infant mortality in the woreda: particularly to the rural part. The data were consistent with the hypothesis that IM in rural area is higher than in urban area. Since urban area has lower rate of infant mortality, and since it is accepted that maternal health care has positive impacts on pregnancy outcomes, there is reason to believe that improving MCH care will improve both maternal and infant health. The data suggest that a solid starting point for reducing the number of infant mortality may be improving the socio-

economic status of women. In line with, the health extension program has a number of important uses as assessed from the FGDs, where most of the participants reached on consensus that it helped the society to use FPP. This indirectly may reduce infant mortality by limiting and spacing of births.

While culture certainly influences maternity care practices, access to health care providers play an invaluable role. In one of the FGD most of the participants agreed that they do not need anything when they are pregnant. The participants reached on the consensus that this is the society culture that they adopted from their grandmothers. Most of the participants forwarded that, "If there is any problem we will go to the experienced TBAs. They will treat us with reasonable price and sometime they serve us without any payment."

As mentioned previously, the status of women in the woreda is poor, partly because of their lack of education. Men are relatively much more likely to have education than women and the data shows nearly 76% of respondents were illiterate compared to 65% of respondents' husbands.

The majority of the housing in the woreda was made from thatch/reed/bamboo and it was observed that infant mortality was high in this housing. Moreover, most of the households in the area had no toilet facility. The data indicate that 80% of infant death occurred in housing unit without toilet facility. Again this finding is consistent with the findings of studies done in Ethiopia (Assefa, 1991; Mekonnen, 1993). The 1994 census of Ethiopia also shows the same result; infant mortality is a slight higher in housing unit without toilet than in housing unit with toilet facility.

In most studies availability of drinking water is considered to be one of the variables that affect infant mortality. In the study area most of the households got drinking water from well which were either protected or unprotected and almost 17% households got drinking water from river/stream. The data show that 54.3%

and 17.1% infant deaths occurred in households that got drinking water from well and river/stream respectively.

In the woreda, as elsewhere, pregnant women did not always have ready access to medical treatment during pregnancy and delivery because of various social, economic and cultural factors or lack of access to health facilities.

In this study, it was known that 8.8 % of respondents encountered infant deaths. The deliveries which take place at homes and assisted by non- health personnel, likely to be more unsafe and unhygienic, that might result in delivery- related complications leading to both maternal and infant mortality. The overwhelming deliveries in the area took place at home and only 11% at health facilities. Most of infant deaths occurred in households where mothers gave their last births at home. It is consistence with the findings that unsafe and unhygienic delivery leads to maternal and neonatal morbidity and mortality (Nanda and Mitra, 1996). There was cultural belief in the area that it was not good to discuss about the dead child. One participant in the rural FGD said that “God will do anything He likes; He will give me a child and if He wants to take the child, He will take”. Finally, the participants reached on the consensus of their religion belief towards death of infant due to God’s will. At the end of the discussion, they were told advices towards child care practices and advantage of birth spacing and limiting to reduce infant deaths by the facilitator.

Birth interval between 24 months and 36 months between two births significantly increases the likelihood of infant survival. A first birth, shorter birth interval (less than 24 Months) and longer birth interval (more than 36 months) significantly enhance the probability of dying of an infant. These findings were consistence with the findings of other studies (CSA & Macro ORC, 2000, 2005;USAID, 2009) and study done by Gashaw (1996) in Maqdela and Tenta districts.

In the woreda the population was almost homogenous regarding with religion and ethnicity; nearly 79% were Muslim and 89% were Oromo ethnic group. Due to this fact it is not possible to analyze infant mortality with respect to religious and ethnicity.

In this survey, the factors that significantly influence infant mortality were a previous birth interval, parity of mother, PNC, breastfeeding and place of treatment of infant .

CHAPTER FIVE

5. Conclusion and Recommendations

5.1. Conclusion

The study made an attempt to explore the association of infant death with use of maternal health care related factors. The data were collected from eligible women (age 15-49) of Limu-Seka woreda residents using structured questionnaire which assessed the maternal health care variables (ANC, DC &PNC) and socio-demographic factors with association of infant mortality.

Women in developing countries as well as Ethiopia face a number of special health risks, associated with pregnancy and child bearing. Maternity care was at very low level in the study area. Maternal health related factors such as postpartum visit, breastfeeding practice, birth interval, parity of mother and place of treatment are the possible predictors of infant death. In the area, some of the social and demographic factors also showed some association with infant deaths .

Mother and child health issues are now an emerging in growing globalization because happy world need healthy live for all. The woreda is at low health coverage and it is fully agro-based economic activity. As a result, the majority respondents are in poor socio-economic and health status. It has been established from the findings that maternal health related factors are playing significant role on infant mortality. In line with these the availability, accessibility, affordability and utilization of MCH services in the woreda should be studied in depth to identify the major factors that deter women from using even the available services.

Each of the maternal health care variables except person assisted during delivery ($\chi^2=3.462$ at 0.063 level of significant) had statistically significant bivariate association with infant mortality. Poor quality health care services, inadequate and low use of TTI, as well as infant care practices related to infant mortality.

Primary health care, including safe motherhood and family planning programmes, help to ensure positive outcomes from high-risk pregnancies, reduce infant mortality by lengthening birth intervals. Health extension workers can play an important role in this effort by encouraging pregnant women to seek pregnant care in the first trimester which will ensure a better birth outcome. It would also be worthwhile to train more women in safe delivery practices, especially TBAs who are well accepted by their societies, and ensure that TBAs are available in each village “gothe”.

Proper medical attention and hygienic conditions during delivery can reduce the risk of infections and facilitate management of complications that can cause death for the mother or the newborn child (Mitra et al; 1997). It is clear from the data that most of deliveries (89%) in the area were delivered at home which were unhygienic and unsafe. This may be one of the important reasons for high infant mortality in the area. This finding is consistent with the findings that unsafe and unhygienic delivery leads to maternal and neonatal morbidity and mortality (Mitra et al; 1997).

An important element in reducing health risks for mothers and infants is to increase the proportion of babies that are delivered under medical supervision in health facilities. Therefore, place of delivery plays an important role in the survival of infant.

Education modifies women's beliefs about disease causation and care and thus influences both traditional infant care practices and the use of modern health care services. Hence, it is important to improve the awareness of modern health care and infant care practice through HEWs activities in the woreda. Moreover women should be encouraged to take their infants to modern health facility for treatment at the right time when they get sick.

All the health posts in the study area are not well-equipped with medical equipments and HEWs also are not well-skilled in managing all MCH care services; as assessed from the rural FGD. Hence, each health post which is relatively near to the village of the respondents should be equipped both with medical equipments and skilled health personnel.

Vaccination practice is directly related with health status of infant. It saves infants from dangerous diseases like tuberculosis, measles and tetanus. In the area most women were well aware of immunization practice of infants. But there are some traditional women who don't want to immunize their infants. It is advisable to raise the benefits of vaccination through IEC of such traditional women; as seen from qualitative data results. A 34 year old participant in the rural FGD said that "Now I decide to take my children to health post to immunize them. But up to now I believe that vaccination does not help to health of child." Another participant added that "In the health post the HEWs are not available and some time they tell as there is no medicine at all. We take our children without getting treatment. It is a waste. We walk more than an hour to reach the near by health post." At last, most participants reached on the consensus that distance and shortage of medical at health post were the main problems that hinder them from getting services for both themselves and their children.

5.2 Recommendation

Training of local women, familiar with the culture as community health workers to promote and support use of maternal and child care and correct place of delivery should be targeted to young inexperienced mothers who have a higher incidence of infant deaths together with the health extension programs to address the problem with popular individuals in the society. Efforts should be made to increase the age at birth, awareness of maternal and child health cares services targeting to reduce both infant and maternal mortality and morbidity.

Promotions to integrate MCH, FP and other health services, to focus on the reduction of infant deaths, and keep in promoting the socio-economic status of mothers are essential.

All possible forms of mass media communications should be used as opportunities for MCH awareness and expansion programs. Moreover, the health extension workers should closely work with mothers who are in high risk of pregnancies like teenage pregnancy and old age pregnancy (above age 34).

Based on all available data and to give evidence based recommendations that will no longer lead health policy makers astray and result in increased infant mortality. Instead, this study should assist with policy development and improvements in the health infrastructures particularly MCH services in the woreda. It is essential that these measures be carried out to responsibly support the needs and realities of each woman in the community either rural or urban area. Intervention should also be in action in addressing the problem in the study area. It is important to improve the quality and accessibility of maternal and child health care services that indirectly or directly lower infant mortality in the woreda.

As a whole, the woreda needs extra care of the mother's safe delivery and available treatment facility during pregnancy and after pregnancy. The following recommendations can also be stated for policy implications:

- The woreda health bureau should take appropriate FPP incorporating MCH.
- The woreda should ensure and take initiatives to empower women through providing credit to participate in economic activities.
- The regional health bureau, the zone health office, as well as NGOs should take proper steps to ensure mother and infant health conditions, safe delivery of mothers in the woreda and extend and improve health extension program.

Finally I would like to say that in-depth studies are needed to explore the impact of distance and cost on use of maternal health care that directly or indirectly affects the survival status of infant.



References

- Amare Deribew, Fasil Tessema, Belaineh Girma (2007). Determinants of under-five mortality in Gilgel Gibe Field Research Center, Southwest Ethiopia. *Ethiopia Journal of Health Development*. 21(2):117-124.
- Assefa Hagos (1991). *Infant and early childhood mortality in Shewa Region: An investigation into the levels and differentials*. Addis Ababa University. (Unpublished Master thesis).
- Burns, P.J (2001). HIV, Breastfeeding, and Infant Mortality: Weighing the Impact of the Non-evidenced-based WHO/UNAIDS Recommendations in the Low-Income, Low- resource countries of Sub-Saharan Africa. Accessed on 12 April 2010 at: <http://www.afronets.org/files/breastfeed.pdf>
- Central Statistic Authority (1993). *The 1990 National Family and Fertility Survey*. Addis Ababa, Ethiopia: Central Statistical Authority.
- Central Statistical Agency (1998). *The 1994 Population and Housing Census of Ethiopia*. Results for Oromiya Region, Volume I: part II Statistical Report on Education and Economic Activity. Addis Ababa.
- Central Statistical Agency (1998). *The 1994 Population and Housing Census of Ethiopia*. Results for Oromiya Region Vol. II Analytical Report. Addis Ababa.
- Central statistical Agency (Ethiopia) and ORC Macro (2001). *Ethiopian demographic and Health Survey 2000*; Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central statistical Agency and ORC Macro.
- Central Statistical Agency(2000). Central Statistical Authority bulletin 228: Analytical report on the 1998/99 Sample Survey and vital events registration. Addis Ababa.
- Central statistical Agency (Ethiopia) and ORC Macro (2006). *Ethiopia Demographic and Health Survey 2005*; Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ORC Macro.
- Central Statistic Agency (2008). *Summary and Statistical Report of the 2007 Population and housing Census*. Dec.2008, Addis Ababa.
- Chali Jira & Tefera Belachew (2005). Determinants of ANC Utilization in Jimma town, southwest Ethiopia. *Ethiopian Journal of Health Sciences*, Vol. 15, No. 1.
- Chan, Y.H(2004). Basic Statistics for Doctors. *Singapore Medical Journal* vol. 45(4): 149.

- Feachem, R.G., & Jamson, D.T. (1991). *Disease and mortality in Sub-Saharan Africa*. A World Bank Publication. Washington D C, USA.
- Gashaw Asfaw (1996). *The Effect of Maternal Factors on Infant Mortality: A survey of Rural Households in Maqdella and Tenta Districts*, south Wello, Ethiopia. Addis Ababa University(unpublished master thesis).
- GHWA & WHO(2006). Country Case Study: Ethiopia's Human Resource For Health Programme. Task Force on Scaling Up Education and Training for Health Workers. Geneva, Switzerland
Accessed on May 2010 at
http://www.who.int/workforcealliance/knowledge/case_studies/Ethiopia.pdf
- Gubhaju, B.B., Streat Field, K. Majunder, A.K (1991). Socioeconomic, Demographic and Environmental determinants of infant mortality. *Journal of Biosocial science*, 23:423.
- Guttmacher Institute (2002). *Family Planning can Reduce High Infant Mortality Levels*. Guttmacher Institute.
- Hossain, K., & Mondal, N.I (2009). A study on the Health Factors of Infant and Child Mortality in Rajshahi, Bangladesh. *Asian Journal of Medical Sciences*, 1.
- IBFAN(1999). IBFAN Africa statement on HIV and infant feeding. The IBFAN Africa Regional Workshop on policy Guidelines for Infant Feeding and HIV. Pretoria, South Africa.
- Kabir, M., & Amin, R. (1993). Factors influencing child Mortality in Bangladesh and Their Implication for the National Health Program. *Asia paific population Journal*, 8(3): 31-46.
- Kumar, D.D., Verma, C.K., Goel, A. A.K., & Sehagal, V.K (2006). *Demographic and Socio-economic Correlates of Infant Mortality in a Primitive Tribe of Chhattisgarh*.
- Macro International Inc.(2007). *Trends in Demographic and Reproductive Health Indicators in Ethiopia*, Calverton, Maryland, USA: Macro International Inc
- Majunder, A.K (1988). Maternal factors and infant and child mortality in Bangladesh. *Journal of Biosocial science*, 20: 89.
- Makonnen Asefa(2000). An Ethiopian birth cohort epidemiological study: to improve the health of children.
Accessed on June 2010 at:
<http://ejhd.uib.no/ejhdv16-special-issue/ejhd-v16-s-pl.PDF>

- Meaza Bekele (1997). *Levels, Trends and Differentials in infant Mortality in Rural Ethiopia*. Addis Ababa University (Unpublished Master thesis).
- Mekonnen Tesfaye (1993). *Demographic Determinants of infant and child mortality in an Ethiopian community: The case of Sebeta town*. Addis Ababa University. (Unpublished master thesis).
- Mitra, S.N., Al-Sabir, A., Cross, A.R., &Jamil, K. (1997). *Bangladesh Demographic and Health Survey 1996-1997*. Dhaka and Calverton, Maryland: National Institute of Population Research and Training (NIPORT), Dhaka, Bangladesh.
- MOFED (2006). *A plan for Accelerated and sustained Development to End Poverty; Volume I: Main Text*. Addis Ababa.
- Mosley, W.H., & Chen, L.C (1984). An analytical framework for study of child survival developing countries. *Population and Development Review* 10 (supplement) 25-45.
 Accessed: 28/06/2010 06:40 at
 Stable URL: <http://www.jstor.org/stable/2807954>
- Mustafa, E.H (2008). Socio-economic Determinants of Infant Mortality in Kenya: Analysis of Kenyan DHS 2003.
 Accessed on 3 March 2010 at
<http://www.scientificjournals.org/journals/2008/articles/1409.pdf>.
- Nair, P., Chandrans, A., & Sabu, A. (2000). The Effect of Maternal Health Care Programmes on Infant and Child Survival in India. *The Journal of Family Welfare* vol.46, No.1
- NFFS(1993). The 1990 National Family and Fertility Survey of Ethiopia.
- Ogunlade, S. & Mezue, C. (1987). Infant and child mortality in Nigeria.
- Oromiya Region Health Report(Jimma Zone). Wikipedia (The Free Encyclopedia).
 Accessed on March 2010 at
<http://en-wikipedia.org/wiki/Jimma-zone>
- Overbosch G., Nsowah-nuamah J., Van den B. et al(2002). *Determinants of Antenatal Care Use in Ghana*, centre for World Food Studies: Staff working paper workshop, 02-13.
- Population Reference Bureau (1999). Breastfeeding patterns in the developing world: With selected maternal and child indicators. Washington, DC: PRB, 1999.
 Accessed on 3 March 2010 at
<http://scinet.dost.gov.ph/union>
- Population Reference Bureau (2006). *Human Population: fundamentals of growth world health*. Vol. 40 (1) January-March: 20-1.

- Schwarz, J. (2007). *Crash course in Statistics for Neuroscience Center*. Zurich, University of Zurich.
- Shakya, K., & McMurray, C.(2001). Neonatal Mortality and Maternal Health Care in Nepal: Searching for Pattern of Association. *Journal of biosocial science*. 33, 87-105.
- Swedish Save the Children Federation(1984). *Report of Maternal Health in Addis Ababa*. A community based survey on the incidence and aetiology of Maternal mortality and the use of maternity services; and confidential Enquires into maternal deaths in Addis Ababa,Sept.1981-1983, Ethiopia.
- Tesfu Alemu(2006). *Assessment of relationship between infant death and high risk Fertility behavior among married women of Afar zone four*. Addis Ababa University Master degree of public health(Unpublished).
- Thapa, S. (1996). Infant Mortality and its correlates and determinants in Nepal: A district-level analysis. *Journal of Nepal medical Association*, 34: 94-109.
- United Nations (1985). *Socioeconomic Differentials in child mortality in Developing Countries*. Department of International Economics and Social Affairs. New York.
- United Nations (2002). *World Population Prospects: The 2000 revision Vol. III Analytical reports*. New York: United Nations.
- United Nations(2005). The Millinnium Development Goal report.
- UNSD(2005). Progress towards the MDG5 1990-2005 Report on MDG5. Accessed on February 2010 at http://unstats.un.org/unsd/mi/goals_2005/goal_5.pdf
- USAID(2009).Health-Related Research and Development Activities at USAID. An Update on the Five Year Strategy, 2006-2010 Accessed on June 2010 at <http://pdf.usaid.gov/pdf-docs/PDACN515.pdf>
- Uthman, O.A. (2008). Effect of low birth weight on Infant Mortality: analysis Using Weibull Hazard Model. *The Internet Journal of Epidemiology*. Vol.6, No.1.
- World Bank (1993). *World Development Report 1993: Investing in Health*. Oxford University Press: New York, NY.
- World Health Organization(1994). *Care of mother and baby at the health center*. A practical guide, Geveva: Maternal Health and Safe Motherhood Programme, Division of Family Health.

World Health Organization (2003). *Antenatal care in developing countries; promises Achievements and missed opportunities: An analysis of Trends Level and Differentials*, 1990-2001.

WHO (2004b). *Making pregnancy safer: The critical Role of Skilled Attendant: A Joint Statement by WHO, ICM and FIGO*. Geneva, Switzerland.
Accessed on May 2010 at
<http://whqlibdoc.who.int/publications/2004/924159169>

WHO (2005). *The world health report 2005-Make every mother and child count*.
Accessed on March 2010 at
<http://www.who.int/whr/2005/en/index.html>

WHO (2006). *Pregnancy, Childbirth, Postpartum and Newborn Care: a guide for essential Practice*. Geneva, Switzerland.

WHO(2007). *Maternal Mortality in 2005: Estimates Developed by WHO, UNICEF, UNFPA, and the World Bank*. Geneva,Switzerland.
Accessed on May 2010 at
WWW.Safemotherhood.org: 2002

WHO &UNICEF(2010). *Countdown to 2015 Maternal, Newborn and Child Survival*
Assessed on June at
www.countdown2015 mnch.org

Yared M & Asnaketch M (2002). *Utilization of Maternal Care Services in Ethiopia*.
Ethiopian Health and Nutrition Research Institute Addis Ababa. ORC
Macro Calverton, Maryland, USA.

Yemane Berhane(2006). *Development Projects to improve maternal and child health: Assessing the impact*. *PLOS Med* 3(4):e192.

Zupan, J. (2005). *Perinatal Mortality in developing countries*. *The New England Journal of Medicine*. Vol.352 (20) : 2036-2048.

Annexes

Annex A

English Questionnaire

Questionnaire for community based survey on the relationship of Infant morality and maternal health care services in Seka Town, Oromiya Regional State.

Verbal Consent:

Hello! My name is _____ from Oromiya Regional Bureau. I am working in research team of Addis Ababa University, College of Development Studies, Institute of Population Studies.

We are conducting a study on the association of infant mortality and maternal health care services in Seka wereda. You are kindly requested to be included in the study, which will have importance in improving maternal and infant health services in the town.

The interview will take about 25-30 minutes. No information concerning you, as individual will be passed to another individual or institution. Your participation is fully voluntary and you have the right not to participate fully or partially. If you agree to be included in the study, I will start my questions by asking general identification points. Only honest answers would contribute to the improvement of health care services in the town.

“May I continue?”

If yes, continue interviewing

If No, thank and stop interviewing.

Name of the Interviewer _____ signature _____ Date _____

Name of the Supervisor _____ Signature _____ Date _____

I. Household Identification

01. Questionnaire Code _____

02. Address: Kebele _____ House number _____

03. How long have you lived in this place? _____

If it is less than five years preceding the study —————→ next HH

04. Have you given birth in the last five years? 1. Yes 2. No —————→ Next HH

If yes, when was the date in which you gave birth regardless of the outcome of

pregnancy? _____

N.B. Please fill on each answer sheet as follow

Time of start of interview _____

Time of End of interview _____

Part I. A: Questionnaire on Socio-Demographic characteristics.

It has been found that it is necessary to understand the socio-demographic history as to their contribution to attending ANC during pregnancy, delivery care while giving birth including choice of place of delivery and following up postnatal care after delivery both to the new born infant and mother. Therefore, I would like to ask you some questions related to this aspect.

101. Your current age in completed years: _____

102. What is the highest level of schooling you have ever attended?

- | | |
|-----------------------------------|---------------------------------------|
| 1. Illiterate | 4. Secondary high school (7-12grades) |
| 2. Only read and Write | 5. Higher education (12+) |
| 3. Elementary School (1-6 grades) | 6. Other, specify _____ |

103. What is the highest level of schooling your husband ever attended?

- | | |
|-----------------------------------|---------------------------------|
| 1. Illiterate | 4. Secondary high school (7-12) |
| 2. Only read and Write | 5. Higher education (12+) |
| 3. Elementary School (1-6 grades) | 6. Other, specify _____ |

104. What is your occupation?

- | | |
|------------------------|-------------------------|
| 1. House wife | 4. Farmer |
| 2. Not employed | 5. Merchant |
| 3. Government employee | 6. Other, specify _____ |

105. What is your husband occupation?

- | | | |
|------------------------|-------------------------|-------------|
| 1. Government employee | 3. Farmer | 4. Merchant |
| 2. Private employee | 5. other, specify _____ | |

106. How old is your husband? _____

107. How many persons usually live in your household? _____

108. Which ethnic group do you belong to?

- | | | |
|-----------|-----------|-------------------------|
| 1. Oromo | 3. Gurage | 5. Other, specify _____ |
| 2. Amhara | 4. Tigray | |

109. What is your religion?

- | | |
|-------------|-------------------------|
| 1. Muslim | 4. Protestant |
| 2. Orthodox | 5. Other, specify _____ |
| 3. Catholic | |

Part I B: Pregnancy and Maternal health care services related questions.

110. What is the total number of pregnancies you had in the preceding five years? _____

111. Where did you deliver your last child?

- | | |
|------------------|-------------------------|
| 1. Hospital | 4. At home |
| 2. Health centre | 5. Clinics |
| 3. Health post | 6. Other, specify _____ |

112. Parity (What is the order of your last pregnancy?) _____

113. Have you had any of your live births died in the last five years preceding the study?

1. Yes 2. No skip to Q 201

114. How many of your live born children died before reaching one year in the last five years? _____

115. Sex of the last infant died: 1. Male 2. Female (If more than one infant died, take only the last one)

116. Date of Birth of the infant: date _____ month _____ year _____

117. Where did you take the child when he was sick?

- | | |
|-----------------------|-------------------------|
| 1. Health centre | 4. No action |
| 2. Traditional healer | 5. Other, specify _____ |
| 3. Local injector | |

118. In your opinion, what do you believe was the cause of death? _____

119. Have you been medically told the cause of death?

1. Yes 2. No → SKIP to Q123

120. What is the number of births you gave?

121. When you were pregnant with this child, did you attend antenatal care for check up on the pregnancy?

1. Yes 2. No → SKIP to Q127

122. Who treated you on your first attendant in health facility?
- | | |
|-------------------|----------------------------|
| 1. Doctor | 4. Health extension worker |
| 2. Nurse | 5. Other, specify _____ |
| 3. Health officer | |
123. How many months pregnant were you at first visit? _____ Months
124. How many times you visited health facility when you were pregnant?
- | | |
|--------------|--------------------------|
| 1. Only once | 3. Three times |
| 2. Twice | 4. More than three times |
125. Where did you deliver this child?
- | | |
|------------------|-------------------------|
| 1. At home | 4. Health post |
| 2. Clinic | 5. Other, specify _____ |
| 3. Health centre | |
126. Who helped you during delivery?
- | | |
|---------------------|-------------------------|
| 1. Relative/friends | 4. Health personnel |
| 2. TBA | 5. Self assisted |
| 3. TTBA | 6. Other, specify _____ |
127. Did you face problem during labour? 1. Yes 2. No SKIP to Q131
128. The problem you faced during delivery was _____
- | | | |
|----------------------|-----------------------|-------------------------|
| 1. Prolonged labour | 3. Malpresentation | 5. Other, specify _____ |
| 2. Obstructed labour | 4. Excessive bleeding | |
129. The child was born:
- | | |
|--------------------------|------------------------------|
| 1. At expected month | 3. Later than expected month |
| 2. Before expected month | 4. I don't know |
130. At birth the size of baby was?
- | | |
|-----------------------|----------------------|
| 1. Smaller than usual | 3. Larger than usual |
| 2. As usual | 4. I don't know |
131. Have you breastfed this child? 1. Yes 2. No → SKIP To Q136
132. How long you breastfed this child? _____ Months
133. Why not you breastfed this child?
- | | | |
|-------------------------|-------------------------|-------------------------------|
| 1. Due to inconvenience | 3. The baby refused | 4. Due to lack of breast milk |
| 2. The baby got sick | 5. Other, specify _____ | |

134. Did the baby receive any vaccination? 1. Yes 2. No → SKIP To Q138

135. Which type of Vaccination that the baby received?

BCG:	1. Yes	2. No	Polio1	1. Yes	2. No
DPT1:	1. Yes	2. No	Polio2	1. Yes	2. No
DPT2:	1. Yes	2. No	Polio3	1. Yes	2. No
DPT3:	1. Yes	2. No	Measles	1. Yes	2. No

136. If not received at all, why?

1. Too young	4. I don't believe it helps
2. Too far to go	5. Other, specify _____
3. I don't know when to do it	

137. Did you receive tetanus toxoid injection? 1. Yes 2. No

Part II: Questionnaire on Antenatal Care (ANC)

201. Have you ever heard about ANC Services? 1. Yes 2. No → SKIP To Q

202. Where did you get information about the sources of ANC services?

1. Health institution	4. Relatives/friends
2. Radio/ TV	5. Women's groups
3. TBA	6. Other, specify _____

203. In your opinion, where should a pregnant woman go to get ANC service?

1. Health Facility	3. TTBA
2. TBA	4. Other, Specify _____

204. In your opinion, what are the benefits of ANC?

1. Maternal health	4. I don't know
2. Child health	5. Others, specify _____
3. Both maternal and child health	

205. Did you go to health institution for ANC check up while you were pregnant in the last five years?

1. Yes 2. No SKIP To Q220

206. At what gestational age did you go to health institution?

1. 1-3 months	3. 7-9 months
2. 4-6 months	4. I don't know

207. What was the total number of visits in the last pregnancy?

1. One 3. Three 5. More than four
2. Two 4. Four

208. To which health institution did you go?

1. Hospital 2. Health centre 3. Clinics 4. Other, specify _____

209. Why did you go to that particular health institution? (Multiple responses are possible)

	Yes	No
A. Close to where I live	1	2
B. Little or no expense	1	2
C. Behaviour of health workers is best	1	2
D. Convenient time of services	1	2
F. High quality of services	1	2
G. Others, specify _____		

210. Have you ever had injection(s) on the arm to prevent Tetanus when you visited a health facility for ANC services?

1. Yes 2. No → SKIP To Q 212

211. How many times have you received such injection (s)?

1. One 2. Two and more

212. What was the main reason that initiated you to go for ANC follow up?

1. Sick and need treatment
2. To start regular check up
3. Others, specify _____

213. Was health education given during each visit?

1. Yes 2. No → SKIP To Q 215

214. What was the topic? (Multiple responses are possible)

	Yes	No
A. ANC Importance	1	2
B. FP	1	2
C. Baby care	1	2
D. Breast feeding	1	2
E. HIV/PMTCT	1	2

F. I don't remember 1 2

G. Others, specify _____

215. Was blood pressure measured when you went for ANC?

1. Yes 2. No 3. I don't know

216. Was your weigh taken at the time of each visit?

1. Yes 2. No 3. I don't know

217. Was laboratory examination done in the ANC clinic? (Blood and / or urine)

1. Yes 2. No 3. I don't know

218. Was your height measured at ANC?

1. Yes 2. No 3. I don't know

219. What was the out come of pregnancy? 1. Live 2. Dead

220. If you didn't attend ANC, why not? (Multiple responses are possible)

	Yes	No
A. No or little knowledge about ANC clinics	1	2
B. Being in a state of good health	1	2
C. Too busy to attend ANC Clinics	1	2
D. Expenses for ANC Clinics are unaffordable	1	2
F. Waiting time is too far from my home	1	2
G. Husband disapproval	1	2
H. Poor quality of services	1	2
I. Because of religion	1	2
J. ANC attendance is useless	1	2
K. Others, specify _____		

Part III. Questionnaire on Delivery care (DC) [Ask women who had at least one live birth in the preceding five years]

301. Where did you deliver your last child?

1. At home 2. In a health facility

302. Have you faced any pregnancy related health problems prior to or during delivery?

1. Yes 2. No

303. How long was the duration of labour?

- | | |
|-------------------------|-------------------------------|
| 1. Less than half day | 3. More than one and half day |
| 2. One day or one night | 4. I don't exactly remember |

304. How do you rate the delivery outcome, in terms of your health?

- | | | | |
|--------------|---------|--------|-----------------|
| 1. Very good | 2. Fair | 3. Bad | 4. In different |
|--------------|---------|--------|-----------------|

305. How do you rate the delivery outcome, in terms of your new born infant health?

- | | | | |
|--------------|---------|--------|-----------------|
| 1. Very good | 2. Fair | 3. Bad | 4. In different |
|--------------|---------|--------|-----------------|

306. Do you think that delivery at health facility is good for the health of infant?

- | | |
|--------|-------|
| 1. Yes | 2. No |
|--------|-------|

Part III-A

Questions for women who delivered in health facilities. [If the answer for question 301 is 2]

307. Why did you want to deliver in health facility?

1. It was my preference
2. It is my usual practice
3. Based on my previous bad experience from home delivery
4. I was informed to deliver in health facilities
5. I have faced obstetric problems which forced me to deliver in health facilities.
6. Others, specify _____

308. Were the institutional delivery services according to your expectations?

- | | | |
|--------------|-------------|---|
| 1. Yes, good | 3. No, good | 5. I was not having specific expectations |
| 2. Yes, poor | 4. No, poor | |

Based on your experience from your last birth, how do you rate the following, with regard to your infant's survival status?

309. How do you rate the health of your infant after delivery?

- | | | |
|--------------|--------------|---------------------|
| 1. Very good | 3. Poor | 5. I don't remember |
| 2. Good | 4. Very poor | |

Part III-B

Questions for women who delivered at home [If the answer for question 301 is 1]

310. Why you delivered at home? (More than one answer is possible)

	Yes	No
A. Expenses for delivery at health institution is unaffordable	1	2
B. Dislike behaviours of health workers at health institution	1	2
C. Wishes to deliver at home where relatives are near by	1	2
D. More trust on TBAS/relatives than health workers at health Institution	1	2
E. No problem during delivery	1	2
F. Others, specify		

311. Who assisted you during delivery?

- | | |
|----------------------------|--------------------------|
| 1. Health workers | 5. Neighbours |
| 2. TBA | 6. No one |
| 3. Close relatives/Friends | 7. Others, specify |

312. Based on your experience and delivery out come from the last child birth at home what would be your future preference for place of delivery?

1. Institutional delivery
2. Home delivery
3. No preference

If the woman prefers institutional delivery ask Q 313

If she prefers home delivery skip to Q 314

313. If you prefer institutional delivery, what is your main reason?

1. I have faced poor out come from home delivery
2. The new born has faced poor out come from home delivery
3. It was against my intention that I delivered at home
4. Other reasons, specify

314. If you prefer home delivery, what is your main reason?

1. I have got better out come from home delivery
2. The new born has got better out come from home delivery

3. It is my usual practice
4. I have observed that deliveries can be handled at home
5. Other reasons, specify _____

Part IV :Questions on respondents view on Infant's survival status for those who attended ANC and delivered at health facilities.

401. What was the health condition of your last live birth child?

1. Very good
2. Good
3. Poor
4. Very poor
5. I can't assess it

402. Was your last child celebrate his/her first birthday?

1. Yes → SKIP to Q 501
2. No

403. What was the reason for your child death?

1. Malnutrition
2. Disease
3. Due to delivery related problem
4. Others, specify _____

Part V: Questions on the level of postnatal care

501. Have you had post partum visit schedule in 45 days after birth?

1. Yes
2. No

502. What was your reason for attending postnatal care?

1. Because I was sick
2. Because my baby was sick
3. To check my health and baby health
4. Others, specify _____

503. What was the length of stay in health facility after delivery?

1. In hours
2. For some days
3. For weeks
4. I don't know

504. Was there any treatment given for the new born after delivery before you leave the health centre?

1. Yes
2. No

505. If yes, was there any support to initiate breastfeeding?

1. Yes

2. No

506. Had your baby encountered any problem in the first 12 months?

1. Yes

2. No

507. If yes, have you sought care for his health? 1. Yes 2. No

508. Who was the person provided care for the baby?

1. Doctor

4. Health extension worker

2. Nurse

5. TTBA

3. Health officers

6. TBA

509. Have you paid for treatment of your baby? 1. Yes 2. No

510. Was the payment affordable?

1. Expensive 2. Fair 3. Cheap 4. I don't know

511. What was the reason that you did not take your baby to health facility?

1. Being too busy

7. Health providers were not available

2. The baby was health

8. Poor quality services

3. Long waiting time

9. I have no idea

4. Financial problem

10. Other, specify _____

5. Long travelling time

6. Long distance

ANNEX-B

Focus Group Discussion (FGD) Guide

Introduction

Good morning and thank you all for coming

My name is _____ my friend near to me is _____ .

“After we conduct some brief introduction, we will be talking about several different issues. We will be asking you questions about your over all experience with infant mortality in related to maternal health services in your locality and questions pertaining to pregnancy related problems, preferences to place of delivery and factors influencing infant mortality. Finally, we will conclude the session by asking you for your recommendations on how maternal and child health, care services might be implemented in your community in any way in the future. Would you be willing to participate in the discussion? If yes, proceed, if no, thank and stop the discussion.”

Name of the moderator _____ signature _____

(Signature of the moderator certifies that consent has been obtained verbally)

Date _____ Time _____

Topic: Community perception and experience of infant mortality in the Seka wereda.

Target Audience: Women who have given birth in the past five year, health workers and TBAs.

Objective of the Discussion: To explore the community’s experience and perceptions of infant mortality.

-To investigate reasons for infant mortality.

-To examine factors influencing infant mortality in the town.

Description of the participants

A total of two focus groups, one from rural area and the other from urban area participants who filled the criteria (including TBA and TTBA), each comprising a minimum of eight and a maximum of ten participants were be involved.

The selection Criteria and the Target Audiences

Residence women who have given birth in the past five years before the survey and who were not included in the door to door interview.

Residence	Women's who full fill the criteria
Seka (Rural)	Group 1-from the near by kebeles
Seka Town (urban)	Group2- selected from the urban

Description of the Focus Group

The participants and facilitator sit in a circle or a round table for the discussion. The facilitator begins the session by introducing himself/ herself and explain the purpose of the focus group. The focus groups meeting take about 1 hour to one and half hours.

Ground Rules

Issue of confidentiality

Please be assured that any information collected here is strictly confidential. The staff of research and other participants are not directly share the information in a way that would reveal an individual's personal identity.

Consent for participation and Tape Recording

As this point it is important that we obtain your consent for conducting the session. Understand that this is more for your protection that anything else.

Read consent form out loud to the group.

"Your remaining in the session indicates that you voluntarily agree to participate in this discussion program. You have the right to refuse to answer any questions and to end the discussion if you find it necessary to do so. For the sake of accuracy and efficiency, we take notes and tape recording this session, unless any one has any objection"

Role of Moderator and Note Taker

The moderator's responsibility is in charge of facilitating the discussion. The moderator tries to bring the discussion back to the topic at hand if it goes beyond the main issues. The moderator does not give any indication (verbal or physical) that would encourage certain types of comments or discourage other types of comments.

In short, the moderator guides the discussion when necessary, with carefully not to lead the discussion. It is our role to facilitate, but your role to tell us what you think.

The note taker has the sole responsibility of capturing the sessions accurately as possible. This includes not only participants' responses, but also non verbal actions, physical environment, atmosphere of the session, as well as other vital characteristics of the session.

Importance of Total Group

In this group everybody should feel free to talk. Each and every opinion is important and wanted. It is very important that all the people in the group get a chance to express their opinions.

Agreement to Disagree

In this group there are no rights or wrong answers. Every body should express the opinions or attitude pertinent to her or him. When you express your opinions you are encourage being honest in your views of the infant mortality and related problems like under utilization of ANC and DC and preventive programs. We want you to focus your comments on the relevant issues and not toward each other or members of the staff.

FGD Topic Guide

Theme1. Introduction

At this point, we would like to ask you to introduce yourself to the rest of the group. Let us start with the research team (Name, Age, education status) and each of you please tell me your name, how long you have lived in this area, parity, occupation, Religion, children ever born (CEB), marital status(only ever married) .

Theme2:- Warm up questions

1. Next we would like to hear a little about your experience or knowledge about infant death and maternal health cares in your setting.
 - 1.1. Who can tell us about infant death?
 - 1.2. Who can tell us about ANC?
 - 1.3. Who can tell us about delivery care services?
 - 1.4. Who would like to tell us dangerous health problems related to pregnancy and child birth both to mother and new born infant?
 - 1.5. What are the causes of infant death?
 - 1.6. What are the consequences of infant death?

1.7. What are the prevention methods?

Probes 1. Would you explain further?

2. Would you give me an example?

3. Has any one else had similar experience?

4. Is there anything else?

5. "I don't understand"

Theme 3: Reasons related to ANC and DC utilization and Infant Deaths

2. Now we would like to ask you specific questions about infant deaths

2.1. Do you think that ANC contributes to the safe and healthy infant delivery outcome?

1. Yes 2. No Why?

2.2. Do you think that delivery at health facility contributes to the safe and live birth?

1. Yes 2. No Why?

2.3. Where do you think is the best place for delivery? Why? What are the advantages?

Probes: - 1. Would you explain further?

2. Would you give me an example?

3. Has any one else had similar experience?

4. Is there anything else?

5. "I don't understand."

3. What are the main reasons for infant deaths?

Probes:- 1. Would you explain further?

2. Would you give me an example?

3. Has anyone else had similar experience?

4. Is there anything else?

5. "I don't understand".

4. What are the main health care practices for new born infants?

What are the advantages and disadvantages of clinical health cares for infants?

Probe: 1. would you explain further?

2. Would you give me an example?

3. Has anyone else had similar experience?

4. Is there anything else?
5. "I don't understand"
5. Where do you think the best place for delivery a child? Why? What are the advantages and disadvantages?

- Probes:-
1. Would you explain further?
 2. Would you give me an example?
 3. Has anyone else had similar experience?
 4. Is there anything else?
 5. "I don't understand."

6. What cultural practices do you have towards infant health cares at home?

- Probes:-
1. Would you explain further?
 2. Would you give me an example?
 3. Has anyone else had similar experience?
 4. Is there anything else?
 5. "I don't understand"

7. What religious belief do you have towards infant health cares?

- Probes:-
1. Would you explain further?
 2. Would you give me an example?
 3. Has anyone else had similar experience?
 4. Is there anything else?
 5. "I don't understand"

8. What is your opinion about infant death and maternal health care services from your cultural and religious point of view?

- Probes:
1. would you explain further?
 2. Would you give me an example?
 3. Has anyone else had similar experience?
 4. Is there anything else?
 5. "I don't understand."

Ending Questions

Are there any issues, questions, comments that you would like to raise or points you want to add?

Debriefing

I would like to thank you for your participation. I also want to restate that what you have shared with us is confidential. No part of your discussion that includes names or other identifying information be used in any reports, displays or other publicly accessible media coming from this research. Finally, I want to provide you with a chance to ask any questions that you might have about this research.

Do you have any questions for me?

“Thank you!!”

Annex C

TableC1 FGD1 (Rural Participants)

Socio-Demographic Characteristics of Participants

Participant	Age	parity	Marital status	Literacy status	Ethnicity	Religion
1	25	4	married	illiterate	Oromo	Muslim
2	20	3	married	primary	Oromo	Muslim
3	35	6	married	illiterate	Oromo	Muslim
4	28	5	married	illiterate	Amhara	Orthodox
5	42	7	widowed	illiterate	Oromo	Muslim
6	34	6	married	illiterate	Oromo	Muslim
7	19	2	married	primary	Oromo	Muslim
8	28	5	married	illiterate	Oromo	Muslim
9	24	4	married	primary	Oromo	Muslim
10	21	2	married	illiterate	Oromo	Muslim

Table C2 FGD (Urban Participants)

TableC2.Socio-Demographic characteristics of the Participants

Participant	Age	parity	Marital status	Literacy status	Ethnicity	Religion
1	27	4	Married	primary	Kaffa	Protestant
2	42	5	Married	illiterate	Oromo	Muslim
3	34	5	Married	secondary	Oromo	Muslim
4	36	6	separated	primary	Oromo	Muslim
5	43	6	Married	illiterate	Oromo	Muslim
6	34	5	Married	primary	Oromo	Muslim
7	27	4	Married	primary	Oromo	Orthodox
8	20	2	Married	secondary	Oromo	Muslim

Annex D

Table D1 Percentage distribution Socio-economic profile of the study population

Variables	Categories	Number(N)	Percentage
Literacy status of respondents	Illiterate	305	76.3
	literate	95	23.8
Literacy status of respondents' husbands	Illiterate	260	65
	Literate	140	35
Occupation of respondents	housewife	224	56
	farmer	161	40.3
	Others*	15	3.8
Occupation of respondent's husband	Farmer	293	73.3
	Employed	58	14.5
	Others**	49	12.3
Ethnicity	Oromo	357	89.3
	Amhara	17	4.3
	Others(†)	26	6.5
Religion	Muslim	316	79
	Christian	84	21
Source of drinking water	well	283	70.8
	Hand pump/tap	48	12
	Stream/river	69	17.3
Type of toilet	none	244	61
	Hole	108	27
	pit flush	48	12

Source: Author's Field Survey, 2010

Others*-student, employed, merchant, etc

Others**- merchant, weaver, handicraft man, etc

Others (†)- Guragie, Keffa, Silite,etc

Annex E
Table E1 Multicollinearity Statistics

Variables	Tolerance	VIF
Mother' occupation	.893	1.120
Total no. of pregnancies	.865	1.157
Type of toilet	.944	1.059
Months of conception	.887	1.127
A previous birth interval	.772	1.296
Parity	.500	1.999
Age	.471	2.123
Breastfeeding	.885	1.130
Postpartum visit	.854	1.171
Place of treatment	.941	1.063

Annex F

Table F1.Model Summary

step	-2 Log likelihood (-2LL)	Cox &Snell R square	Nagelkerke Rsquare
1	174.416	.146	.325

Table F2 Hosmer and Lemeshow Goodness of Fit Test

Model	Chi-square	Sig.
Infant Mortality	6.458	0.596

LIMU SEQA WEREDA MAP



Legend

ROAD TYPE

- All Weather Road
- - - Dry Weather Road

RIVER TYPE

- Intermittent River
- Permanent River

- Limu Wereda Kebele Boundary
- Town

1:275,000

Prepared By: CSA (Central Statistical Agency)

Declaration

The thesis is my original work, has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged.

TEFERA TADDELE

Student

[Signature]

Signature

22/06/10

Date

I confirm that this thesis has been submitted with my approval as the supervisor of the same.

Nigatu Regassa

Advisor

[Signature]

Signature

2/10/02

Date

