Duration and Determinants of Birth Interval among Women of Child Bearing Age in Lemo woreda, Hadiya Zone, SNNPR, Ethiopia

By: Samuel Yohannes (BSc)

A Research paper to be submitted to the department of Population and Family Health School of graduate Studies of Jimma University in Partial Fulfillment of the Requirements for the Degree of Masters in Public Health

Jun. 2010, Jimma University

Duration and Determinants of Birth Interval among Women of Child Bearing Age in Lemo woreda, Hadiya Zone, SNNPR, Ethiopia

By: Samuel Yohannes (BSc)

Advisors: Mekitie Wondafrash (MD, DFSN)

Muluemebet Abera (BSc PH, MPH/RH)

Jun. 2010, Jimma University

ABSTRACT

Background: Ethiopia is the second most populous country in Africa next to Nigeria, with population size of 77 million and total fertility of 5.4. The population is increasing at an annual rate of about 2.7%. Fertility is an important component of population dynamics which plays a major role in changing the size and structure of a given population. Reforms that encourage longer intervals between consecutive births decrease the number of children each woman has with subsequent beneficial effects on population size and on the health status of mother and child. Birth interval also has significant effect on the child's future physical and mental capabilities. This study, therefore, provides empirical evidence for the local health planners.

Objective: The objective of this study is to assess duration and determinants of birth interval among women of child bearing age in Lemo woreda, Hadiya zone, South nations, nationalities and people's regional state, Ethiopia.

Methods: The study was carried out in Lemo woreda among women of child bearing age from March 9 to 16 2010. The study design employed was community based cross sectional study design. The study population was sampled women of child bearing age with history of at least two deliveries and at least the last delivery within the last five years. The sample size was 844 and calculated using single population proportion formulae. Census was conducted prior to the data collection time and simple random sampling method was applied to identify the study subjects. Structured interviewer administered questionnaire translated to Hadiyigna language were used to gather the required information. The data were coded, entered and cleaned by using SPSS version 16 and analyzed by using descriptive, bivariate and multivariate techniques.

Results: sixty % of the study subjects were knowledgeable based on the judgment criteria and majority, 57%, of women are currently practicing short birth interval length with the median birth interval length of 33 months. Birth interval showed significant variation by contraceptive use, residence, wealth index, breast feeding and occupation of the husband.

Conclusion and recommendations: Relative to knowledge level, low proportion of optimal birth spacing practices with short birth interval length was observed. Significantly longer preferred birth interval lengths as compared to actual birth interval were evident among the study subjects. Therefore, collaborative efforts have to be exerted by zonal health department, woreda health office and health providers at different levels together with other relevant sectors to alleviate the situation.

ACKNOWLEDGEMENTS

I would like to present my heartfelt thanks to my Lord Jesus Christ, the Lord of knowledge and wisdom, for his limitless help and giving me the opportunity and capability to produce my thesis.

I would like to thank my advisors Dr. Mekitie Wondafrash and Mss. Mulumebet Abera for their valuable advice and comments they have provided during the whole course of the research.

I would also like to extend my thanks to Jimma University College of public health and medical sciences for providing me the opportunity to carry out this study.

My thanks also go to my dear friends in MPH specialty for sharing me their experiences and relevant information during the development of this paper.

I would also like to acknowledge Hossana College of health sciences for its material support and providing me all the necessary facilities needed during the study period.

Last but not the least, my acknowledgement goes to Hadiya zone health department, Lemo woreda and Hossana town health offices, kebele administrators, study participants and data collectors for their valuable contribution in the realization of this study.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABREVIATIONS

BF	Breast Feeding
DHS	Demographic and Health Survey
EDHS	Ethiopian Demographic and Health Survey
FP	Family planning
HEWs	Health Extension Workers
IUCD	Intra Uterine Contraceptive Device
MC	Modern Contraceptives
MPH	Masters of Public Health
NGO	Non Governmental Organizations
OBS	Optimal Birth Spacing
PAS	Proportional Allocation to Size
SNNPR	South Nations Nationalities and People's Region
SRS	Simple Random Sampling
TFR	Total fertility Rate
USAID	United States Agency for International Development
WCBA	Women of Child Bearing Age
WHO	World Health Organization
WrHO	Woreda Health Office
ZHD	Zonal Health Deparment

CHAPTER 1: INTRODUCTION

1.1. BACKGROUND OF THE STUDY

Birth interval is the length of time between two successive live births **(1)**. Beginning with a live birth, the birth interval can be divided into several components: the period of postpartum amenorrhea, the menstruating interval, and the following period of gestation. The length of the birth interval is dependent on the duration of each component, with the postpartum amenorrhea and the menstruating intervals having greater variability in their duration than the other **(2).**

Ethiopia is the second most populous country in Africa next to Nigeria, with population size of 77 million and TFR of 5.4 **(3).** The population is increasing at an annual rate of about 2.7%. Evidence shows that nearly two million people are added to the country's population each year **(4).** According to a recent projection, the population will be doubled to the size of 135 million by the year 2030 **(3)**. The total fertility rate (TFR) calculated from the 2005 Ethiopian demographic and health survey (EDHS) shows little difference from the one obtained in 2000 EDHS (5.4 versus 5.5). Fertility rates in the rural areas (TFR=6.0) are much higher than in the urban areas (TFR=2.4) and have not changed much since the adoption of the national population policy **(4).**

Like many other African countries, Ethiopia has so far shown little change in fertility. Between 1990 and 2005, the total fertility rate in Ethiopia declined steadily from 6.4 to 5.4 children per woman of reproductive age. Apart from the high fertility, the large variation in fertility between rural and urban areas and between the regional states in Ethiopia calls for attention. According to the 2005 Ethiopian Demographic and Health Survey (DHS), fertility in rural Ethiopia is nearly two and half times greater than in urban centers (6.0 versus 2.4) **(5).**

Fertility is an important component of population dynamics which plays a major role in changing the size and structure of a given population. Differences in a country's fertility levels can be attributed to the differences in the length of the reproductive life of women and differences in the length of time between births when women are exposed to the risk of conception. Changes in reproductive patterns can influence child health and survival through a number of different mechanisms-most notably, through changes in maternal age at child bearing; birth order and the interval between births for childhood mortality have been of particular interest **(6)**.

According to Bongaart, factors affecting fertility are broadly classified into proximate (direct) and distal (indirect) factors. The proximal factors are bio-behavioral factors, like being sexually active, use of contraceptive, duration of postpartum infecundability, abortion and sterility which

affect fertility directly, whereas, distal determinants, are socio-cultural factors which affect fertility indirectly through affecting the bio-behavioral factors **(3, 14).**

Optimal spacing until the next pregnancy is generally understood to refer to resting period between pregnancies that allows the mother time to recover from pregnancy, labor and lactation; replenish her nutritional stores including calcium, iron, and vitamins; and provide time for the last born to secure his/her rights to comprehensive care and lactation **(7).**
Longer time period between births allows the next pregnancy and birth to occur more likely to be at full gestation and growth; there is less competition between existing children for breastfeeding, food, nutrition, the mother's time, and other resources **(8, 9).**

For years, family planning programs have advocated two years intervals between births for infant and child health and survival **(8, 9).** Recent research found that birth intervals of 3 to 5 years are safer for mothers and babies compared to birth intervals of two years or less. Children born 36 months after their next older sibling have a lower risk of neonatal, infant and under-five death as well as a lower risk of stunting than children born to 24 to 29 months apart **(6, 8,9).**

Studies indicate that there could be additional gains to child health by increasing the spacing between births to a minimum of three years. Previous research from Matlab, Bangladesh had suggested that there is little empirical evidence for an association between birth interval length and the risk of maternal death. However, a more recent analysis of data from Matlab, Bangladesh indicates that women with short or very long inter-pregnancy intervals are at a significantly higher risk of maternal complications **(8).**

Some researchers also opined that birth intervals longer than five years are less healthy suggesting that such mothers may lose the protective benefit of previous child bearing and hence have complications as seen in primigravida **(9).**
Understanding factors which influence women's inter birth interval is critical for countries like Ethiopia with a population policy aiming at reducing fertility. This study, therefore, aimed at identifying the duration and determinants of inter birth intervals among WCBA in Lemo woreda (Hadiya zone) and will furnish important directions for intervention which will help local health planners to critically look at the problem during their planning process.

1.2. STATEMENT OF THE PROBLEM

Worldwide, infant and under five child mortality is a serious problem. The DHS conducted by USAID in 2002 estimated that, in every country involved in the survey, thousands more children could survive each year if all women spaced their births at least 3 years apart. In Nigeria, for instance, infant mortality could fall from 75 deaths per 1000 births to 54 deaths –a 28% decline- if all women spaced their births at least 3 years apart. Under five mortality could fall from 140 deaths per 1000 births to 108 deaths –a 23% decline **(6)**.

Current trends in child and maternal survival point to a quiet, global health tragedy. Ten million infants and children and about 500,000 women die annually, due mainly to preventable causes. Each year, an estimated 20 million infants are born with low birth weight. These immense and heartbreaking numbers have remained roughly static since the early 1990s. Birth spacing is a well-known, underutilized, and admittedly not fully understood health intervention **(10).**

Most African cultures value children highly. But few people-including women themselves understand the risks involved in bearing children. Women in Africa die much more frequently from complications of pregnancy and child birth than women in Europe and North America. In Sub-Saharan Africa, these complications are sometimes the most common cause of death for women of child bearing age. In fact, the WHO estimates that 1 out of every 22 women in Africa die from pregnancy related complications **(6)**. Ethiopia has one of the highest maternal mortality ratios in Africa and the world, estimated at 673 per 100,000 live births in 2005 **(1)**.

Women in developing countries have shorter birth intervals than they would prefer. The main reason for short birth intervals is that many women in developing countries do not use contraception after birth and therefore are likely to become pregnant once fecundity returns (**11**)

Adequate child spacing is considered as a positive factor on the health of mothers and their children. The birth interval has been reported to have significant effect on the child's future physical and mental capabilities. It has also been shown to affect the health of mothers. The birth interval not only directly affects the chance of infant survival but it also acts as the filtering factor through which other variables indirectly operate on infant mortality. In developing countries, complications of pregnancy and delivery account for about one quarter of all deaths among women of reproductive age **(6).**

Both short and long inter pregnancy intervals have been associated with low birth weight, preterm delivery, and delivery of a small for gestational age infant. The increased risk of adverse

pregnancy outcomes related to short inter pregnancy intervals has been attributed to a number of mechanisms including maternal depletion, hormonal imbalance, and postpartum stress **(12).**

A variety of demographic and socio economic characteristics influence women's spacing practices. These include maternal age at the birth of each child, the number of children she has, and her educational attainment, social status, labor force participation, duration of breast feeding, contraceptive use, place of residence and cultural norms (**6**). Differences in women's roles and status and the value of children may also influence the birth intervals. There is no doubt that the socioeconomic, demographic, health and cultural background of a country, consequently that of women, affects the above factors **(13).**Women who want to space their births need access not only to family planning information and counseling but also to contraceptive supplies that offer them a wide variety of methods from which to choose **(6).**

The new evidence makes child spacing compelling as a health issue of global importance. The rationale for increased attention to birth spacing is evidence-based, the magnitude of the problem of too closely spaced births is enormous, and the demand and unmet need for birth spacing services are considerable **(10).**

Thus, understanding factors which influence women's birth interval is critical for countries like Ethiopia with a population policy aiming at reducing fertility. However, there has been no study conducted so far to assess factors that influence birth interval in this particular area in Hadiya zone.

CHAPTER 2: LITERATURE REVIEW

2.1. LITERATURE REVIEW

Birth interval is the period between two consecutive live births i.e. from birth date to birth date. Birth intervals are affected by a complex range of factors, some of which are rooted in social and cultural norms, others in the reproductive histories and behaviors of individual women, utilization of reproductive health services and other background factors **(8).**

In this section, therefore, a review of some of the important socio economic, demographic, and biological variables which are related to birth interval length have been discussed.

Actual birth interval practice

Population report of 2002 in 55 sub-Saharan Africa showed Birth intervals are growing longer, yet most are still short of the healthiest interval of 3 to 5 years. The median birth interval in developing countries is about 32 months, 4 months short of 3 years, based on Population Reports analysis of 55 countries with DHS data. While this statistic suggests that many women are close to reaching the healthiest birth interval, in fact, 57% of women in the countries included in the analysis space their births shorter than 3 years. The rest proportion, 43%, had more than 3 year's birth interval length. Many more women need to space births longer to realize the health benefits (**16**).

In the DHS analytical study conducted in 20 sub-Saharan countries, the median length of actual birth intervals is 33.7 months on average (**17**).

Socio economic Determinants of Birth interval length

Education

Among the widely studied variables that determine birth interval length is education of women. Education is considered to be one of the most important socio economic factors having an indirect influence on birth interval length through its impact on one or more of the biological variables such as contraceptive use, breast feeding practice, frequency of sexual intercourse and sexual abstinence.

At the survey done at national level in Mozambique, women who read are the least likely to have short intervals. In Nampula, those who can read with difficulty are the most likely to have intervals less than three years. Interestingly, in Zambezia, short intervals occur to those who are the most literate **(8).**

The study in Saudi Arabia showed that mothers of children born after longer preceding interval (>31 months) had significantly more years of education compared to mothers of children born after shorter preceding interval (<17 months). When comparison was made between the succeeding birth intervals it was noted that, although there was no statistical significance, the mean number of years of education of mothers to children born before a longer birth interval succeeding interval (>35 months) is more than the mean number of years of education for children born before a shorter succeeding interval (<19 months) **(15).**

In 38 of 51 countries with DHS data, women with no education were more likely than women with education to space births less than 3 years apart **(16).**

Inter-birth intervals by levels of partner's education were also examined and similar results were observed to female educational rates. At the country level, 50% of intervals less than three years occurred among women whose partners have no education compared to 52% among those with partners with at least a primary education **(8).**

Labor Force Participation/employment

Female participation in the labor force has often been considered one of the means of promoting the use of contraception and thereby indirectly to reduce fertility. Concerning woman's current working status the study in Mozambique shows the most correlation with the length of her previous inter-birth interval. At the national level, those who are working are significantly less likely to have intervals shorter than three years than those who are not working; nationally, 49% among those working versus 53% among those who are not **(8).**

Women with lower status, whether within the household or within society and women who are not employed tend to have shorter birth intervals than women of higher status or who are employed **(16).**

Ethnic Differentials

In certain ethnic groups, culture encourages prolonged lactation, sexual abstinence after birth or during certain months of the year leading to prolonged waiting time to conception and lengthening birth intervals. The difference in birth interval length between different ethnic groups can be largely explained by variation in their cultural practices. For example, in a study conducted in Amhara region the median length of birth interval for Agew ethnic group is longer in each birth order as compared to the Amhara except in the first and second birth intervals where the median length for the two ethnic groups is equal. There is a difference of 4 months in the fifth

birth interval for the two ethnic groups. Agew women in general tend to have longer birth spacing as compared to the Amhara **(6).**

Religious Differentials

Among the various socio-cultural factors influencing fertility, religion has been considered very important. Religion prescribes a code of life, refers to system of beliefs, attitudes and practices which individuals share in groups, is one of the factors that could affect birth interval length. The difference in birth interval length between different religious groups can be largely explained by variation in their cultural practices. For example, in the study conducted in Amhara region, the interval disparity is largest for first and fourth birth intervals with a difference of 6 months. Variation in birth spacing is clearly observed between the two religious groups Orthodox and Protestant. This variation in birth spacing between the two religious groups may be accounted for mainly by differences in their socio economic, demographic and cultural factors, leading to differences in their attitudes, knowledge and practice of modern contraceptive methods and intensity and duration of breast feeding **(6).**

Residence

Residence is another important demographic determinant that is usually considered to influence birth interval. Study in optimal Birth Spacing in Mozambique showed that there are some urban-rural differentials with rural women less likely than urban women to have intervals over five years. Interestingly, they are also more likely to already be having intervals of between 3 and 5 years (35% of rural women versus 31% of urban women) **(8).**

Population report of Johns Hopkins Bloomberg School of Public Health showed that in 51 of 55 countries surveyed by the DHS, women who live in rural areas are more likely than women in urban areas to have birth intervals shorter than 3 years. In only three countries—Chad, Mozambique, and Pakistan—are urban women more likely than rural women to have birth intervals shorter than 3 years. These findings are not surprising, as urban women have better access to education and employment opportunities **(16).**

According to the 2005 EDHS data, urban women have slightly longer intervals between births (39.1 months) compared to rural women (33.6 months) (**1**).

Wealth index

According to the EDHS 2005, the median number of months increased from a low of 32.3 months among the lowest quintiles to a high of 35.5 months among the highest quintiles (**1**).

Demographic Determinants of Birth interval Length

Maternal age

Correlates of inter birth interval in Mozambique examined which women were more likely to have short birth intervals of three years or under. In general, younger women were more likely to have an interval less than three years than those older; nationally, three-quarters of 15-19 women were likely to have a short preceding interval while lower proportions of older women have such short intervals. A similar pattern was observed in all three provinces. This pattern makes intuitive sense because younger women are more likely to have children for a variety of reasons such as greater fecundity and being early on in the family building process **(8).**

In the study conducted in Saudi Arabia age of the mother and parity were found to be the only significant predictors of birth interval. Women who were 30-34 years old had about an eight-fold likelihood of increased birth interval compared to those in the younger age groups (20-24 years). Older women, 35 years and over, were 19 times more likely to have a longer birth interval. In this study, the mean ages of mothers of children born before and after a longer birth interval were found to be more than the mean ages of mothers of children born before and after a shorter birth interval. However, only in preceding interval is the difference statistically significant **(15).**

Younger women are more likely than older women to have their next child within 3 years. In all 50 countries with DHS data, 60% or more of women ages 15 to 19 have birth intervals shorter than 3 years. In only 2 of 55 countries do 60% of women ages 40 and older have birth intervals shorter than 3 years. In a few countries, such as Botswana, Brazil, Ethiopia, and Togo, there is little or no difference after age 30 **(16).**

Age at first Marriage

Early marriage provides more years in which conception can occur in addition to its indirect effect through limited schooling and employment opportunity. Women who married before 18 years have shorter birth intervals as compared to women who had married at 18 years and after 18 years in all birth intervals.

According to the study done in Amhara region women who had married at age 18 or more slightly have longer median birth interval length as compared to those who had married at age less than 18 years**(6).**

Survival Status of the Index Child

The health of a woman's previous child often affects the timing of her next birth. If a child dies, particularly within the first year of life, couples tend to have their next child sooner than if the child survives. Similarly, if a newborn is unhealthy in infancy, couples are more likely to have another child without waiting as long as they otherwise would. For example, in all 55 countries surveyed by DHS between 1990 and 2001, women are more likely to have their next child within 3 years if the previous child dies. The longer the previous child survives, the less the effect on the subsequent birth interval **(16).**

Studies have shown that the death of a preceding child leads to a shorter birth interval than when the preceding child survived. The median birth interval is more than eight months shorter for children whose previous sibling is dead than for children whose previous sibling is alive (26.1 months and 34.6 months, respectively). It is presumed that the difference in the birth intervals is related to the desire of parents to replace a dead child, as well as to the loss of the fertility-delaying effects of breastfeeding (**1**).

Sex of preceding child

It has been observed that in cultural settings with son preference, the sex of the previous child can determine the subsequent interval length; the birth of a girl is typically followed by a shorter interval than if a boy had been born. In the study conducted in Mozambique, the sex of the previous child does not seem to influence the length of the interval; for example, short intervals follow a boy's birth in 51% of the cases and 50% of the cases when a girl is born **(8).** But couples who prefer sons tend to have their next child soon after the birth of a daughter. Among 55 countries with data, women are more likely to have a next child within 3 years after the birth of a daughter than after a son's birth in all regions except Latin America **(16).**

Parity

Birth intervals are closely linked with the number of children a woman has. There are two ways in which parity is linked to interval length. The literature has often suggested that those who have suffered a pregnancy or child loss are more likely to replace that pregnancy/child and hence the interval between births is short. A second explanation is related to the fecundity factors—women who conceive easily and quickly are also those who are more likely to have more children. Due to these different effects, the relationship between parity and birth interval is often U-shaped; shorter intervals for those who have few children or many children and longer intervals for those who have a moderate number of children **(8).**

The study in Mozambique revealed that women who have few currently living children (none or one) or over five children more likely to have short intervals than those who have between two and four children. For example, in Nampula this is a statistically significant relationship—79% of those with few children had short intervals, as did 53% of those with two to four children, and 57% of those who had five or more **(8).**

Bio-behavioral Determinants of Birth interval Length

Duration of breastfeeding

Breastfeeding is well known to be associated with a delay in the return of ovulation following childbirth and, subsequently, with longer intervals between births. Particularly, in populations with low contraceptive use, breastfeeding is an important determinant of the interval between births **(15)**.

The study in Mozambique showed that breastfeeding for up to six months reduces short inter-birth intervals; for example, 48% of women who did not nurse are likely to have intervals less than three years compared to 39% of those who had nursed between one and six months. However, nursing beyond six months does not increase the interval further; 46% of women who nursed for 7-12 months had short intervals as did 51% of those who nursed for 12 to 24 months and 56% of those who nursed over two years**(8).**

A study conducted in Saudi Arabia found that more than one-third of those who were born after a preceding interval of more than 31 months were breastfed for two years or more compared to only 17.1% of children born after a preceding interval less than 17 months. The difference was statistically significant. On the other hand 35% of children born before a succeeding interval of more than 35 months have been breastfed significantly longer (> 2years) than those who were born before a succeeding interval of less than 19 months (18%) **(15).**

Contraceptive Use

Contraceptive use is an important determinant of inter-birth interval among population who use it. Inappropriate use of contraceptive methods interferes with lactation amenorrhea. This would lead to the risk of pregnancy and hence a shorter birth interval, than if lactation amenorrhea was left to operate. A study in Saudi Arabia found that nearly one-third of the mothers studied used a method of contraception before the birth of the index child compared to 47.9% of them who used it after the birth of the index child **(15).**

According to the study conducted in Amhara region, the median birth interval length for the last birth interval was calculated for contraceptive users and non-users. Consequently, the median birth interval length is higher (21 months) among users of contraception as compared to non-users (18 months) (**6**).

Preferred birth interval length

On average, women in developing countries have much shorter birth intervals than they would prefer. Many women not only are unable to achieve their own reproductive goals but also are falling far short of the 3- to 5-year intervals that new evidence suggests are healthiest. If more women achieved their preferred birth intervals, fertility rates would fall further, since longer birth intervals typically mean that women have fewer children over the course of their reproductive lives (**16**).

Most developing countries women's actual birth intervals are shorter than the intervals they would prefer. In several countries, such as in Egypt and Pakistan, however, women's actual intervals are close to their preferred intervals. Countries with the longest median preferred birth intervals have the largest gaps between their preferred and actual intervals (**16**).

Wide gaps between actual and preferred intervals signify that a transition from high to low fertility is underway: that is, reproductive goals are changing, but contraceptive behavior has yet to follow. In many sub-Saharan African countries, women are the furthest from achieving their preferred birth interval. From this report, for example, women in Nigeria, Niger and Cameroon had preferred median birth interval of 32, 34 and 34 months respectively (**16**).

In the DHS analytical study conducted in 20 sub-Saharan countries, the median length of preferred birth interval is almost 39.9 months. The median preferred interval length is at least 2.5 years in every country and as long as four years in five countries (Comoros, Ghana, Kenya, Rwanda, and Zimbabwe) (**17**).

Conceptual Frame work

The independent variables can be classified into socio economic, demographic and biological factors while the dependent variable is birth interval length in months. The socio economic and cultural variables that should be considered in terms of their possible association with birth interval include: education; labor force participation; place of residence; ethnicity and religion. Age at first marriage and survival status of the index child are demographic variables while breast feeding and contraceptive use are biological

variables. According to the diagram shown below, women's background variables such as education, ethnicity, labor force participation, religion etc, are important in determining birth interval length directly or indirectly, through the biological variables i.e. by altering the intensity and duration of breast feeding as well as the use of modern and effective contraceptive methods. Demographic variables can also influence birth interval length indirectly through their impact on the biological variables. Diagrammatically it is shown as follows.

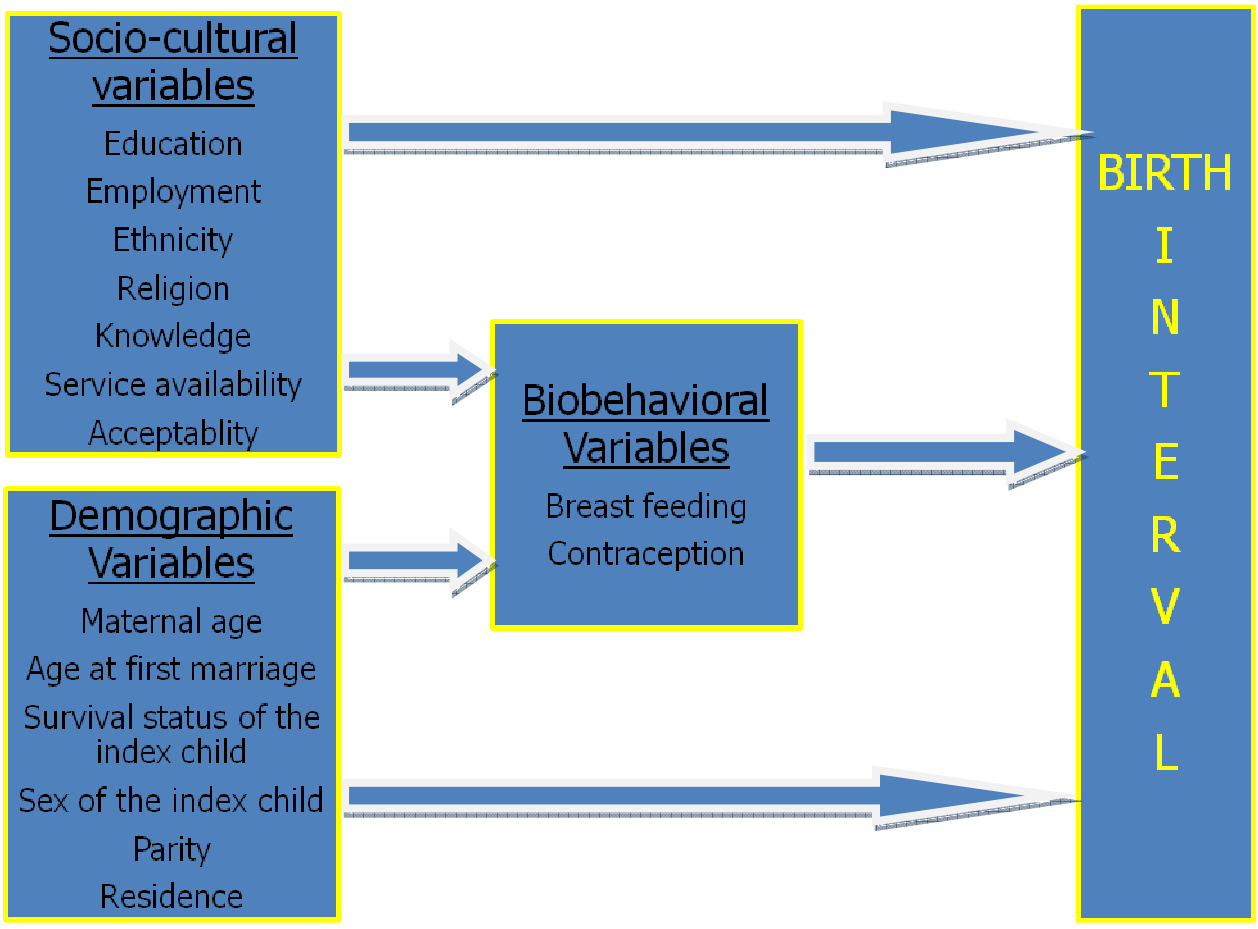

Figure 1Conceptual frame work developed on determinants of birth interval among WCBA in Lemo woreda, Hadiya zone March 2010.

2.2. SIGNIFICANCE OF THE STUDY

Too close pregnancies are the major contributors of maternal and infant mortality particularly in developing countries like Ethiopia. It places a heavy burden over the shoulders of family economy and health condition in particular and nation's economic development in general. Practice of adequate birth interval between successive pregnancies is a proven measure in combating maternal and infant mortality. Therefore, assessing the knowledge and practice of birth

interval among the women of reproductive age is an essential step in targeting the problem associated with short birth interval. Studies have not been conducted on such matters in the area and empirical evidence is very helpful to act on the problem locally.

An analysis of factors that influence birth interval among women will provide planners and policymakers with useful information that could lead to reforms that encourage longer intervals between consecutive births. Such reforms may ultimately decrease the number of children each woman has with subsequent beneficial effects on population and on the health status of mother and child. This study, therefore, aimed at identifying the duration and determinants of inter birth intervals among women of reproductive age in Lemo woreda (Hadiya zone) and will furnish important directions for intervention which help local health planners to critically look at the problem during their planning process.

CHAPTER 3: OBJECTIVES

3.1. GENERAL OBJECTIVE

The general objective of this study is to assess duration and determinants of birth interval among women of child bearing age in Lemo woreda, Hadiya zone, SNNPR, Ethiopia.

3.2. SPECIFIC OBJECTIVES

1) To determine the knowledge level about birth interval among WCBA in Lemo woreda, Hadiya zone.
2) To describe the duration of the interval between the last two successive births among women of child bearing age in Lemo woreda, Hadiya zone.
3) To assess predictors of birth interval among women of child bearing age in Lemo woreda, Hadiya zone.
4) To determine the difference between actual and preferred lengths of birth intervals among women of child bearing age in Lemo woreda, Hadiya zone.

CHAPTER 4: METHODS AND MATERIALS

4.1. STUDY AREA AND PERIOD

Lemo woreda is found in SNNPRs, Hadiya administrative zone at the south of the country. It is located 230km far away from Addis Ababa and 194km from the regional capital city, Hawassa. It is one of the eleven woredas found in the zone. The woreda has 35 rural and 8 urban kebeles with a total population of 203032. It is bounded by Siltie zone in the north, Soro and Gomboro woredas in the west, Anlemo woreda in the east and Kembata zone in the south. It has purely woinedega agro ecological zone. It is situated at 1800-2950 meters above sea level and has an average temperature ranging from 10^{o}c to 24^{o}c. The annual rain fall is 1250 mm per year. More than 95% of the population is engaged in agriculture. There are 46 schools of all types in the woreda. In addition to this, the woreda has 36 health institutions of which 33 are health posts and 3 are health centers. The study was conducted from March 9 to 16 2010.

4.2. STUDY DESIGN

Community based cross sectional study design was employed.

4.3. POPULATION

4.3.1. Source population

The source population for the study is all the women of child bearing age who experienced at least two deliveries and at least the last delivery within the last five years prior to the data collection period.

4.3.2. Study Population

Study population is the representative number of women of child bearing age selected from the source population.

4.4. INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria

Women of child bearing age 15 to 49 years with history of at least two deliveries and at least the last birth within the last five years.

Exclusion criteria

Clients who experienced still birth initiating the interval under consideration were excluded from the study.

4.5. SAMPLE SIZE AND SAMPLING TECHNIQUES

Sample size

The sample size was calculated by using a single population proportion sample size calculation formula considering the following assumptions.

P =50% (assuming proportion of women 15 – 49 years who spaced consecutive births 3 to 5 years)

d = margin of error of 0.05 with 95% confidence level.

Z α/2 = 1.96 (level of significance)

The one population proportion formula used was:

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

$$n = \frac{(1.96)^2 \, (0.5) \, (1-0.5)}{(0.05)^2}$$

n = 384 individuals

Considering the design effect of 2, due to the sampling technique employed, and 10% non-response rate, the final sample size was 844 women of child bearing age.

Sampling Techniques

Stratified multistage sampling technique was employed for the study. The total of 43 kebeles found in the woreda were stratified in to urban and rural kebeles settings using naturally existing strata. There are 8 urban kebeles and 35 rural kebeles. World Health Organization recommends that at least 50 study subjects in the primary sampling units should be there during the design of sampling technique to determine the number of primary sampling units included in the study. Considering the recommendations, the total number of kebeles included in the study was determined by using proportional allocation to size. Hence, two urban and six rural kebeles were randomly selected by using lottery method. Complete census before the actual data collection process was carried out in all the selected kebeles to identify WCBA with history of at least two deliveries and at least the last delivery within the last five years. Each house hold was given consecutive corresponding house number. Households with WCBA who satisfied inclusion

criteria were identified. Finally sampling frame was created for each stratum separately and simple random sampling technique was employed to select the study subjects. The number of study subjects from each stratum was determined using proportional to size allocation.

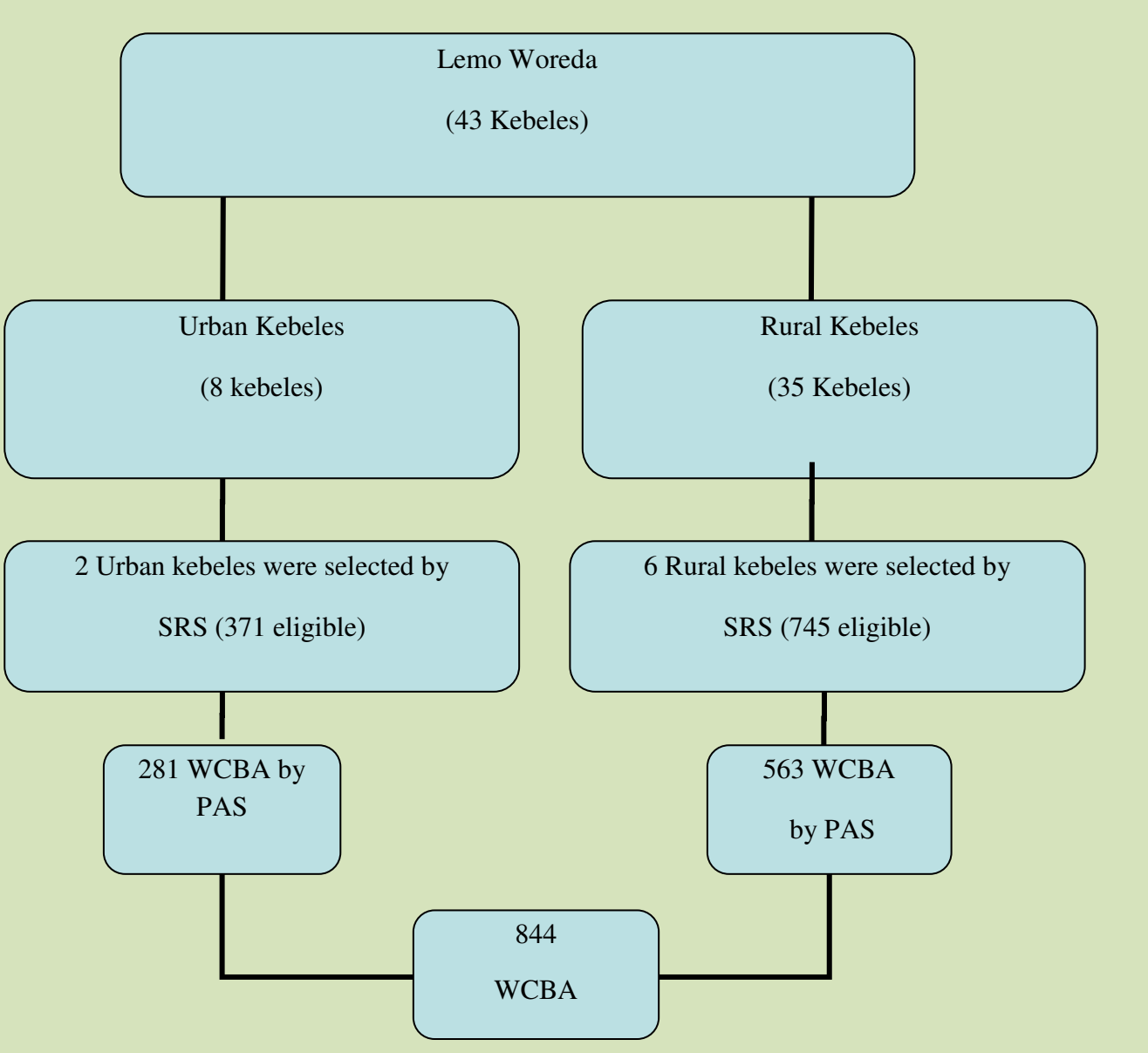

Figure 2 Sampling techniques employed to select study subjects for the study on duration and determinants of inter birth interval among WCBA in Lemo woreda, Hadiya zone March 2010.

4.6. DATA COLLECTION TECHNIQUES AND INSTRUMENT

4.6.1. Study Variables

Dependent variable

The dependent variable is the birth interval length in months.

Independent variables

The independent variables were classified into socio economic, demographic and bio-behavioral factors.

Socio economic and cultural variables: education, labor force participation, ethnicity, religion, knowledge, service availability, acceptability and wealth index.

Demographic variables: maternal age, age at first marriage, the survival status of the index child, sex of the index child, parity and place of residence

Bio-behavioral variables: breast feeding and contraceptive use.

4.6.2. Data Collection Instrument

Data were collected by using structured questionnaire adapted from different literatures and modified according to the local context by the investigator. The questionnaire were translated first to Hadiyigna (the local language) to make data collection process simple and back translated to English language to check its consistency.

4.6.3. Data collection Process

Data were gathered through interviewer administered technique using translated and pretested structured questionnaire. Data were collected by trained female data collectors whose mother tongue is Hadiyigna and high school complete and above. Supportive supervision was conducted during the entire data collection period by the investigator.

4.7. OPERATIONAL/ NOMINAL DEFINITION

1. Inter birth interval: the period between two consecutive live births, from birthdates to birthdates (**16**).
2. Short birth interval: the birth interval less than 3 years between two successive births (**8**).
3. Optimum birth interval: the birth interval of 3 to 5 years between two successive births (**8**).
4. Long birth interval: the birth interval greater than 5 years between two successive births (**8**).
5. Inter-pregnancy interval can be converted to birth interval by adding 9 months, e.g., a 6 month inter-pregnancy interval is the approximate equivalent of a 15 month birth interval (**10**)
6. The proximate (direct) determinants of fertility refer to the behavioral and biological mechanisms by which fertility is reduced below its biological maximum.
7. Distal determinants: socio-cultural factors which affect fertility and/or birth interval indirectly through affecting the bio-behavioral factors (**3**)
8. Index Child:- the child initiating the interval under consideration (**6**)

9. Duration of breastfeeding: the entire period during which the child is fed on breast milk or without supplements (liquid or solid) (**6**).
10. Post partum Amenorrhea: period from delivery to the onset of first menstruation (**6**).
11. Fecundity: is the monthly probability of conception (**6**).
12. Ultimate child: the last child in birth order (**6**)
13. Abortion : the termination of pregnancy before the age of viability of the fetus (usually before the age of 28weeks of gestation)
14. Sterility: being infertile or incapable of becoming pregnant
15. Postpartum infecundability: the inability to conceive immediately after delivery in post partum period due to the natural effect of pregnancy and child bearing.
16. Menstruating interval: the interval between the initiation of menses after birth and conception of a new pregnancy (**2**).
17. Period of gestation: time period elapsed from conception to delivery or the entire period of pregnancy.
18. Maternal depletion syndrome: a condition by which short birth intervals do not allow a mother enough time to restore her nutritional reserves after childbirth and lactation (**16**)
19. Knowledgeable: those respondents who score at least 60% of the knowledge questions were considered knowledgeable. To get in to this category the respondent should have answered the compulsory question (q202) correctly, which is duration of optimal birth spacing.
20. The Wealth Index- is a composite measure of the cumulative living standard of a household. The wealth index is calculated using easy-to-collect data on a household's ownership of selected assets, such as television and radio, materials used for housing construction and types of water access and sanitation facilities. Generated with a statistical procedure known as principal components analysis, the wealth index places individual households on a continuous scale of relative wealth. Each household asset for which information is collected is assigned a weight or factor score generated through principal components analysis. The resulting asset scores are standardized in relation to a standard normal distribution with a mean of zero and a standard deviation of one. These standardized scores are then used to create the break points that define wealth quartiles as: Lowest, Second, Third, and Highest.

4.8. DATA ANALYSIS

Data were coded, entered and cleaned by using SPSS version 16 and analyzed by using descriptive, univariate and multivariate techniques. Ninety five % confidence level was used in identifying important determinant and predictive variables of needed dependant outcome variable. Descriptive analysis of the duration of birth interval and knowledge level of WCBA on the duration of birth interval was carried out by univariate analysis. Bivariate analysis of the birth interval with some selected independent variables was done to see their differentials. The presence of significant association between dependent and independent variables was also determined. Multiple logistic regression analysis was done to see which of the variables, with significant association during bivariate analysis, were important predictors of the birth interval length. Finally, comparison of actual and preferred birth interval lengths was done using one sample T test statistic.

Wealth index analysis: initially**,** reliability test was performed using the socioeconomic variables involved in measuring the wealth of the households and Chronbach's alpha was calculated to be 0.698. The variables which were employed to compute the alpha value were entered in to the principal component analysis. These variables include the presence of electricity, watch, radio or tape, TV, mobile and fixed phone, refrigerator, table, chair, stove, bed, kitchen facility, farm land facility and human waste disposal system. At the end of the principal component analysis, the wealth index was obtained as a continuous scale of relative wealth. Finally, quartiles of the wealth index were created to see the differences in practice of the birth interval length.

4.9. DATA QUALITY CONTROL

To ensure the quality of data to be gathered from the study subjects, a range of mechanisms were employed to address major areas of bias introduction during the data collection period. First, the questionnaire were pre- tested by taking 5% (42women) of the sample size on similar but different setting and necessary modification in the questionnaire was made like category formation and sequencing of questions. A three days intensive training with practical examples was given for data collectors and supervisors on how to gather the appropriate information, procedures of data collection techniques and the whole contents of the questionnaire. The data were collected by 16 trained female data collectors using a standard, structured and pretested questionnaire prepared in Hadiyigna. A day to day on site supervision was carried out during the whole period of data collection. At the end of each day, the questionnaire were checked for completeness, accuracy and consistency by the investigator and corrective

discussions were under taken with all the data collectors. Data were cleaned and edited after it was entered in to the SPSS soft ware.

4.10. ETHICAL CONSIDERATIONS

Prior to data collection, appropriate ethical clearance was obtained from the ethical clearance committee of the Jimma University. Formal letter of permission was produced from administrative bodies of the zone to the woreda and then to respective kebeles. Verbal permission from kebele administrators was obtained. Confidentiality was assured for the information provided since the name of the information provider was not stated on the questionnaire rather coding system was applied. Finally verbal consent was requested from every study participant included in the study during data collection time after explaining the objectives of the study.

4.11. DISSEMINATION PLAN

The findings will be presented to the Jimma University scientific community and submitted to the department of population and family health and college of public health and medical sciences. The findings will also be communicated to the local health planners and other relevant stake holders at zonal and woreda level in the area to enable them take recommendations in to consideration during their planning process. It can also be communicated to health planners and managers at regional level. Publications in peer reviewed, national or international journals will also be considered.

LIMITATIONS OF THE STUDY

1. The inherent nature of cross sectional study design does not show cause effect relationship.
2. Poor reporting of births and their exact intervals might have hampered the quality of the data gathered.
3. Lack of information on biological variable like frequency of sexual intercourse hindered the study to examine the effect of this variable on birth spacing practices.
4. Birth interval measurement may miss abortions, thus making intervals seem longer on average than they actually are.
5. Measuring preferred length of birth interval was based on only from the perspective of women and it did not include husbands' preferences because this study did not incorporate men.

CHAPTER5. RESULTS

Socio-demographic characteristics

The total size of the study units who were actual respondents during the data collection period in this study was 811. Therefore, the response rate of the study was calculated to be 96%. The median age of the study subjects is found to be 30 years with standard deviation of 5.95 and the median age at marriage is 18 years with standard deviation of 3.47.

Most of the respondents, 777(95.8%), are currently married. Among the total respondents, 563(69.4%) are Protestant Christians, 121(14.9%) are Orthodox Christians and the rest constitute less than 10% each. The three major ethnic groups of the study subjects are Hadiya 678 (83.6%), Amhara 44 (5.4%) and Kembata 42(5.2%). Majority of the mothers, 727(89.6%), are house wives in their occupation (Table 1).

Table 1 Socio-demographic characteristics of the respondents in Lemo woreda Hadiya zone, Ethiopia, March 2010

Back ground variable	Categories	Frequency	%	Remark
Residence	Rural	552	68.1	
	Urban	259	31.9	
Marital status	Married	777	95.8	
	Others	34	4.2	
Religion	Protestant	563	69.4	
	Orthodox	121	14.9	
	Islam	56	6.9	
	Others	71	8.8	
Ethnicity	Hadiya	678	83.6	
	Amhara	44	5.4	
	Kembata	42	5.2	
	Others	47	5.8	
Maternal education	No education	207	25.5	
	Primary	444	54.8	
	Secondary & above	160	19.7	

Husband's education	No education	82	10.1	
	Primary	356	43.9	
	Secondary & above	339	41.8	
Maternal occupation	House wife	727	89.6	
	Employee	24	3.0	
	Others	60	7.5	
Husband's occupation	Farmer	430	53.0	
	Employee	147	18.1	
	Merchant	116	14.3	
	Daily worker	69	8.5	
	Others	15	1.8	

The maternal age has been indicated in the following figure in five years category with its relative proportion.

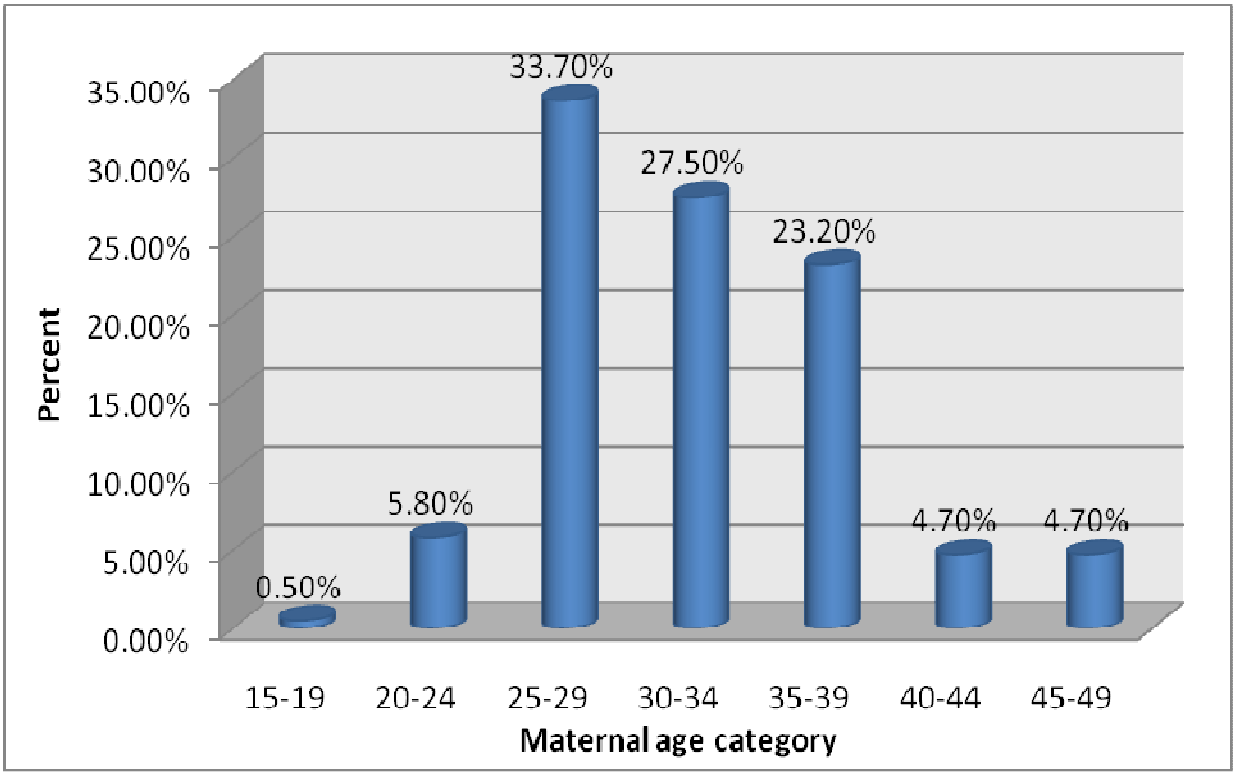

Figure 3 Percent distribution of respondents' age category in Lemo woreda Hadiya zone, Ethiopia, March 2010

Birth spacing knowledge and practices

The actual birth interval among the respondents has been tri-chotomized based on the WHO recommendations in to less than 36 months, 36 to 60 months and above 60 months categories. Accordingly, majority, 467(57.6%), of the study subjects spaced births less than 36 months. Two hundred ninety (35.8%) subjects spaced births 36 to 60 months apart and the rest spaced for greater than 60 months (fig. 4).

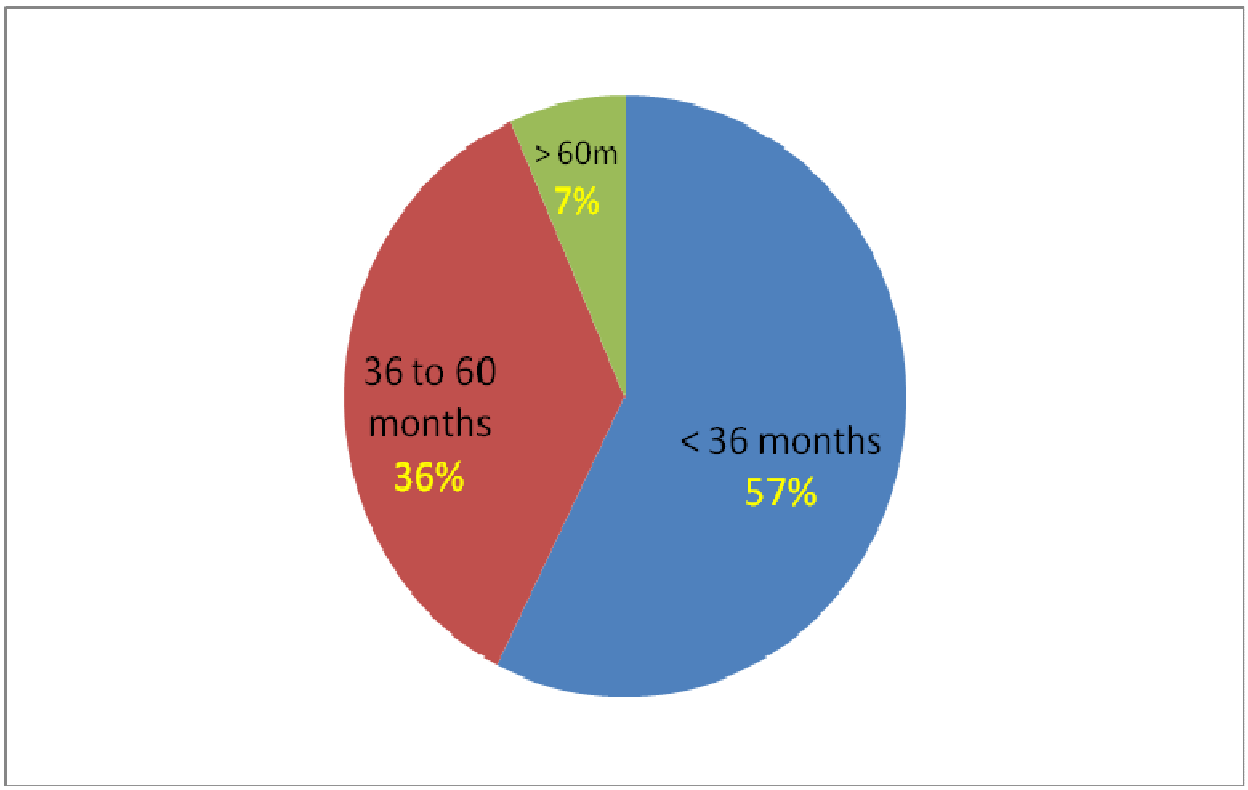

Figure 4 proportions of mothers with their respective actual birth interval practice in Lemo woreda Hadiya zone, Ethiopia, March 2010

The median length or duration of actual birth interval is 33 months (SD+/-16.71) whereas; the median length of preferred birth interval is 38 months (SD+/_19.14) for the last two successive births.

Among the total respondents, 762 (94%) have had information on optimum birth spacing practices between live births. Two hundred forty (31.5%) of the respondents, who have had the information, reported the optimum birth interval between two successive births to be below 36 months and 454(59.6%) of them reported it to be between 36 and 60 months. The rest are in the category greater than 60 months.

The knowledge level of the respondents was assessed for the advantages of practicing optimal birth spacing and the disadvantages of practicing short birth intervals both for the mother and the child. The results showed that almost all, 806 (99.4%) of the respondents, reported the presence of health advantages of practicing optimal birth interval and 807 (99.5%) reported the presence of health disadvantages of practicing short birth interval.

Among those who reported the presence of health advantages of optimal birth interval, 757 (93.3%) of them claimed that both mother and child are benefited from practicing optimal birth interval between two successive births. But higher number of respondents, 804 (99.8%), witnessed the presence of health advantages to the mother when compared to 757 (94%) who witnessed the presence of health advantages to the child.

Among those who reported the presence of health disadvantages of short birth interval, 747 (92.1%) claimed that both the mother and the child are disadvantageous from short birth interval practices between two successive births. But higher number of respondents, 806 (99.9%), witnessed disadvantages to the mother when compared to 749 (92.8%) who witnessed that child is disadvantageous.

When desire to have more child during conception of the last child was asked, 632 (77.9%) of the respondents had the desire to have the last child and the rest do not at all. Of those who wanted more children, 448 (70.9%) wanted to become pregnant then and 184 (29.1%) desired to postpone the pregnancy to sometimes later. Some reasons were mentioned for having the child prior to the time they would prefer. These include, problems associated with contraceptive usage 140 (17.3%), not using modern FP methods at all 39 (4.8%) and others 5 (0.6%). Among the FP users (427) between the last two pregnancies, 132 (30.9%) had become pregnant prior to the time they desired it. Forty eight (11.2%) of the users became pregnant while wanting to limit child bearing.

Modern Contraceptives practices

Among those who have information about modern contraceptives (774), injectables are the most well known, 733 (94.7%), methods of modern contraceptives followed by pills 724 (93.5%). Implants, male condom and IUCD were known in 66, 64.1 and 50.6% of the cases respectively. Generally, among 774 respondents who have been informed about modern contraceptives, 427 (55.2%) were users before the conception of the last child.

Government health facilities like health posts, health centers and hospital were the major sources of modern contraceptives for the users in 35, 30.3 and 33.8% of the cases respectively. Health

posts were the chief source for rural residents whereas, the nearby hospital was the main source for urban residents. Health centers serve nearly equal proportion of urban and rural residents.

Among the common types of modern contraceptives, injectables, 336 (78.7%), are the most popular methods used by the respondents followed by pills, 74 (17.3%). Two hundred fifty five (31.4%) of the respondents have never used any modern contraceptives due to different reasons. Among the reasons cited by the respondents, the desire for more child 105 (41.2%) and health conditions associated with its usage 75 (29.4%) are the two major reasons. Moral and cultural reasons, religious reasons, lack of information and others are also contributing factors for the non use in rest of the cases.

Breast feeding practices

Nearly all mothers, 806 (99.4%), have breast fed their previous to the last child. Of these, majority, 540 (67%), of the respondents have breast fed their babies for 24 months and above. The child being old enough and the occurrence of next pregnancy were the two main reasons for the complete cessation of breast feeding practice and account 451 (55.6%) and 274 (33.8%) cases respectively.

Birth interval differentials

Maternal Education

The median length of actual birth interval among women with no education is relatively higher (33 months) as compared to those with primary education (32 months). But mothers with secondary and above education level have the highest (34.5 months) median length of birth interval among the three maternal education levels.

Higher proportions, 57% of mothers with no education and 59% with primary education, had birth interval length less than 3 years as compared to those with secondary and above education (52%). On the other hand, more mothers with secondary and above education (48%) have been practicing birth interval length greater than 3 years when compared to those with no education (44%) and primary education (40%).

Inter-birth intervals by levels of partner's education were also examined. Accordingly, 57% of intervals less than three years occurred among women whose partners have secondary and above education compared to 48% among those with partners with no education. But women whose partners have secondary and above education (57%) practice birth interval length less than 3 years less as compared to those whose partners have primary education (61%).

Additionally, higher birth interval lengths were observed for mothers with educational level of at least primary when compared to birth interval lengths among mothers whose husbands have similar educational attainment (fig.5).

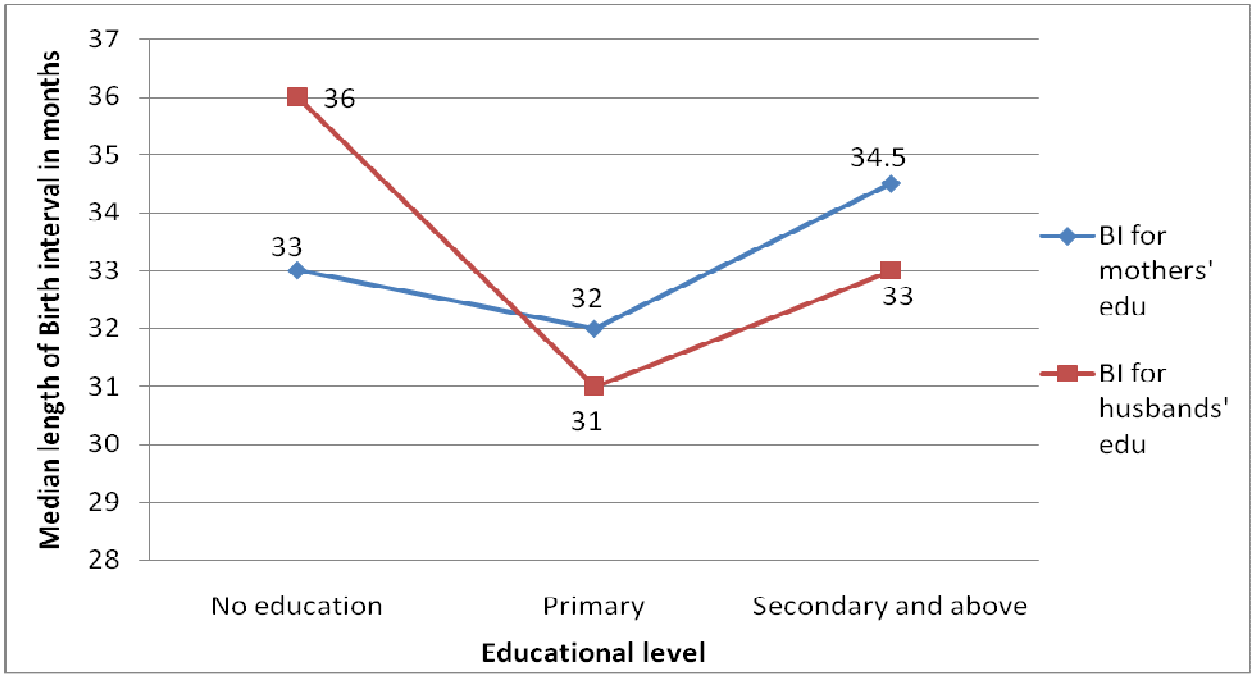

Figure 5 the median lengths of birth intervals in months by both partners' educational levels in Lemo woreda Hadiya zone, Ethiopia, March 2010

Labor Force Participation/employment

The median length of actual birth interval practice among women who are working outside home is 33 months and it is the same for women whose occupation is house wife. But lower proportion, 55%, of working women outside had birth interval length less than 3 years as compared to those who are not employed (house wives), 58%. Besides this, higher proportion (45%) of women who work outside had birth intervals of more than 3 years as compared to those who are not working outside, 42%. When husbands' occupation is considered in the analysis of birth interval, women whose husbands are employees have greater length of birth interval, 36 months, as compared to women whose husbands are engaged in, for example, agriculture (32 months).

Residence

The median length of birth interval among women residents of urban setting is 36 months whereas, among those of rural setting is 32 months i.e. in average 4 months longer between births among urban women as compared to rural. More specifically, rural women are 2.66 times more likely to practice birth interval length less than 3 years as compared to their urban counterparts. Moreover, higher proportion (39.4%) of urban women had birth interval length of 3 to 5 years when compared to their rural counterparts (34%).

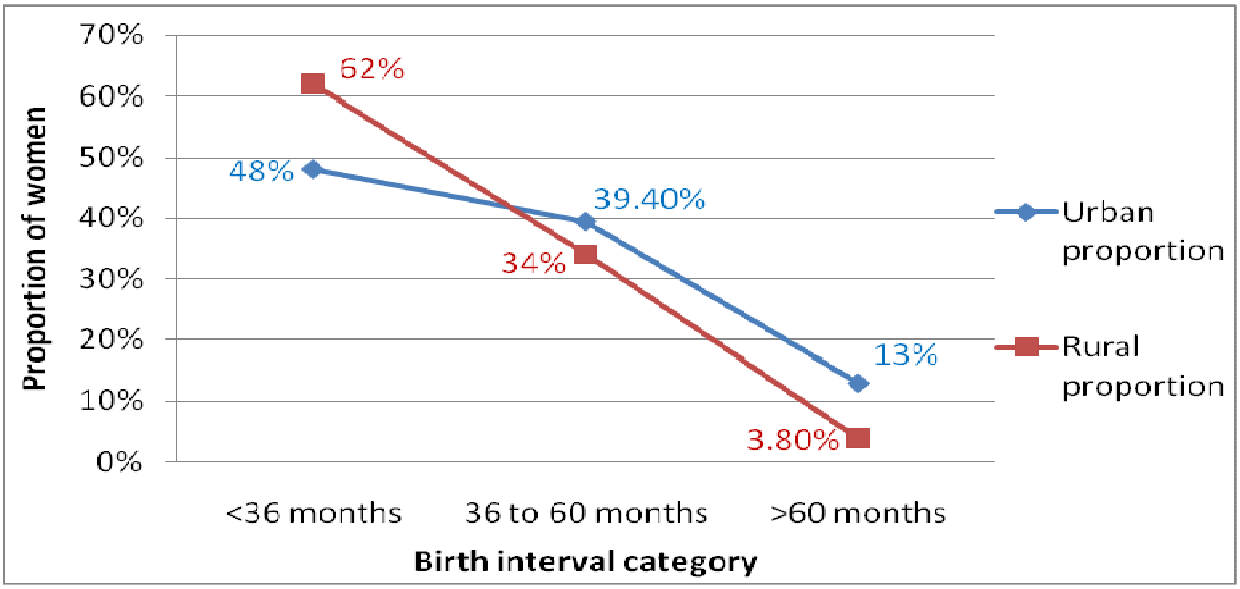

Figure 6 Proportion of women in different birth interval category by residence in Lemo woreda Hadiya zone, Ethiopia, March 2010

Maternal age

More proportion of younger women had birth interval length less than three years than those of older women. On the other hand younger women practice birth interval length between 3 to 5 years and above less when compared to those of older women. Interestingly, as the mothers' age becomes older and older the proportion of mothers who practice short birth interval length decreases and those who practice longer birth interval length increases.

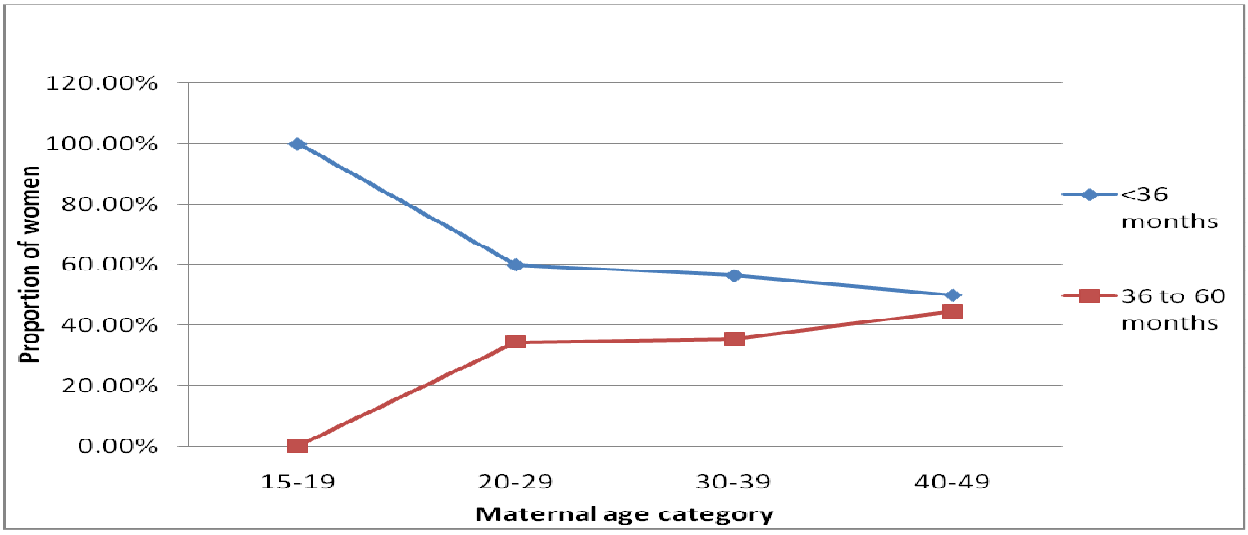

Figure 7 Proportion of women in different birth interval category by maternal age category in Lemo woreda Hadiya zone, Ethiopia, March 2010

The median number of months since a preceding birth increases with age, from a low of 30 months among mothers age 15-19 to a high of 35.5 months among maternal age 40-49 (fig. 8).

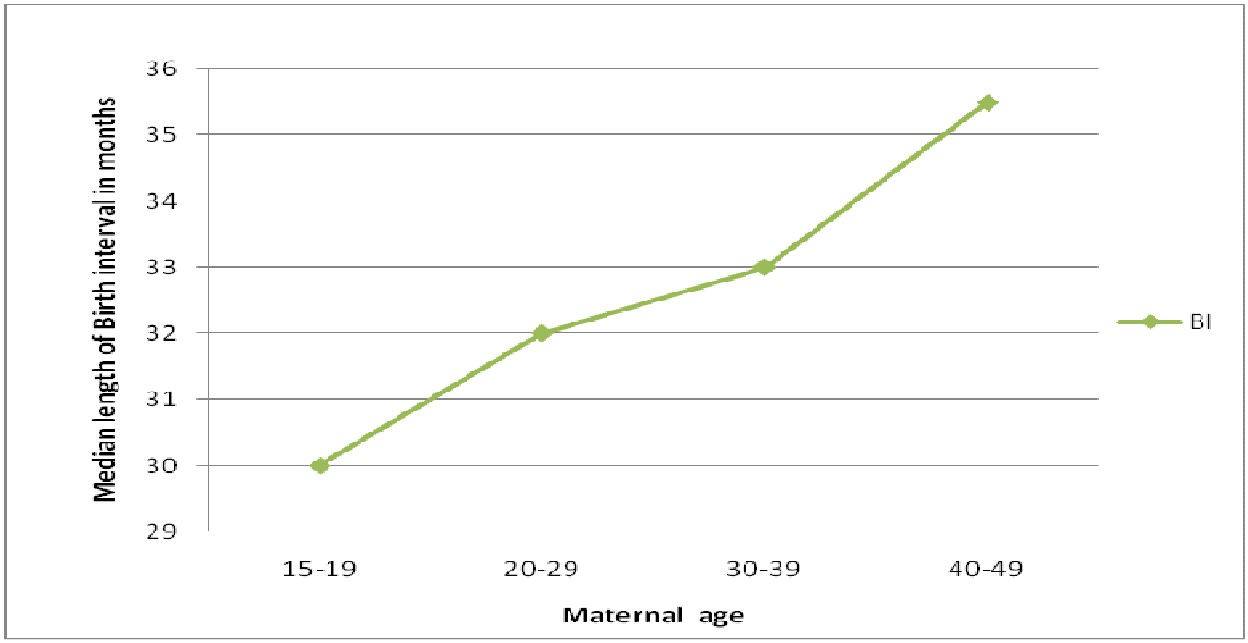

Figure 8 the pattern of median length of actual birth interval by maternal age among the respondents in Lemo woreda Hadiya zone, Ethiopia, March 2010

Age at first Marriage

Women who had married before the age of 18 constitute 27.6%.Those who had married at age 18 or more have relatively shorter (32 months) median birth interval length as compared to those who had married at age less than 18 years (33 months).

Survival Status of the Index Child

The median birth interval length when the child preceding the birth interval is surviving is 33 months. On the other hand, the birth interval length is 20.5 months when the child preceding the birth interval is not alive.

Sex of preceding child

The sex of the child preceding the birth interval has brought variation in birth interval lengths. Generally, the median birth interval length is 32 months when the sex of the preceding child is male and 33 months when female was born. But more specifically, birth interval length of less than 3 years follows in 59.8% of the cases when the sex of the preceding child is female and 55% of the cases when the sex is male.

Parity

The birth interval length varies when parity shifts based on the given categories. For example, the median duration of birth interval length for mothers' with two or less children is 30 months whereas, for those mothers with three to four and above four children is 34 and 33 months respectively. Sixty three % of mothers with few children less than or equal to two have had short intervals less than 3 years. Fifty four and fifty eight % of mothers who have 3 to 4 and greater than or equal to five children respectively have short birth interval length less than 3 years (fig. 9).

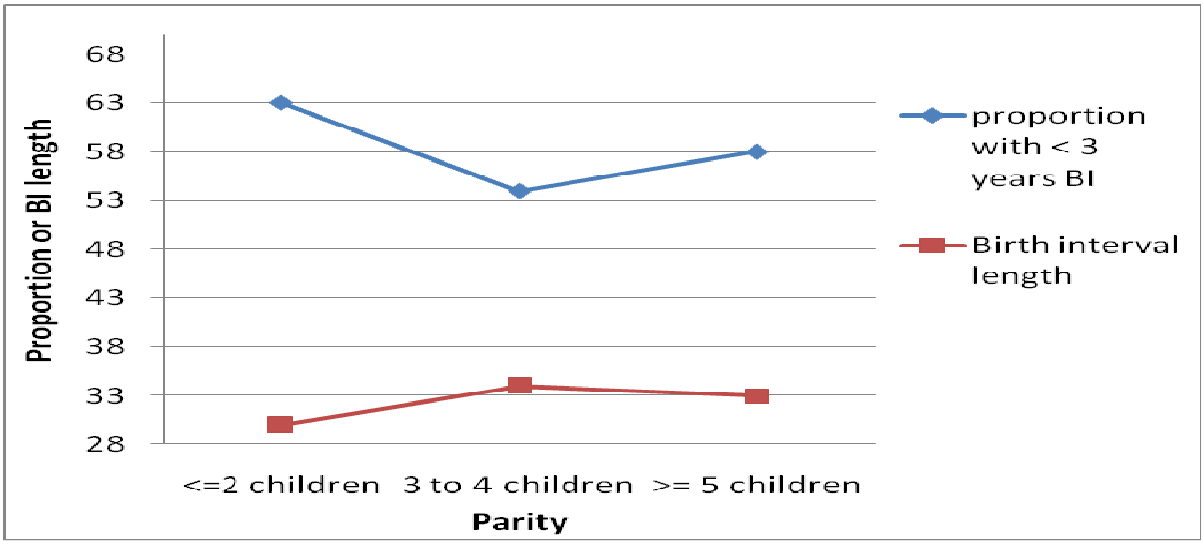

Figure 9 Proportion of women with short birth interval and birth interval length by parity in Lemo woreda Hadiya zone, Ethiopia, March 2010

Duration of breastfeeding

Among mothers who have birth interval length less than 3 years, the proportion is higher among mothers who breast fed their babies 1 to 6 months (70.6%) as compared to those breast fed 13 to 24 (65.5%) and above 24 months (20.7%). Generally, the proportion of mothers who practice short birth interval length decreased from 70.6% to 20.7 percent as one goes from duration of 1 to 6 to greater than 24 months. On the other hand, among those who have had birth interval length greater than 3 years, proportion of mothers' increased from 29.4% to 79.3% as we go from 1 to 6 to greater than 24 months of breast feeding.

Breast feeding till six months reduced short birth intervals practices. For example, women who did not nurse practice short interval length more (80%) when compared to those who had nursed between one and six months,70.6% (fig. 10).

Forty eight percent of children born before a succeeding interval of more than 35 months have been breastfed longer (> 2years) than those who were born before a succeeding interval of less than 19 months (0%).

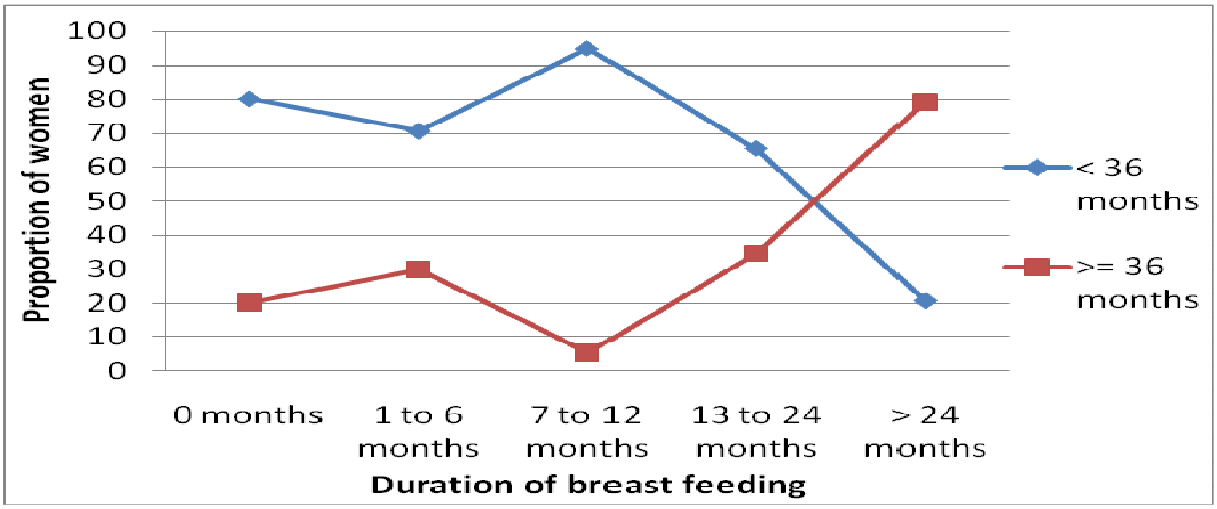

Figure 10 the proportion of mothers practicing the birth intervals by duration of breast feeding in Lemo woreda Hadiya zone, Ethiopia, March 2010

Modern Contraceptive Use

Contraceptive usage between the two pregnancies has been determined. Consequently, the effect of contraception on duration of birth interval is seen variably among users and none users. For example, the median length of birth interval was calculated to be 35 and 30 months among contraceptive users and non users respectively. Women who did not use modern contraceptives are 1.56 times more likely to practice short birth interval length as compared to those who used modern contraceptives and it is statistically significant.

Wealth index

The median birth interval length varies within the different wealth categories. The length varies from the lowest of 28 months to highest of 36 months when we shift from lowest quartile to highest quartile (fig. 11).

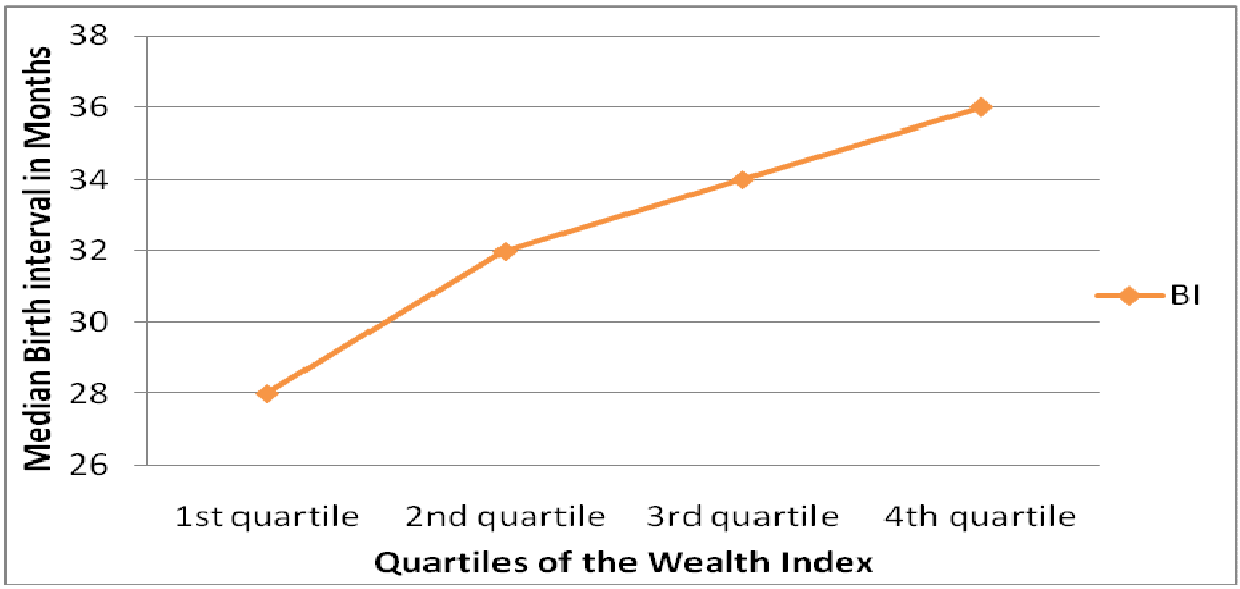

Figure 11 the pattern of median length of actual birth interval by quartiles of the wealth index among the respondents in Lemo woreda Hadiya zone, Ethiopia, March 2010

The proportion of mothers who have had birth interval length less than 3 years decreases from 32 to 19% when we shift from the lowest quartile to the highest quartile. On the other hand, the proportion increases for 3 to 5 years birth interval length from 19 to 31% as we proceed from lowest to highest quartile. Women in the highest wealth quartile are 1.97 times more likely to practice birth interval length of 3 to 5 years as compared to women in lowest wealth quartile and this is statistically significant.

Predictors of the birth interval length

Bivariate chi-square test for the dependent and other relevant explanatory variables was done and variables like residence, religion, ethnicity, husband's occupation, duration of BF in months, use of modern contraceptives and wealth index showed significant association at 0.05 level with birth interval length less than 3 years (Table 2). Explanatory variables like, survival status of the index child, duration of breast feeding and wealth index were found to be significantly associated with practice of birth interval length of 3 to 5 years (Table 3).

Table 2 Chi-square test results for short birth interval length and some explanatory variables in Lemo woreda Hadiya zone, Ethiopia, March 2010

Variables	**Chi-square**	**df**	**p-value**
Residence	14.68	1	0.00
Maternal age in years	37.18	28	0.12
Marital status	0.31	1	0.58
Maternal age at marriage	18.61	16	0.29
Religion	8.89	3	0.03
Ethnicity	13.98	5	0.02
Maternal education	4.32	5	0.51
Husbands education	5.44	2	0.07
Maternal occupation	11.10	6	0.09
Parity	2.89	2	0.24
Husbands' occupation	14.30	5	0.01
Information about OBS	1.58	1	0.21
Knowledge on duration of OBS	0.21	1	0.65
Sex of the index child	1.66	1	0.20
Survival status of the index child	1.51	1	0.22
Duration of BF	2.04	3	0.00
Information on MC	0.62	1	0.43
Use of MC	16.38	2	0.00
Wealth index	28.50	3	0.00

Table 3 Chi-square test results for optimum birth interval length and some explanatory variables in Lemo woreda Hadiya zone, Ethiopia, March 2010

Variables	**Chi-square**	**df**	**p-value**
Residence	2.18	1	0.14
Maternal age in years	35.00	28	0.17
Marital status	1.08	1	0.30
Maternal age at marriage	18.53	16	0.29
Religion	3.93	3	0.27
Ethnicity	2.12	5	0.83
Maternal education	3.50	5	0.62
Husbands' education	0.94	2	0.62
Maternal occupation	10.44	6	0.11
Parity	3.94	2	0.14
Husbands' occupation	4.31	5	0.51
Information about OBS	0.21	1	0.65
Knowledge on duration of OBS	0.06	1	0.81
Sex of the index child	1.34	1	0.25
Survival status of the index child	3.99	1	0.05
Duration of BF	1.70	3	0.00
Information on MC	0.07	1	0.79
Use of MC	4.36	2	0.11
Wealth index	15.20	3	0.00

Table 4 Multivariate logistic regression of short birth interval length with some important explanatory variables in Lemo woreda Hadiya zone, Ethiopia, March 2010

Predictors	B	P-value	Adjusted. OR	95.0% C.I.	
				Lower	Upper
Residence					
Rural	0.98	0.00	2.66	1.39	5.08
Husbands' occupation					
Employee			1.00		
Merchant	0.11	0.73	1.12	0.60	2.06
Student	-0.69	0.04	0.50	0.26	0.99
Farmer	-0.21	0.58	0.81	0.38	1.72
Daily worker	-2.01	0.01	0.13	0.03	0.61
Breast feeding					
0 – 6 months			1.00		
7 – 12 months	2.17	0.01	8.78	1.73	44.66
13 – 23 months	1.52	0.04	4.56	1.11	18.69
24 and above	-1.40	0.03	0.25	0.07	0.89
Contraceptive use					
No	0.44	0.01	1.56	1.10	2.21
Wealth index					
Lowest quartile			1.00		
Second quartile	-0.28	0.28	0.75	0.45	1.26
Third quartile	-0.38	0.13	0.68	0.42	1.12
Highest quartile	-0.72	0.04	0.49	0.25	0.96

Table 5 Multivariate logistic regression of optimum birth interval length with some important explanatory variables in Lemo woreda Hadiya zone, Ethiopia, March 2010

	B	P-value	Adjusted OR	95.0% C.I.	
				Lower	Upper
Breast feeding					
0 – 6 months			1.00		
7 – 12 months	-0.25	0.83	0.78	0.08	7.27
13 – 23 months	-0.43	0.70	0.65	0.07	5.76
24 and above	2.67	0.01	14.46	1.86	112.22
Wealth index					
Lowest quartile			1.00		
Second quartile	0.29	0.24	1.34	0.82	2.17
Third quartile	0.27	0.25	1.31	0.83	2.07
Highest quartile	0.68	0.00	1.97	1.24	3.15
Survival status of the index child					
Dead	-1.56	0.17	0.21	0.02	1.93

In the multivariate logistic regression analysis, explanatory variables such as rural residence, being student and daily worker in husbands' occupation, breast feeding for 7 to 12, 13 to 23 and 24 and above months, non use of modern contraceptives and highest wealth quartile were found to be significantly associated with practice of short birth interval length. Therefore, these explanatory variables are important predictors of short birth interval length. On the other hand, breast feeding for 24 and above months and highest quartile of the wealth index showed significant association with optimum birth interval length and considered important predictors of optimum birth interval length.

Difference between actual and preferred birth interval

Two separate means were compared from the two observations called actual birth interval and preferred length of birth interval among the study subjects. To test whether the difference between the two means is statistically significant or not, the statistical method used for the analysis is one samples T test. The test results are displayed in the table 6 below.

Table 6 Comparison between actual and preferred birth interval length in Lemo woreda Hadiya zone, Ethiopia, March 2010

	Test Value = 42.48 (mean of the preferred birth interval)					
	t	df	P-value	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Actual birth interval in months	-12.37	810	.000	-7.26	-8.41	-6.10

The difference between the means is found to be statistically significant at 810 degrees of freedom with p value of 0.000 at the given confidence interval. This shows that the mean preferred birth interval is significantly greater than the mean actual birth interval length. This is in disagreement with the null hypothesis of no difference.

CHAPTER6. DISCUSSION

Sixty percent of the respondents were knowledgeable in this study regarding birth spacing practices. When we look at the actual birth spacing practices among the knowledgeable group of women, only 36% have had actual birth interval length between 3 to 5 years. When birth spacing practice of 3 to 5 years is compared between the knowledgeable and the other group, the proportion is slightly higher (36%) among knowledgeable women when compared to the other group (35%). The practice of the median birth interval length is on average one month longer for knowledgeable group as compared to non knowledgeable group (33 months versus 32 months). The possible explanations for these observed differences in birth spacing practices between the two groups could be due to relatively high rate of contraceptive use among knowledgeable group (54%) as compared to non-knowledgeable group (51%). Knowledge of birth spacing practices on the duration of birth interval and contraceptive use among the respondents might have also contributed for the difference.

Population report of 2002 in 55 sub-Saharan Africa showed that 57% of WCBA practiced birth interval lengths less than 3 years. The rest 43% had more than 3 years of birth interval length (**16**). Findings of this study exactly supports this situation in which case 57% of the respondents had less than 3 years and 43% had greater than 3 years of birth interval length. Only 36% of the respondents in this study are currently practicing optimal birth interval length. This is far lower relative to higher proportion (60%) of the respondents who were considered knowledgeable. Regarding the median length of actual birth interval, the present study revealed it to be 33 months (SD+/-16.71). This is in line with the findings of most of the studies done elsewhere (**1, 16, 17**).

Education is considered to be one of the most important socio economic factors having an indirect influence on birth interval length through its impact on one or more of the bio-behavioral variables such as contraceptive use, BF practice, frequency of sexual intercourse and sexual abstinence **(8).** In 38 of 51 countries with DHS data, women with no education were more likely than women with education to space births less than 3 years **(16).** This is in line with what is in the current study, where mothers with no education (57%) and primary education (59%) practice birth interval length less than 3 years more when compared to those with secondary and above education (52%). Concerning partner's education in present study, 57% of interval lengths less than three years occurred among women whose partners have secondary and above education as compared to 48% among those with partners with no education. This is in line with the study conducted in Mozambique (**8**).

Female participation in the labor force has often been considered one of the means of promoting the use of contraception and thereby indirectly to reduce fertility (**8).** Comparable results are obtained in present study like findings in Mozambique and the DHS data analysis in sub-Saharan Africa (**8, 16**). Lower proportion (55%) of working women outside the home had birth intervals less than 3 years as compared to those who are not working outside 58%.

There are some urban-rural differentials with rural women less likely than urban women to have intervals over five years **(8)**. In 51 of 55 countries surveyed by the DHS, women who live in rural areas are more likely than women in urban areas to have birth intervals shorter than 3 years (**16**). Equivalently in this study, rural women are 2.78 times more likely to practice birth interval length less than 3 years as compared to their urban counterparts. In the 2005 EDHS data, urban women have longer intervals between births (39.1 months) compared with rural women (33.6 months) (**1**). Comparable findings are evident in this study, where urban women have 4 months longer median birth interval length than rural women, (36 versus 32). Moreover, higher proportion (39.4%) of urban women in present study practice birth intervals 3 to 5 years and over five years as compared to rural women (34%) and this is similar with the situation in Mozambique. These variations by residence could be attributed to differences in social services like urban women have better access to education and employment opportunities. On the other hand, the degree of being informed about OBS practices in urban residence is 3.56 (CI: 1.496, 8.480) times higher as compared to those living in rural areas ($x^2 = 9.3$, p= 0.002).

This study revealed that, younger women practice interval less than three years more than older women. In other words, lower proportion of younger women practice birth interval between 3 to 5 years and above as compared to older women. These findings match with other studies conducted elsewhere (**8, 16**). The EDHS 2005 has put an increment of the median number of months since preceding birth from a low of 26.1 months among mothers age 15-19 to a high of 38.8 months among mothers age 40-49 (**1**). Similarly, this study has also identified an increment of median number of months since a preceding birth with age, from a low of 30 months among mothers age 15-19 to a high of 35.5 months among mothers age 40-49. Interestingly, as the mothers' age becomes older and older the proportion of mothers who practice short birth interval decreases and those who practice longer birth interval increases. This variation could be due to younger women being more likely to have children for a variety of reasons such as greater fecundity and being early on in the family building process.

Unlike studies conducted in other places (**6**), women who had married at age 18 or more, in this study, have relatively shorter (32 months) median birth interval length as compared to those who had married at age less than 18 years (33 months). Different literatures show that, early marriage provides more years in which conception could occur in addition to its indirect effect through limited schooling and employment opportunities. But having more years for conception could not always guarantee the practice of short birth interval but it could also provide enough fertility periods to plan the desired family size in a relaxed fashion. In this study, exposure to information as well as knowledge on optimum birth spacing practices is better among those who had married before age 18 than among those who had married at age 18 and above. Probably this could have brought the observed difference in birth interval length between both groups.

Women are more likely to have their next child within 3 years if the previous child dies i.e. the longer the previous child survives, the less the effect on the subsequent birth interval **(16).** The median birth interval in present study is more than twelve months shorter for children whose previous sibling is dead than alive (20.5 months and 33 months, respectively). This is supportive with the findings in EDHS 2005 where the median birth interval is more than eight months shorter for children whose previous sibling is dead than alive (26.1 months and 34.6 months, respectively) (**1**). The difference could be related to the desire of parents to replace a dead child sooner than if the child survives particularly when a child dies within the first year of life and, as well as to the loss of the fertility-delaying effects of BF.

In the study conducted in Mozambique, the sex of the previous child does not seem to influence the length of the interval; for example, short intervals follow a boy's birth in 51% of the cases and 50% of the cases when a girl is born **(8).** But couples who prefer son tend to have their next child soon after the birth of a daughter. Among 55 countries with DHS 2002 data, women are more likely to have a next child within 3 years after the birth of a daughter than after a son's birth **(16).** In this study short intervals of less than 3 years follow in 59.8% of the cases when the sex of the preceding child is female and 55% of the cases when the sex is male. Unlike the DHS 2002 and the current study, different findings are observed in a case of the study conducted in Mozambique. These variations could be due to the differences in sex preferences among the different cultural settings.

In this particular study, birth interval length varies when the magnitude of parity increases. For example, the median duration of birth interval for mothers' with two or less children is 30 months

whereas, for those mothers with three to four and above four children it is 34 and 33 months respectively. Moreover, 63% of mothers with few children less than or equal to two have had short intervals. Fifty four and 58% of mothers who have 3 to 4 and greater than or equal to five children respectively have short birth intervals. These findings are comparable with the study findings in Mozambique (**8**). For the observed variation the possible explanation could be those who have suffered a pregnancy or child loss are more likely to replace that pregnancy or child and hence the interval between births is short. Secondly, women who conceive easily and quickly are also those who are more likely to have more children (**8**).

The study in Mozambique showed that BF for up to six months reduces short inter-birth intervals; for example, 48% of women who did not nurse are likely to have intervals less than three years compared to 39% of those who had nursed between one and six months **(8).** Similarly, in this study, short birth interval reducing effect of BF was observed where 80% of women who did not nurse had intervals less than three years compared to 70.6% of those who had nursed between one and six months. In the study conducted in Saudi Arabia, 35% of children born before a succeeding interval of more than 35 months have been breastfed significantly longer (> 2years) than those who were born before a succeeding interval of less than 19 months (18%) **(15).** Findings follow similar fashion in the current study. For example, 48% of children born before a succeeding interval of more than 35 months have been breastfed longer (> 2years) than those who were born before a succeeding interval of less than 19 months (0%).

The median length of birth interval is calculated to be 35 and 30 months among contraceptive users and non users respectively. Women who did not use modern contraceptives are 1.54 times more likely to practice short birth interval length as compared to those who used modern contraceptives and it is statistically significant. This shows positive effect of contraceptive usage on the duration of birth interval. Similar effect of contraceptive use has been observed in a study conducted in Amhara region where contraceptive users space births longer than non users (**6**).

According to the EDHS2005, the median number of months increased from a low of 32.3 months among the lowest quintiles to a high of 35.5 months among the highest quintiles (**1**). Similarly in this study, the median length of the birth interval grew from a low of 28 months to a high of 36 months when we shift from lowest quartile to highest quartile of the wealth index.

Most developing countries women's actual birth intervals are shorter than the intervals they would prefer. Many women not only are unable to achieve their own reproductive goals but also

are falling far short of the 3 to 5 years intervals that new evidence suggests are healthiest. In many sub-Saharan African countries, women are the furthest from achieving their preferred birth interval. For example, women in Nigeria, Niger and Cameroon had preferred median birth interval of 32, 34 and 34 months respectively. The actual birth intervals are smaller except for Nigeria, which has the same actual and preferred birth interval, in Niger (31 months) and Cameroon (32 months) (**16**). In the DHS analytical study conducted in 20 sub-Saharan countries, the median length of actual birth intervals is 33.7 months on average compared with preferred birth interval of almost 39.9 months (**17**). The findings in this study are supportive particularly with the study findings in 20 sub-Saharan countries (**17**). The actual and preferred median length of birth intervals are 33 and 38 months respectively with observed difference of 5 months. This indicates that women in this study practice birth intervals in average 7 months shorter than they would prefer. The difference between the two birth intervals is statistically significant (T = -12.37, DF = 810, p value 0.000).

Studies in different parts of Saudi Arabia showed that age of the mother, current age of the mother and parity were found to be the only significant predictors of birth interval (**15, 18**). But at present study, rural residence, being student and daily worker in husbands' occupation, breast feeding for 7 to 12, 13 to 23 and 24 and above months, non use of modern contraceptives and highest wealth quartile were found to be significant predictors of short birth interval length. Breast feeding for 24 and above months and highest quartile of the wealth index are significant predictors of optimum birth interval length.

CHAPTER7. CONCLUSION AND RECOMMENDATIONS

CONCLUSION

Majority of the study subjects are aware of the optimal length of birth interval between two successive births and its advantages and disadvantages. Accordingly, 60% of the respondents are knowledgeable. When compared to this relatively high proportion of knowledgeable women, the actual practice of optimal birth spacing is low in which case only 36% of WCBA have had actual birth interval practice within the recommended interval of 3 to 5 years. More than half (57%) of the women in reproductive age group have been practicing short birth interval below the recommended duration of optimal birth spacing practices. Regarding the median length of months between two successive births, women on average are 3 months behind what has been recommended as the healthiest birth interval.

Explanatory variables like rural residence, being student and daily worker in husbands' occupation, breast feeding for 7 to 12, 13 to 23 and 24 and above months, non use of modern contraceptives and highest wealth quartile were found to be significant predictors of short birth interval length. But breast feeding for 24 and above months and highest quartile of the wealth index were found to be significant predictors of optimum birth interval length.

Women in the study area have been practicing on average 7 months shorter birth interval length than they would prefer otherwise and the preferred length of birth interval among the study subjects is significantly greater than actual birth interval length.

RECOMMENDATIONS

Ministry Of Health

- Ministry of health has to consider the issue of optimum birth spacing practices during the revision of the national service delivery guidelines and protocols to incorporate birth spacing information to provide service providers with technical assistance.

Regional health bureau

- The regional health bureau has to focus on the observed gap in optimum birth spacing practices identified in this particular study area and take the responsibility to make use of all available opportunities including annual and sub annual regional conferences and review meetings to advertise the optimum birth spacing practices of 3 to 5 years.

Zonal health department and woreda health office

- The ZHD and WrHO have to critically look at the gap between the actual and desired birth interval length among WCBA in the area and have to orient service providers at service delivery points, particularly in clinic based settings on optimum birth spacing practices, so that women have better quality services to achieve their spacing.

- The lower median length of birth interval and higher proportion of mothers who practice short birth interval length in the area calls for attention and concerned bodies at the woreda health office and zonal health department level have to design strategies to educate both partners on health risks of short intervals and health benefits of OBS practices.

Health service providers

- HEWs in the area have to take the identified problems in to consideration in order to further build the current knowledge level among WCBA and narrow the observed gap between the knowledge and practice through counseling on birth spacing.

- Family planning counselors and providers at service delivery units have to focus on the observed gap between actual and preferred birth interval length in order to actually meet the preferred birth interval length in practice through counseling women to enable them achieve that objective through contraceptive use.

Other relevant bodies

- Better family wealth is significantly associated with optimum birth interval length. Hence, the finance and economic development and other government offices at zonal and woreda level have to do activities related with employment and job opportunities for women in particular and families in general to increase their economic status.

- NGOs working on family planning programs locally and regionally have to consider the identified gap on birth spacing practices in the area and involve in advocating the new optimum birth spacing evidences during the implementation of their programs.

- Any interested bodies can do further comprehensive research incorporating the role of men in optimal birth spacing practices and variables like sexual activity and duration of postpartum infecundability, which were not addressed in this study, in order to clearly understand the situation in the area.

REFERENCES

1. 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.

2. Herndn L. Delgado, Reynaldo Martorell, and Robert E. Klein. Nutrition, lactation, and birth interval components in rural Guatemala. Am J Clin Nuir: 1982 Jun; 35:p. 1468-1476.

3. Samson Gebremedhin and Mulugeta Betre. Level and differentials of fertility in Awassa town, Southern Ethiopia. Afr J Reprod Health. 2009; 13[1]:93-112.

4. Getu Degu Alene and Alemayehu Worku. Estimation of the total fertility rates and proximate determinants of fertility in North and South Gondar zones, Northwest Ethiopia: An application of the Bongaarts' model. Ethiop.J.Health Dev. 2009; 23(1):19-27.

5. Yohannes Dibaba. Factors influencing women's intention to limit child bearing in Oromia, Ethiopia. Ethiop.J.Health Dev. 2008; 22(3):28-33.

6. Ayanaw Assaye Negussie. Proximate determinants of birth interval length in Amhara region: the case of Fagita Lekoma woreda, Awi- zone, unpublished M.Sc thesis Addis Ababa, Ethiopia Jun, 2008.

7. Catalyst Consortium/ Tahseen project. Optimal birth spacing: an in-depth study of knowledge, attitudes and practices. Dec 2004.

8. Saumya RamaRao, John Townsend and Ian Askew. Correlates of Inter-birth Intervals: Implications of Optimal Birth Spacing Strategies in Mozambique. Population Council. March 2006.

9. E. O. Orji, A. S. Shittu, O. N. Makinde and S. S. Sule. Effect of prolonged birth spacing on maternal and perinatal outcome. East Afr Med J. Aug 2004; 81(8): 388-391.

10. M. Norton. New evidence on birth spacing: promising findings for improving newborn, infant, child, and maternal health. Int J Gyn Obs. 2005; 89:51—56.

11. Nahla Abdel-Tawab, Sarah Loza and Amal Zaki. Helping Egyptian women achieve optimal birth spacing intervals through fostering linkages between family planning and maternal and child health services. Sep 2008.

12. Olof Stephansson, Paul W. Dickman, and Sven Cnattingius. The influence of inter pregnancy interval on the subsequent risk of stillbirth and early neonatal death. The American college of obstetricians and gynecologists. Obs Gyn. Jul 2003; 102(1):101–8.

13. Abdolrahman Rasekh and Majid Momtaz. The determinants of birth interval in Ahvaz-Iran: A graphical chain modeling approach. J Dat Sc. 2007; 5: 555-57.

14. Yohannis Fitaw, Yemane Berhane and Alemayehu Worku. Differentials of fertility in rural Butajira. Ethiop.J.Health Dev. 2003; 17(1):17-25.

15. SM Al-Almaie. The pattern and factors associated with child spacing in Eastern Saudi Arabia. JRSH. 2003; 123(4): 217-221.

16. Vidya Setty-Venugopal, and Ushma D.Upadhyay. Birth spacing: three to five saves lives. Population reports, series L, No. 13. Baltimore, Johns Hopkins Bloomberg School of public health, population information program, summer 2002.

17. Rafalimanana, Hantamalala and Charles F. Westoff. 2001. Gap between Preferred and Actual Birth Intervals in Sub-Saharan Africa: Implications for Fertility and Child Health. DHS Analytical Studies No. 2. Calverton, Maryland: ORC Macro.

18. N.N.A. Al-Nahedh. The effect of socio-demographic variables on child-spacing in rural Saudi Arabia. Eastern Mediterranean Health Journal 1999; 5 (1):136-140.

ANNEXES

Annex: 1. Questionnaire

Informed Consent

Dear Respondent:

My name is _____. This questionnaire is prepared to conduct a study on the socio-demographic, socio-economic and biological factors determining inter birth interval among WCBA in this area. You are selected and included in the study as part of the sample population to complete the questionnaire designed by the researcher. The information obtained in this study will be used only for research purposes. The data you will provide is very helpful to achieve the intended objectives of the study. Any information obtained will be kept strictly confidential and will not be exposed to any other body. But it may remind you some condition which you may not want to remember at all like death of your family member etc. Involvement in this study is optional and in voluntary basis and you can drop any individual question or the whole questionnaire. But your participation and contribution in the study is very important to come up with important findings which may help local health planners to intervene the problem locally.

Do you have any opinion regarding this study?

Do you agree to participate in this study?

Yes, continue No, thank you!

Name of the data collector_____ Sign_____ Date_____

Part I Socio-demographic Characteristics of the respondents

S.N	Questions	Response and Coding	Skip
101	House code	_____	
102	Residence	1. Urban 2. Rural	
103	Age of the mother in years	_____	
104	Marital status	1. Married 2. Single 3. Divorced 4. Widowed	
105	At what age did you marry?	_____	
106	Religion	1. Orthodox 2. Protestant 3. Muslim 4. Catholic 5. Others (specify)_____	
107	Ethnicity	1. Hadiya 2. Kembata 3. Guragie 4. Siltie 5. Amhara 6. Others (specify)_____	
108	Education of the mother	1. Illiterate 2. Able to read and write 3. Elementary (1 - 6) 4. Junior (7 - 8) 5. Secondary (9 - 12) 6. Tertiary (12+)	
109	Education of the husband	1. Illiterate 2. Able to read and write 3. Elementary (1 - 6) 4. Junior (7 - 8) 5. Secondary (9 - 12) 6. Tertiary (12+)	Skip to
110	Occupation of the mother	1. Employee (GO/NGO) 2. House wife 3. Merchant 4. Student 5. Farmer 6. Daily worker 7. Others (Specify)_____	
111	Occupation of the husband	1. Employee (GO/NGO) 2. Merchant 3. Student 4. Farmer 5. Daily worker 6. Others (Specify)___	Skip to

Part II Knowledge on Birth Interval

S.N	Questions	Response and Coding	Skip
201	Have you heard about optimal birth interval between two consecutive births?	1. Yes 2. No	If no go to Q**203**
202	If yes to question no 201, what is the optimum number of months or years between two successive births?	1. Below three years 2. Three to five years 3. Above five years 4. I don't know	
203	Does adequate/optimum birth spacing have a **healt**h advantages?	1. Yes 2. No 3. Don't Know	If no or DK go to Q**205**
204	If yes to question no 203, whom do you think have a health advantages?		
	204.1. The mother?	1. Yes 2. No 3. Don't Know	
	204.2. The child?	1. Yes 2. No 3. Don't Know	
	204.3. Both?	1. Yes 2. No 3. Don't Know	
205	Does short birth interval have a health disadvantages?	1. Yes 2. No 3. Don't Know	If no or DK go to Q**301**
206	If yes to question no 205, whom do you think have a health disadvantages?		
	206.1. The mother?	1. Yes 2. No 3. Don't Know	
	206. 2. The child?	1. Yes 2. No 3. Don't Know	
	206. 3. Both?	1. Yes 2. No 3. Don't Know	

Part III Birth History of the respondents

S.N	Questions	Response and Coding	Skip
301	How many children have you ever born alive?	Males ____ Females_____	
302	Have you ever given birth to any child who died later?	1. Yes 2. No ⟶	If no go to Q**304**
303	If yes, how many of your children died?	Males _____ Females_____	
304	At the time you became pregnant with the last child did you want to have more child?	1. Yes 2. No ⟶	If no go to Q**308**
305	If yes to question no 304, was your preference to become pregnant then or wait until later?	1. to become pregnant then ⟶ 2. to wait until later	If "1" go to Q**308**
306	If your preference is to wait until later, how long did you prefer to wait?	_____	
307	What is the reason to become pregnant then while preferring to wait until later?	_____	

308. Birth Order	**1.** Sex 1. Male 2. Female	**2**. In what month and year did (name) born?	**3**. Is he /she alive? 1. Yes 2. No	**4**. If died, how old was (name) he/she died 1----------year 2---------Month	**5**. Current age	**309**. Birth interval in months
308.1.Last child						
308.2. previous to last child						

Part IV Breast feeding practice

S.N	Questions	Next to Last Child (Response)	Skip
401.	Did you breast fed previous to last child (name)?	1. Yes ⟶ 2. Never breast fed	If "never" go to Q**404**
402.	If yes to question 401, for how long was (name) breastfed?	_____months	
403.	Reason for stopping breast feeding?	1. The child being old enough 2. New pregnancy 3. The mother was sick 4. Other(specify)_____	
404.	When do you think breast feeding should stop completely?	After _____ months.	

Part V. Knowledge and practice of modern contraceptive use

S.N	Questions	Response and Coding	Skip
501	Do you know any modern method that women and men can use to delay or avoid pregnancy?	1. Yes 2. No ⟶	If no go to Q**601**
502	If yes for q501, which of the following methods do you know about?		
	502.1. Pills	1. Yes 2. No	
	502. 2.Injectable	1. Yes 2. No	
	502. 3. Condom	1. Yes 2. No	
	502. 4. Implants	1. Yes 2. No	
	502. 5. IUD	1. Yes 2. No	

503	Have you been using any of the modern methods before the conception of your last child?	1. Yes 2. No ⟶	If no go to **Q506**
504	If yes to question no **503**, what was the purpose?	1. Birth spacing 2. Limiting birth	
505	If yes to question no **503,** which of the following modern methods did you use?	1. Pills 2. Injectables 3. Condom 4. Implanta 5. IUCD	
506	Are you using any of the modern methods now?	1. Yes 2. No ⟶	If no go to **Q508**
507	If yes to question **503** or **506**, from where have you got family planning service?	1. Health post 2. Health center 3. Hospital 4. Private sector	
508	If you were not using any contraceptive method to delay or avoid pregnancy, would you tell me the main reason?	1. Desire for more children 2. Health problem 3. Religious reason 4. Moral and cultural reason 5. Lack of information about contraception 6. FP service not available 7. Others /specify/_____	

Part VI: Socio-economic characteristics of respondents

S.N	Questions	Response and Coding	Skip
601	What is the main source of drinking water for members of your household? *Circle ONLY ONE answer*	1. piped water 2. protected Dug well 3. unprotected dug well 4. protected spring 5. unprotected spring 6. rainwater 7. tanker truck 8. surface water (River, pond) 9. bottled water 10. others_____	
602	Do you treat your water in any way to make it safer to drink?	1. Yes ⟶ 2. No	If no go to Q**604**
603	What do you usually do to the water to make it safer to drink? *Circle ALL applicable answers*	1. boil 2. add bleach/chlorine 3. strain through a cloth 4. use water filter (ceramic/Sand/ compo 5. let it stand and settle 6. others _____	
604	What kind of toilet facility do members of your household usually use? *Circle ONLY ONE answer*	1. flush or pour flush toilet 2. ventilated improved pit latrine (VIP) 3. pit latrine with slab 4. pit latrine without slab/ open pit 5. No facility/bush/field 6. others (specify _____	
605	Does your household have:	1) Electricity? 2) A watch? 3) A radio? 4) A television? 5) A mobile telephone 6) A non-mobile telephone? 7) A refrigerator? 8) A table? 9) A chair? 10) A bed? 11) An electric mitad?	
606	What type of fuel does your household mainly use for cooking? *Circle ONLY ONE answer*	1) electricity 2) biogas 3) kerosene 4) charcoal 5) wood 6) straw/shrubs/grass 7) animal dung 8) others (specify)____	

S.N	Questions	Response and Coding	Skip
607	Do you have separate room which is used as kitchen?	1. Yes 2. No	
608	Main material of the floor (observation) *Circle ONLY ONE answer*	1) earth/ mud 2) wooden 3) ceramic tiles 4) cement/bricks 5) other [specify]_____	
609	Main material of the roof (observation) *Circle ONLY ONE answer*	1) thatch/leaf 2) plastic sheets 3) wood 4) corrugated iron sheet 5) cement 6) other [specify]_____	
610	Main material of the walls (observation) *Circle ONLY ONE answer*	1) wooden and mud 2) wood/sticks 3) cement 4) stone with lime/cement 5) bricks 6) WOOD plank/SHINGLES 7) other [specify]_____	
611	What is <u>now</u> the primary source of income for this household? *Circle ONLY ONE answer*	1. farming, including cash crops 2. livestock 3. employment/salary 4. petty trading (including sale of fire-wood, charcoal, grass, local brewery) 5. daily labor 6. handicrafts/artisan 7. remittances	
612	Does this household own any land that can be used for agriculture?	1. Yes ⟶ 2. No	If no go to Q**614**
613	If yes how much land does your household own?	_____Timad	
614	Does this household own any livestock, herds, or farm animals?	1. Yes ⟶ 2. No	If no stop
615	How many of the following animals do this household own? **[PROBE AND MARK THAT ALL APPLY, MULTIPLE ANSWER IS POSSIBLE]**	1. cows_____ 2. oxen, or bulls_____ 3. calves _____ 4. horses/donkeys/ mules_____ 5. sheep and Goats_____ 6. chickens_____	

ጅማ የኒቨርስቴእ ምናደብና ፈየአም ኤጌች ምናደብና ለሳንች ቆዶአ ቀረንቻ ኤጌች ለሳጥና ለዕም ድግሬኤ ማሽ ካትብ ነቃሻ ጉድስምና ዊጣአክም ነቃሽ ዊጣችና እቲ ሰገረ ኡዎ ሜና ስድምና ጉድስኮ ጉድሻ

ለጽታቶ አይቼ፡ –

እ ሱም _____ የመሞኮ፡፡ ኩ ጠምች ቀረሞ አስ ለምቤኤ ዮ አሜ መረቶ፣ ገነ አጎራ አማጣ መል መል ዴሃአ ከኩሉሌቲ ዊጣእሜና ጎዳኮ ጣምዕቻ፡፡ከዕኔ ጣዕምችና ዶዕላኮ ሚ ማቲቲ ከአጎራና ስንዶም ሁንክ ነቀሽም ጠዕምች ሃሳና ወንሽምና ሆሳሃኔ፣ ክዕኔ ኡዊታካም ነቃሽ ሃሰን አጎራ አጥስምና አራቅ አዋድ ዮሃኔ፡ ኡዊታካም ነቃሽ ሁንድም ቆጥጣንችና ማጣቃንችኔ አማንዶማን እሁክስ መል ማን አፎቤአን እሁክሳ ጫክንሶም፡፡ ካ ጣሌእ እቴሉስጥ በጠንቻን ሾቶአኮሃነ ጣዕምዕሜክ ሁንዳም እሁኮ ኮሌ ደባቻ ሆግም ጠንስሶሃኔ እሁካሬም ዱ ክኔ ከለሳንች ወሮን እትኔ በጠንች ጠዕሜአም ጠዕምቻን ደናም ምሻ ኤብና አረቅ አዋደሃኔ እሆኮ፡፡

ጣዕምቻ አጎረን መ ሰዎት የኮ

ጣዕምቻ ደባሯማ ሃሳካሜኔ

አያ, አሼሬ አአአ, ገለጦሞ

ነቃሽ ዊጣአንች ሱማ _____ ፊርማ _____ አያሞ _____

በጠንች መዮ፣ ገት አጎራ ናቃሽ

ጥጎ	ጠዕምቻ	ዶዕለንቻ ደበቻ	ሂንና
101	ሜዕነ አናን ሱማ	_____	
102	ገት ኩኩሌታ	1. ቤሮአ 2. ገጠራ	
103	አማ ዐመራ	_____	
104	ምን እስከም አጎራ	1. ምን እስቶኮ 2. ባጃሞ 3. ቡቤሳቸ 4. መንች ለዙነ ኮኔ	
105	ሂንካዕን አመራ ጌቴ)	_____	
106	ጎይሞኛታ	1. ኦርቶዶክሳ 2.አመናዕ/ክርስትንዕ 3. እስላዕ 4. ካቶሊካ 5. ሚኤክ/ጫክሴ	
107	ዘራ	1. ሀዲይዕ 2. ከምላዕ 3 ጉራጌክዕ 4. ስልጠክዕ 5. አማዕ 6. ሚኤክ/ጫክሴ	
108	አም ለኳጥ ቆፍቴ	1. ክብታማ ቀነነ አዕማ ጠንተምኬአኔ 2. ክታብማ ቀነነ አዕማ ጠንተአሜ 3. 1-6 4. 7-8 5. 9-12 6. 12 ሃናን	
109	ሚንአን ለኳጥ ቆፍቴ	1. ክብታማ ቀነነ አዕማ ጠንተምኬአኔ 2. ክታብማ ቀነነ አዕማ ጠንተአሜ 3. 1-6 4. 7-8 5. 9-12 6. 12 ሃናን	
110	አማ በጥ አጎን	1. አድልዕ በጣንዕቴ 2. ምን አመቴ 3. ደደራንዕቴ 4. ለሳንዕቴ 5. አቡላንዕቴ 6. በል በጣንዕቴ 7. መላክ ዮለስ	
111	ምን አንችክ በጥ አጎር	1 አድልዕ በጣንዕቴ 2. ደደራንዕቴ	

		3. ለሳንዕቴ 4. አቡላንዕቴ 5. በል በጣንዕቴ 6. መላክ ዮለስ	

በጠንች ለሞ፡ አም ለች አጎራ

ጥጎ	ጠፅምቻ	ዶፅለንቻ አበቻ	ሂጎና
201	ለም ሃናንአስ ለምቤኤን ሄፅም ሃስሶ አመን ቢክና መጪልሎዊ ዮሆኔሄ)	1. አያ 2. መጪቯሞዊ	መጪቯሞዊ ይትትለስ 203 ስነ ሂጊማ
202	ለም ሀናንአስ ለምቤኤን ሄፅም ሀስሶ ለም አዎናን አስ ለምቤኤነ ሄህም ሃሲሶ ፎንነግ ሂንካን ኢህም ሃሲሶ)	1. ሰስ ሂንች ወሮኔ 2. 3-5 ሂንች አፈቤኤ 3. 5 ሂንች ሃናን 4. ለአሞዑ	
203	ለም አወናን አስ ለምቤኤነ ኡሼጠከአ አቀር ፈየአመኔ አዋድ ዮኮ ይታ ሰዊቶ)	1. አያ 2. አእ 3. ለአሞዑ	አእ ይትትለስ 205 ስነ ሂጊማ
204	ጠፅማች ጥግ 203 አያ ይትለስ፣ ፈያአማ ሲጦኮክ አየቴ)		
	204.1. አማዜ	1. አያ 2. አእ 3. ለአሞዑ	
	204.2.. ጨል	1. አያ 2. አእ 3. ለአሞዑ	
	2.4.3. ለሞም	1. አያ 2. አእ 3. ለአሞዑ	
205	ሀስሶ አመንሴ ወሮኔ ሀነኔ ቀርም ፈየአመኔ ኤቦ ሀዊ ዮኮ ይታ ሰዊቶ)	1. አያ 2. አእ 3. ለአሞዑ	አእ ይትትለስ 301 ስነ ሂጊማ
206	መፅማች ጥግ 205 አያ ይትለስ፣ ሀነኔ አስ ቀርም አይ ፈየአመ ዋዶኮክ		
	206.1. አማዜ	1. አያ 2. አእ 3. ለአሞዑ	
	2006.2. ጨል	1. አያ 2. አእ 3. ለአሞዑ	
	206.3. ለሞም	1. አያ 2. አእ 3. ለአሞዑ	

በጠንች ሠሥ፣ ቀረንች ህራሳ

ጥነ	ጠምዕቻ	ዶዕለንቻ ደበቻ	ሂነና
301	ፎሪ ቀረሙ አስ ሜዕ ዮኮ)	1. ነና _____ 2. ሜንቶ _____	
302	ፎሪ ቀረማ ለሰጌ ሌሁ አስ ሄአዕንሄ	1. ኦያ _____ 2. ቤኤ _____	አእ ይትትለሰ 304 ሰነ ሂጊማ
303	ፎሪ ቀረማ ለሰጌ ሜየ ሆስ ሌሃ)	1. ነና ሜዕ _____ 2. ሌንቶ ሜዕ _____	
304	ለሳንች ቀች ሆንግት አመጌ ለም ቀች ቀሬሜ ህሳሄልቶኒ)	1. ኦያ 2. አእ	አእ ይትትለሰ 304 ሰነ ሂጊማ
305	ለሳንች ቀቲ ጨልዕ ቀቴነ ህሳሄሊ ቴዕም ኤጌርምነ ህስቱየም ነደቦ አፉሉኮክ)	1. ህሳቴቴ ሲሉሞክ 2. ኢሆ ቀጠመነነ ኤጌሬን ህሳ ሄኡሞ	1. ይትትለስ 308 ሰነ ሂጊማ
306	ኤጌርምነ ህስታዕሌ ለብክ ቀረመካኒ ሂንከዕን አመነ ኤጌርምነ ህሳ ሄዕልቶ)	_____	
307	ኡህቀጠመነ ኤጌቴን ህስቱይ ሲቲ መሸ ከእ መህ)	_____	

308 ቀራራች ሬራራቶ	1. አልበቻ 1. ነነ 2. ሜንቶ	2. ሂንክ አመጌ ቀረንቶአ/መኮ/	3. ፎርኔ ዮሆኒሄ 1. ኦያ 2. አእ	4. ሜኡ ኡመረኔቴ ሌሀኮክ	5. ዕመሮ	ለሜም አስ ለሚቤኤኔ ዮ ቀረንች አናኖም አገኒኔ
308.1 ለሳንችቤቶ						
308.2 ለሳንእ ለብክ						

በጠንች ሶሮ፡ – አኑና እጫክም ለጣኖ

ጥን	ጠምዕቻ	ዶዕለንቻ ደበቻ	ሂንና
401	ለሳንች ጫልችን ለብክ አኑና አጫፈልኔ	1. አያ 2. አእ	አእ ይትትለሰ 404 ሰነ ሂጊማ
402	ጣዕምች ጥግ 401 አያ እሀለስ፣ ሂንካን አመጌ አኑን ኢጨኪክ)	_____ አገንነ	
403	አኑን አጨኒን ኡትቱያመሽከአ መሃ)	1. አማን አፋብክና 2. አዎናች ቤት ጎደቦ አፋሩ ቡክና 3. አማ ጥስቶ ቢክና 4. ሚኬክ	
404	መት ጫልች አኑን ኡልስም ሃሲሶኪ ኡመፂኔ ሰዊቶቶ)	_____ አገንነ	

በጠንች አንቶ፡ – ሃሬች ስሪማ ሆላንቻ ለቻ ሎሳኖ

ጥ/	ጠ/ምዕቻ	ዶዕለንቻ ደበቻ	ሂ/ና
501	ቀሪማ ኡልስምና ሚን አን ሚን ዶል ቀራሬ አዋጥም ሃስሶ ጎ/ ለቆንዬ)	1. ኦያ 2. አእ	አእ ይትትለሰ 601 ሰነ ሂጊማ
502	ጠዕምች ጥግ 501 ኦያ ይትታዕሌ አዋና ዮሀኒ ህንክ አዋጥ ጎ/ ለቆቶ)		
	502.1 ልቅጭ የከም ክኒና	1. ኦያ 2. አእ	
	502.2 ሞርፌኔ ኡዋከም ቀራሬ	1. ኦያ 2. አእ	
	502.3 ኮንደማ	1. ኦያ 2. አእ	
	502.4 ጨቁኔ ኡዋማካም ቀራሬ	1. ኦያ 2. አእ	
	502.5 ጎሰ ወሮኔ ዲስከም ቀራሬ	1. ኦያ 2. አእ	
503	ለሳንች ጫልች ቀረሜን ኢለጌ ቀሪም ኡሲሶ ኪኒና አዋጠታካአ ለዕቀከሞኒሄ)	1. ኦያ 2. አእ	አእ ይትትለሰ 506 ሰነ ሂጊማ
504	ጠዕምች 503 አእ ኢሀለስ አዋጠታኮዕቤዕ መሸከአ ኩሌኔ)	1. ፈርገ ፈረገ ኢሰከላ ቀርሜ 2. ቀርም ኡልስሞገ	
505	ጠዕምች ጥግ 503 አያ ጥትታዕሌ ሂንክ ዶል ቀራሬ አዋጥቶክ)	1. ልቅጭ የከም ክኒና 2. ሞርፌኔ ኡዋከም ቀራሬ 3. ኪንደማ 4. ጨቁኔ ኡዋማካም ቀራሬ 5. ጎሰ ወሮኔ ዲስከም ቀራሬ	
506	ከአሜን ዶል ቀራሬ አዋጥቶሊሄ)	1. ኦያ 2. አእ	አእ ይትትለሰ 601 ሰነ ሂጊማ
507	ጠዕምች 503 ቴዕም አያ ይትታዕሌ ሀኒሴቴ ሲዶቶክ)	1. ፈያአም ኤጌች ምኒ 2. ጠፍ ጣበእ 3. ሆስፒታሊ 4. ሜል አዋጠከም ምኒንስ	
508	ጠዕምች ጥግ 503 ና 506 አእ ይትታዕሌ አዋጥትቤዕ መሸከአ መዶዕ)	1. ሞኬካ ቀርም ሃሶምቢኪና 2. ፈየአም ቄድ ዮ/ብከና	

		3. ሃይሜኖት ኢጃጆ ቤቢክና 4. አኦም ቤዕብክና 5. ለች ቤዕብክና 6. አዋጠኳ አብሶን ሲዳም ቦብክና 7. መኬካ (ጫኪሴኔ)	

በጠንች ሌሆ፡ – ሃሬች ስሪማ ሆላንቻ ለቻ ለሳኖ

ጥጎ	ጠምዕቻ	ዶዕለንቻ ደበቻ	ሂንና
	ክኑዊ ምንና አግዎአ ሎጥ ቤዬኔ ሲደከሞክ ሀንሴቱ	1. ቦንብ ዋአ 2. ጊንበኮዕ በል ዎአ 3. ጊንበኮቤዕ በል ዎዕ 4. ጊንበኮዕ ቡዕ 6. ጠዕን ዎአ 7. ታንኬር ዋሮ ዋአ 8. ዳጆአ ዎአ /ሌዕለኣ ዎአ/ሌዕል ዎአ/ 9. አፍስማ ዋሮ ዎአ 10. መኬካ (ጫኪሴ)	
602	አግ ዎዕ ፈየአምና ሽናተም ኔ እሆና ዎዕ ዋሮ ጀቦ ብእሶ ጎጎ አዋጥተከም)	1. ኤያ 2. ለአሞዬ	ለአሞዬ የኮለስ ጥግ 604 መሬ
603	ጠምቾ 602 ኤያ የከም ደባች እሁን ሂንኮ አዋጥ ጎጎ አዋጥተከም)	1. አፈልማ 2. ክሎሪና ኤድማ 3. መጪፎ ኤዴችኔ ቀረስማ 4. ሸሸርኔ/ቦች ቦጠም ዎዕ ቀረንስሜ 5. ኤልንዕኔ ፈስሞኔ 6. መጥ ወሮኔ ቀረሮእስ እስማ 7. መኬከሞ/ጪክሴ _____	
604	ክንምን መን ሹማ ሹሜኩከክ ሀኖኔቱ	1. ዎእኔ በጦ ሹም ምኔኔ 2. ፎሽ ቤዕ ጎገል ሽም ምኔኔ	

		3. ነገል ሽም ምኔ 4. ደጁት ቤዕ በሬኔ 5. ሀቀ ዎሮኔ 6. ሞኴሞ/ጨክሴ _____	
605	ክን ምኔኔ ዮኮክ	1. ኤሌክትሪክ 2. ሰዓት 3. ሬድዮ 4. ቴለቬጅና 5. ሞባይል/ሞክሞክዕ ስልክ 6. ምዕን ስልክ 7. ስግሳንዕ 8. ጠረጁዝ 9. ወንበር 10. አልግ 11. ኤሌክትሪክ ምጣዱ	
606	ሀርባተ ሰተኬነ ሉጥ በዮኔ አዋጥተክም መህኔቴ	1. ኤሌክተሪክ 2. ቆጨኞች ጋዘ 3. ቀዳል ጋዝ 4. ከሰለ 5. ግዕል ሀቃ 6. ቆጠጠ/ሹፋር ሀቃ 7. ኮቦታ 8. ሞኴክም/ጭክሴ _____	
607	ሀርባት ሰተክሞኪ አነን ሚን ዮሆኔሄ)	1. አያ 2. አእ	
608	ሜዕን ገጥ ለዓክክ በጦሞክክ መረኔቴ /ሞኢሜ/	1. ቡቺን 2. ሀቅን 3. አነን ቡቻ /ሴራሜክስ/ 4. ሲሚንቶአ /ኪንን/ ቦኬኬታ 5. መኴክ ዮለስ ኩሬ	
609	ሜዕን ኢመን በጦሞክክ መረኔቴ) /ሞኢሜ	1. ጉፍን 2. ሽራዕን 3. ሐቅኔ 4. ቆርቆሮዕን 5. ሲሚንቶኢን 6. መኴክ ዮለስ ኩሬ	
610	ምዕን ነርተን በጦሞክክ መረኔቴ; /አኢሜ/	1. ሀቂኔ ሀርኔ 2. ሀቂኔ ሜሮዕኔ 3. ሲሚንቶዕኔ 4. ክኒኔ ስምጎቶዕኔ 5. ቦሌኬትኔ 6. ጣመልኔ 7. መኴ የለስ ኩሬ	
611	አቡል ኡል ዮሆኒሄ)	1. አቡላ 2. ዲነ ቲንሴ 3. አገን ሜቆኢንሴ 4. ደደሪንሴ 5. በል በጠንሴ 6. አንግ በጠንሴ 7. መረን አሴአከም ዲነ ቲንሴ	
612		1. አያ 2. አኤ	አኤ የኮለስ ጥግ 614 ሂኔ

613	ሲንካን አቡል ኡል ዮኮ)	_____ ጥንዳ	
614	ሜዕን ዱነት የሆኒሄ	1. አያ 2. አኤ	አኤ የኮለስ ኡሊሴ /አፊ/
615	ሂንከዕን ድነት ሄአቱ)	1. ሌለዋ _____ 2. ሚርጎኡዋ _____ 3. አዳዕ /ዊኢዕ/_____ 4. ገኑዋ _____ 5. ጌፊቢ ፈላእ _____ 6. አንተባአ _____	

DECLARATION

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

Name: SAMUEL YOHANNES

Signature: _____

Name of the institution: JIMMA UNIVERSITY

Date of submission: JUNE 14, 2010

This thesis has been submitted to the department with my approval as University advisor

Name and Signature of the first advisor

MEKITIE WONDAFRASH (MD, DFSN) _____

Name and Signature of the second advisor

MULUMEBET ABERA (BSC, MPH/RH) _____