ADDIS ABABA UNIVERSITY
FACULTY OF MEDICINE
SCHOOL OF PUBLIC HEALTH

THE PATTERN AND DETERMINANTS OF BIRTH INTERVAL AMONG MARRIED WOMEN OF REPRODUCTIVE AGE GROUP, MAICHEW TOWN, SOUTH TIGRAY.

BY
MACHE TSADIK (B.SC)

ADVISOR

Prof. MISGANAW FANTAHUN (MD, MPH, PhD)

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Addis Ababa University
Faculty of Medicine
School of Public Health

The pattern and determinants of birth interval among married women of reproductive age group, Maichew town, South Tigray.

By:

Mache Tsadik (BSc.)

Approved by the Examining Board

_____ _____
Chairman, Dept. Graduate Committee

Prof. Misganaw Fantahu _____
Advisor

_____ _____
Examine

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Acronyms

AAU - Addis Ababa University

CI - confidence interval

EDHS - Ethiopian demographic health survey

IRB- institute of review board

NGO – non government organization

OBSI - Optimal birth spacing initiatives

OR - Odds Ratio

BI - Birth interval

SPSS - Statistical Package for Social Science

USAID - United States Agency for International Development

WHO - World Health Organization

BF - Breast feeding

Abstract:

Background: Ethiopia is one of the populated African countries with total fertility rate of 5.4 and annual population growth rate of 2.6. Birth spacing is an important factor for regulating the fertility of country's population and it is in turn determined by reproductive behaviors and socio-demographic factors which have direct and indirect effect on the health of the mother and child. The mean birth interval of Ethiopia is 33.8 months which is below the recent healthier recommended range of 3-5 years by OBSI and the proportion of short birth interval is 56%.

Objectives This study aimed at assessing the pattern and determinants of length of birth interval as well as the mean duration of birth interval in Maichew town.

Methodology: For this study, 605 eligible women (women who had at least two children) were selected by using simple random sampling technique. Sub-kebelles were randomly selected after listing and census was done on the selected sub-kebelles and sampling frame was prepared and the eligible women were selected by simple random sampling. Data was processed and analyzed using EPI Data and SPSS version 11computer soft-wares. In order to investigate the effects of covariates on the dependent variable, logistic regression was used.

Result: The median birth interval of the study population was 34.6 months (2.84 years). An examination of the birth interval distribution by duration categories (< 36 months and >36 months) reveals that 357(59%) of women have intervals shorter than 36 months. In multivariate analysis, educated women, women with high and moderate social status, women with educated partner and those who usually breastfeed longer and use contraception were found to have longer birth intervals.

Conclusion and recommendations: Dissemination of information on the normal birth interval in health facilities is low and the effort to increase the length of contraceptive use is less as majority of mothers only use less than two years. Therefore, dissemination of information about recommended interval and provision of comprehensive family planning services should be considered. Cooperative effort to improve women's economic independency and decision making power to increase maternal social status has to be conducted. Finally female education as well as male education should be encouraged by concerned local stakeholders.

1. INTRODUCTION

1.1 Background information

Birth interval is the time period between subsequent births, which indicates the pace of child bearing (1). In recent years, policy makers and planners have focused a great deal of attention on the birth interval and its determinants because of its link with maternal and child health and the number of births and birth interval is a major determinant of fertility rate, family size and population growth (2,3).

Studies suggest that women differ widely in their birth spacing practices worldwide. Demographic and socioeconomic characteristics influence women's spacing practices, the health of a child and mother and the major difference in women's in birth spacing, is mainly caused by variation in Bongaarts's proximate determinants of fertility (4,5).

In most developing countries, less attention has been paid to the timing of birth. In recent time researchers and organizations such as optimal birth spacing initiatives (OBSI) aimed at an instituting an optimal birth spacing recommendation of 3 to 5 years at the policy, programmatic and behavioral levels. On average, women in developing countries have much shorter birth intervals than they would prefer. The median birth interval is about 32 months. 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 (6,7).

Worldwide, infant and under five mortality is a serious problem. The DHS study conducted by USAID estimates that in every country, 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 1,000 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 1,000 births to 108 deaths—a 23% decline (7).

A study done in India also indicated that interest in the determinants of child mortality has recently surged, with the inclusion of targets for child mortality amongst the Millennium Development Goals and short birth-spacing is widely regarded as one of the most important causes of early childhood death. The finding showed that childhood mortality risk is influenced by the timing and spacing of births, and that birth-spacing and fertility are, in turn, a function of realized mortality (8).

In Ethiopia there is high proportion of short birth interval about 56 % and many study findings show associations with high maternal mortality rate (673 per 100,000 live births), infant mortality rate (77/1000 live births) and child mortality rate (123/1000 live births) The median birth interval is 33.8 months, contraceptive prevalence rate is very low (14.7%), annual growth rate is 2.6 and total fertility rate is 5.4 (9).

A study done in Jimma Hospital to examine pregnancy outcomes, 81% of birth intervals were under 36 months and 32.2% of intervals less than 12 months resulted in spontaneous abortion and 13.2% of 12-24 month intervals resulted in spontaneous abortion. The stillbirth rate was 3.2%, and 42.3% of birth intervals less than 12 months resulted in pregnancy wastage: abortion, stillbirth, or neonatal mortality (10).

Study done in Amhara region showed that high fertility commonly attributed to low levels of socioeconomic development and cultural norms that encourage the desire for many children and limit the ability of couples to effectively control the timing and number of births. However, the family planning use is very low (11).

1.2. Rationale of the Study

In Ethiopia many studies have been done on outcomes of birth interval rather than identifying the determinant factors where appropriate intervention is possibly taken to tackle the problem.
However, there is high proportion of short birth interval about 56 % and many study findings show associations with high maternal, infant and child mortality rate. There were only few studies conducted on pattern and determinants of length of birth interval in Ethiopia and almost there were no studies in Tigray regional state and particularly in Maichew town.

Therefore, the purpose of this study is to examine and investigate the underlying socio economic, demographic and reproductive variables that play a crucial role in determining birth interval length in the study area and the finding of the study will potentially benefit policymakers and program planners to design and implement appropriate and feasible programs and strategies to the study area and even at regional and higher level.

This study will also serve as a baseline study to conduct other analytical studies in the topic. The information gained will give a clue as to what health professionals in the study area should recommend birth spacing to their clients.

2. Literature Review

2.1. Pattern of birth intervals

In a study done in rural Saudi, the pattern of birth interval across age groups showed that there is an eightfold increased birth interval in women 30-34 years old compared to those younger age group (20-24 years). Older women, 35 years and over, were 19 times more likely to have a long birth interval (12).

A pattern across age groups in Mozambique indicates 15-19 year old mothers have the shortest interval of 28.9 months while those 20-29 have slightly longer intervals of 32.7 months. In general, younger women were more likely to have an interval less than three years than the older (13).

According to EDHS 2005, about 56% of mothers have less than 36 months of birth interval. This evidenced that birth spacing has been critical to reducing maternal and infant mortality; yet Ethiopian teenage mothers typically had children at shorter birth intervals than did older women. The median number of months between a birth and the preceding birth was 26 months for women ages 15-19, 32 months for women ages 20-29, and 35 months for women ages 30-39. Moreover only 16 percent of married female teens and 24 percent of married 20- to 24-year-old women used a modern method of contraception while 52 percent of sexually active unmarried females ages 15-24 used a modern method (9).

2.2. Determinants of birth interval

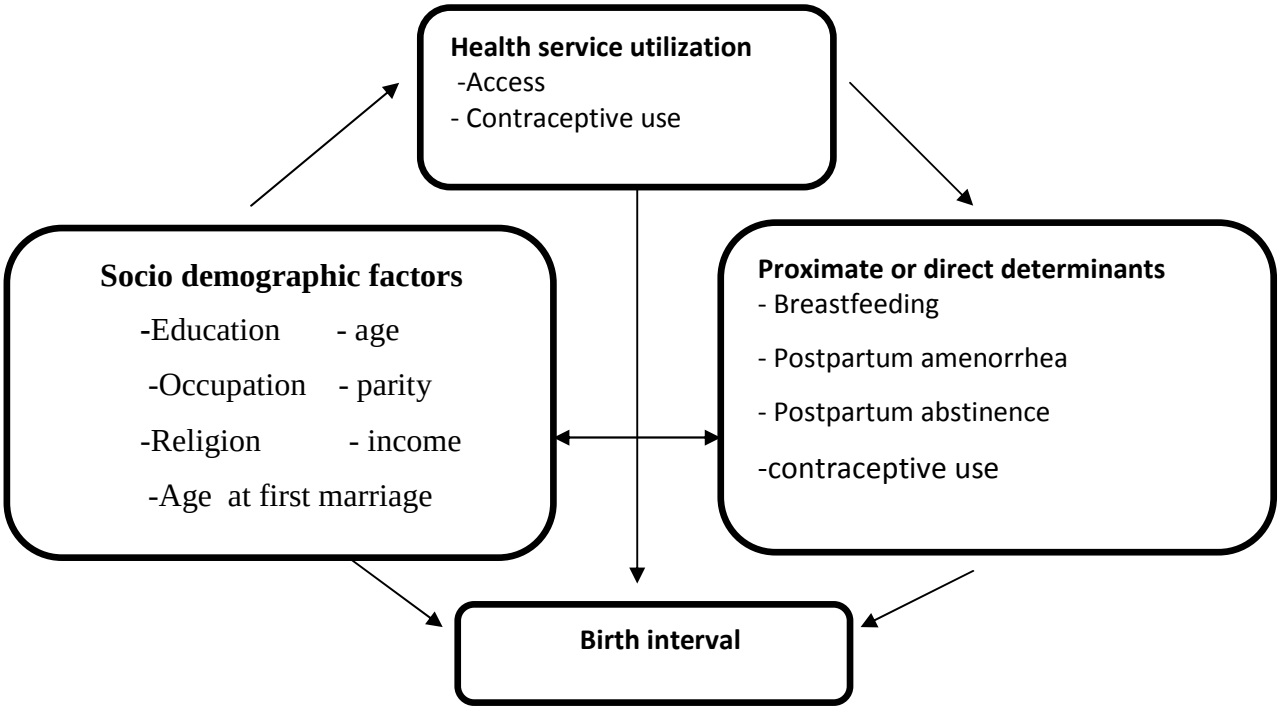


Figure 1.Conceptual frame work showing the inter relationship of variables that determine length of birth interval .

Description of the conceptual framework: The distal socio demographic factors like maternal education, occupation, religion, age and parity have a direct effect on the proximate determinants like breast feeding, postpartum amenorrhea, postpartum sexual abstinence and contraceptive practice which have also in turn a direct effect on the outcome (birth interval).

2.2.1. Proximate or direct determinants of birth interval

Birth intervals are affected by a complex range of factors, some of which are rooted in social and cultural norms. A conceptual framework useful for examining birth intervals is one proposed by Bongaarts for studying fertility that influence final fertility outcomes (4,5,13).

Studies done in Costa Rica and Pakistan also designed a theoretical framework which specifies that direct determinants of length of birth interval are breast feeding, contraception, abortion, frequency of intercourse, and fecundity. Results showed that breast feeding and contraception in Pakistan were found significant determinant of birth intervals, but not in Costa Rica (14).

A study done in northern Iran, Babol also indicated that maternal age, duration of breast feeding , sex of index child, type of contraception used, regular attendance at a family planning clinics and parity are the major proximate determinant of fertility and showed a significant correlation with birth interval (15).

A study done in Mozambique reveals that breastfeeding for up to six months reduces short inter-birth intervals, 48% who do not breast feed have intervals less than three years compared to 39 % of those who breast feed between one and six months. The study also concludes in higher fertility populations, breastfeeding has the greatest effect. Duration of breast-feeding was observed to affect all the birth intervals significantly (13).

In Philippines, Malaysia, and Indonesia, a comparative study of the determinants of birth-interval length has been done and shows the use of contraception and breastfeeding are important but that length of the previous interval also has an effect. Effects of breast feeding disappear after 11 months in Philippines and after 17 months in Malaysia and persist even in the last period 36-45 months in Indonesia. Contraception was more widely used in Philippines, although 25% of those contraceptive users report rhythm method (16).

According to EDHS, 2005 the median number of months since the preceding birth is 33.8. The median duration of amenorrhea is 15.8 months; postpartum abstinence is 2.4 months with majority (85 %) abstain from sex during the first two months following birth. Breastfeeding is nearly universal in Ethiopia, and the median duration of breast feeding is long (25.8 months) (9).

In Ethiopia, a study on proximate determinants of fertility indicates that the most important fertility inhibiting factor is duration of breast feeding and its impact on postpartum amenorrhea. In urban areas, the marriage pattern is the most important fertility determinant. Prevalence of contraception is very low, and has a minimal effect on suppressing fertility (17).

Study in Manipur showed that duration of breast- feeding has the highest impact on birth interval dynamics. It has 20% less likely to have short birth interval if there is six months increase of duration of breastfeeding. One of the possible ways is that the duration of breast feeding can lengthen the post partum amenorrhea. Breast feeding seems to have suppressed the ovulatory cycle and acts as a major form of protection against conception (18).

A study conducted in Amhara region showed postpartum amenorrhea and postpartum abstinence lengthens the time until a next birth. The average duration of breast feeding is close to two years but women aged 15-19 and 20-24 have mean durations of breastfeeding from 3 to 12 months less than women in their late twenties and thirties. The mean duration of postpartum amenorrhea is shortest at the youngest age and increases with age, women age 15-19 on average 12 months compared to close to 17 months for women in their twenties, and 27 months for women in their early thirties. Prolonged breastfeeding is the single most important factor in reducing fertility below its biological maximum in the region (11).

According to EDHS, 2005 the median number of months since the preceding birth is 33.8. The median duration of amenorrhea is 15.8 months; postpartum abstinence is 2.4 months with majority (85 %) abstain from sex during the first two months following birth. The national contraception prevalence rate is 14.7% , highest in Addis Ababa (57%), lowest in Somali region (3%), in Tigray (16.5%) and 46.5% in urban community (9).

2.2.2. Socio-economic and demographic determinants of birth interval

Socio-economic factors such as the mother's place of residence, education and work have also been correlated with birth spacing. In Mozambique, 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 and those who are working are significantly less likely to have intervals shorter than three years than those not working (13).

Findings in Bangladesh and Pakstan indicated that women living in the urban areas tend to have a longer birth interval than rural areas. Educated women have shorter first but longer subsequent birth interval than women having no education. Upper social class women used to have shorter first but longer subsequent birth interval than middle or lower class women. An unexpected finding was that ever users of contraception have distinctly shorter birth interval than never users. This may be due to shorter average length of breast feeding (19,20).

There was also a study conducted in Egypt and Vietnam indicating mothers' education was consistently related to the likelihood of another birth at each birth order, with the most-educated women experiencing a significantly lower probability of having a subsequent birth at every birth order, suggesting that the woman's education is a prime determinant of fertility and that increasing the educational attainment of women is one of the most beneficial measures to reduce fertility (5,21).

Another study done in eastern Saudi Arabia, birth intervals are closely linked with the number of children a woman has and the relationship between parity and birth interval is often U-shaped. Men's education level, place of residence and couple's occupation have indirect association with 2-nd birth interval. The 3-rd birth interval has direct relation with 2-nd birth interval (22). In Bolivia, Women married to men with no schooling were 1.4-2.0 times less likely to have short birth interval compared to women with partners with some schooling (23).

In rural Saudi child-spacing is increased with age because of the relationship of breastfeeding practices with age and parity. The proportion of women with short birth interval less than 18 months was lower in high parity and older women because older mothers practiced breastfeeding as their primary contraceptive method. Mother's education with secondary education and above had longer birth intervals (12).

In a study done in the fertility analysis of Oromia region done in 2002, differences in fertility by level of education and place of residence were found significant. The finding of the study conclude that regardless of place of residence, increases in women's education are associated with lower fertility and having even some education can reduce fertility (24).

The analysis of 55 countries with DHS data of 2002 also indicated 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 which is below the newly recommended optimal birth spacing initiative (25).

The EDHS, 2005 indicated that the median birth interval is longer among births to women with at least some secondary education than among births to women with lower levels of education. Younger mothers typically had children at shorter birth intervals than did older women. The median number of months between a birth and the preceding birth had been found longer with corresponding maternal age (9).

2.3. Recommended (preferred) verses actual mean birth interval

Estimating actual and preferred intervals is important because they serve as powerful tools in research, programming, and advocacy. Researchers often compare actual and preferred birth intervals to estimate the potential demand for family planning services. It has long been known that avoiding closely spaced births is advantageous to child health. Two-year spacing was widely identified and promoted as "the healthy interval." Recent studies supported by the United States Agency for International Development (USAID), optimal birth spacing initiatives (OBSI) recommended that an interval of 3–5 years help to reduce risk of adverse maternal and child health outcomes (25).

In Mozambique the Median durations of breastfeeding, post-partum abstinence and amenorrhea are 22, 12 and 14 respectively. Prolonged duration of breast feeding increases the length of birth interval through inhibition of the ovulatory cycle. This physiological change also prolongs the duration of post partum amenorrhea which increases the length of birth interval (13).

In EDHS, 2005 result shows that regional variations in birth intervals range from a low of 29 months in Affar to a high of 45.2 months in Addis Ababa. The median birth interval is longer among births to women with at least some secondary education than among births to women with lower levels of education. The proportion of short birth interval (less than 3 years) is 56% and the birth interval in the recommended range is 44% (9).

2.4 Birth interval outcomes

A survey done in south Ethiopia shows that only 11% of all births with preceding birth intervals belong to less than 18 months. The mean length of birth interval for all births is 31.7 months. Birth intervals shorter than 24 months account for a 25% of all births (26). Studies revealed that short birth intervals have been associated with adverse birth outcomes of risk of stillbirth or neonatal death in rural north India (27).

A study in India also revealed that, the risk of neonatal/infant/child mortality is greater when birth intervals are shorter than 36 months. Birth intervals of three or more years are associated with reductions in neonatal, infant, child and under-five mortality. The study also indicated that when families choice to delay birth for at least 36 months after the preceding birth, it is estimated that infant mortality would drop by 29%, under five mortality would drop by 35%, and total deaths to children under five years of age would fall by 1,434,000 annually (8).

The death of the previous child was a very strong positive predictor of a women's risk of birth; early child death was associated with a premature cessation of breastfeeding, resumption of menses, and early subsequent birth. Maternal age, parity, and religion also strongly influenced a mother's monthly risk of birth. Older women and those of high parity had lower relative risk of birth than younger women with lower parity (28).

Research conducted in Egypt during the last few years associates short birth intervals with an increased risk of infant and child mortality, as well as with several adverse perinatal outcomes. These adverse outcomes can include preterm delivery, low birth weight and small-for-gestational age (29).

Based on the reviewed literatures difference in results among the various studies has been noted possibly because of the difference in socioeconomic, cultural and demographic factors. Therefore, this study will find out what important determinant factors will affect the birth interval particularly in the study area and also will answer if the mean and pattern of birth interval are different from the other findings. Moreover, since birth spacing 3-5 years is new recommended range, the practice and knowledge of the community will also be assessed. Finally, the finding of the study will be a potential input for further policy and program improving like family health and family planning program and being birth interval is the heart of family planning and plays a central role in regulating population growth and in improving child survival.

3. OBJECTIVE

3.1 General objectives

To assess the pattern and the determinants of length of birth-interval among married women of reproductive age group in Maichew Town, South Tigray.

3.2 Specific objectives

3.2.1. To assess the pattern of birth interval across age group in the study area.

3.2.2. To describe the mean birth interval of the study population.

3.2.3. To identify factors affecting the length of birth interval in the study area.

4. Methodology

4.1 Study design and area

Community based Cross sectional survey was conducted in Maichew town, Tigray, Ethiopia to assess the pattern and the determinants of birth interval among women of reproductive age group. Maichew town is the capital of zonal administration of south Tigray and according to 2007 census it has total population of 23,484 of which 47% are males (30).

Maichew town is located 120 kilometers away to the south of Mekelle (capital of Tigray region) and it is about 640 kilometers far from Addis Ababa. The town has four kebeles and 3-5 sub kebeles. It has also some basic infrastructures such as one referral hospital, one health center, two high schools, one government technical college, one wood industry, five elementary schools, 24 hours electric power and pure water supply. It has also private hotels, restaurants, clinics and recreational areas which provide serve to the community.

4.2 Study population

4.2.1 Source of Population

All married women aged 15-49 years who have two or more alive children and those who give birth within five years before the survey in Maichew town were included in the study. A total of 605 women were randomly selected and a structured, coded, and pre-tested questionnaire was administered by interviewer.

The inclusive and exclusive criteria for the study :

Inclusion Criteria-

- All multi parous mothers with two or more alive children and who give birth within the last 5 years before the survey.
- Those who are married/in union and living with their husband
- Those who live in Maichew town for at least six months.

Exclusive Criteria:

- Those who didn't give birth and first birth,
- Mothers who have abortion, still birth and death of child with in 5 years before survey

4.2.2 Sample size determination

The survey sample was calculated by using Epi info stat calc soft ware using the sample size determination formula for two population proportions with 95% confidence interval, and power of 80% based on the following assumptions:

1. In EDHS, 2005 the prevalence of short birth interval (< 3 years) is 56% representing $\mathbf{p_1}$ and those with normal birth interval (3 years and above) have prevalence of 44% represents $\mathbf{p_2}$.
2. The population allocation ratio b/n the two populations is 1:1 ratio
3. $\mathbf{n_1}$ is the sample size for short birth interval and $\mathbf{n_2}$ the sample size for normal birth interval
4. **Z** α **/2** is a standard Z score, 1.96, corresponding to a 95% confidence interval
5. **Z** β , 80%is the power of the study to detect 12 % difference b/n the two study group
6. **p** is population proportion , $\mathbf{p= p_1+rp_2/1+r}$
7. **n** is the sample size for each group
8. None response rate of 5%

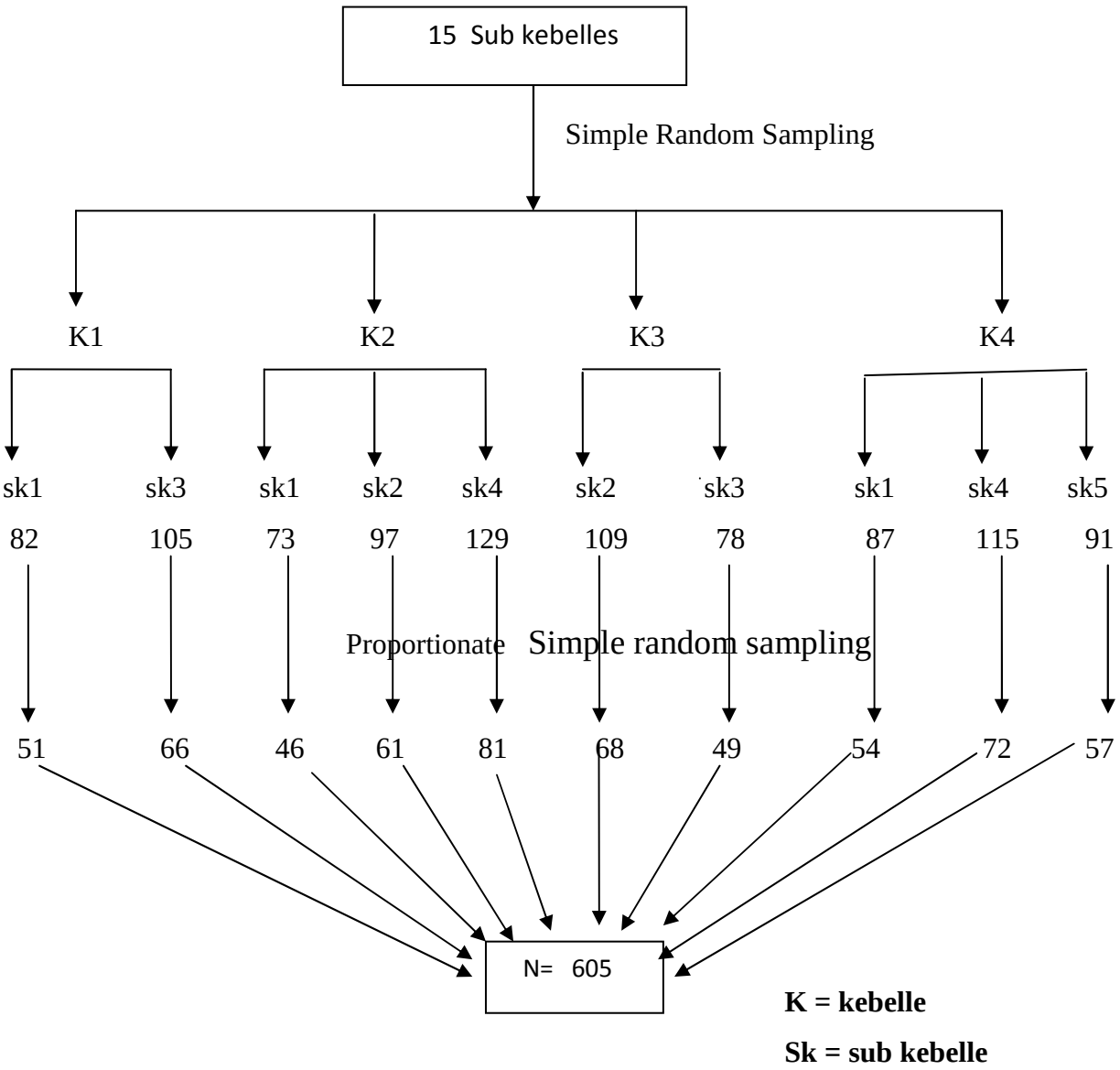
Based on the formula: $$\mathbf{n = \frac{[z/\alpha \sqrt{(1+1/r)p(1-p)} \pm Z\beta\sqrt{p1(1-p1)+\frac{p2(1-p2)]^2}{r}}}{(p1-p2)^2}}$$

n = 576 (288 from the exposed + 288 from unexposed)

A total of **605** i.e. 576 + 5% (non response rate) of 576 eligible participants were taken for the study.

4.2.3 Sampling procedure

There are 4 kebeles and 15 sub kebelles in the town and among the 15 listed sub kebelles, 10 sub kebeles were randomly selected then a household census was done to identify the eligible study population. After the identification of eligible population a sampling frame was developed which enlists all the eligible study subjects then the study participants were selected from the sampling frame by simple random sampling proportional to size using SPSS random number generator.



4.2.4. Measurements and Variables

Independent variables:

- Demographic variables: age at marriage, age of mother at first birth, parity and birth order , postpartum amenorrhea and post partum abstinence
- Breastfeeding.
- Mother's level of education.
- Husband's level of education.
- Mother's occupation.
- Religion
- Contraceptive use
- Household income

Dependent/outcome variable:

- Birth interval is the crucial variable of interest
  - Short birth interval = less than 3 years
  - Recommended birth interval = three to five years

4.3 Data collection

4.3.1 Data collection tools

Data was collected using a interviewer administered questionnaire, including birth intervals, demographics and fertility variables, such as maternal education, maternal age at marriage, parity, duration of breast feeding, contraception method used, and attendance at a family planning clinic. The questionnaire is developed by reviewing several literatures which considers local and international situation of the study subject matter. Some questionnaires were adopted from standard EDHS questionnaire and some were developed in the context of the objective of the study which were pretested and checked for consistency.

The questionnaire is translated in to local language Tigrigna by a person who has good ability of both languages for better understanding then back translated in to English by another individual of similar ability in order to see the consistency of contents of the instrument. Data collection was conducted from March to April, 2010.

4.3.2 Data collection procedure

Training was given to data collectors and supervisors by the principal investigator. There was a two days training session on over all issues of the data collection technique which consists of instruction about the study guides, a review of informed consent, respectful approach of participants, ethical procedures and general information on birth intervals and the objective of the study. The data collectors and supervisors were assigned to the randomly selected sub kebelles of the town. Data collection was conducted week end on Saturday and Sunday to include employed mothers who are not available at home on working days. Then data collectors interviewed a randomly selected participant in the sub kebelle taken from the prepared sampling frame by a simple random sampling.

4.3.3 Data quality control

To maintain the quality of data in the survey the questionnaires was pre-tested by taking a 10% sample of study subjects and rechecking the correctness and consistency of the data. Moreover, a two days training was given to data collectors and supervisors' and regular follow up was made by the supervisors and the principal investigator to monitor quality of the data collection process. A daily checkup for completeness and consistency of the collected data was also done.

4.3.4 Data processing and analysis

Quantitative data was entered using Epi data version 3.1, exported to SPSS, cleaned and analyzed by SPSS version 11. Socio demographic data, breast feeding, education, religion, age, parity, contraception utilization and work status were summarized and presented by frequency tables and summary statistics. Determinants of birth interval data were also summarized and presented by graphs, tables and figures.

Statistical tests of logistic regression was applied to analyze the relationship between certain variables such as mother's education, age, parity, contraceptive use and length of breast feeding with the outcome variable of birth interval. For all statistical significance tests, the cut- off value set is $p<0.05$. Chi- square and odds ratio was done to test association of the dependent variable (birth interval) and the socioeconomic and demographic variables. Multiple logistic regressions was used to control for confounding.

Thirty (5%) questionnaires were selected at random and checked for data entry error, missing value or any inconsistency. Some variables such as duration of mother's sexual abstinence (19.2%) and time mothers resume menstruation (17.4%) after birth of index child were not analyzed because of missed cases. In some cases reports from data collectors and supervisors revealed that even for those with a response on household income the figures were not reliable.

4.4 Ethical consideration

Ethical approval was obtained from the institute of review board of Addis Ababa University Medical Faculty. Data collection was carried out after approval of the project proposal by IRB. Permission was obtained from head of local administrator and Maichew town health office. Verbal consent was sought from selected participant to confirm willingness to participate in the study. To ensure confidentiality interview was held in private. Confidentiality was ensured throughout the process. All the participants in the questionnaire survey were informed to participate on voluntary basis and confidentiality of information they give was kept well. Moreover, the purpose, procedures of the study, advantages, disadvantage and time spent on interview was told to participants before the start of the interview..

4.5. Dissemination of findings

The findings of the research will be submitted to AUU School of Public Health, Tigray Health Bureau, organizations working on family health, Maichew town health office and other administrative and responsible bodies of the study area. The result will be presented to the School of Public Health and in different seminars, meetings and workshops. Finally; the findings will be published.

4.6 Operational Definitions

Birth interval - the period between two consecutive live births, from birth date to birth date **(**the interval between the birth of the index child and his/her immediate younger sibling, sometimes referred to as the 'succeeding interval)..

Normal birth interval – Is birth which occurs three to five years of previous child birth in OBSI.

Short birth interval – Birth which occurs within three years of the previous child birth in OBSI.

Preferred birth interval- an estimated period of time based on the mothers' perspective how soon mother wants her next child.

Actual birth interval – the exact time taken to a mother to have her next child.

Index child – the immediate preceding child to the last child.

Subsequent child – The immediate younger sibling to the index child (last child) who was born with in 5 years before the survey.

Postpartum amenorrhea is the interval between the birth of a child and the resumption of menstruation.

Postpartum abstinence refers to the period of voluntary sexual inactivity after child birth.

Parity*:* The number of full-term children previously borne by a woman.

5. Result

5.1 Description of study subjects

5.1.1 Pattern of length of birth interval across age group in the study population

Maternal age across age group is associated with birth interval indicating that older mothers tend to have longer birth intervals as indicated in table -4. There is a considerable difference among age group of 20-29 and those of 30-39; but major differences begin to appear in those over 40 years of age as can be seen in Figure 2. When comparing median intervals across age groups, it reveals the same pattern—the shortest median interval does occur among younger mothers than older that is, 20-29 years old mothers have the shortest interval of 32.4 months while those 30-39 have slightly longer intervals of 35 months and those forty and over years old have interval of 42 months. (See figure 2)

Alternatively it can be explained as follows. When mothers in the age group of 20-29 were compared with mothers of age group 30-39 and 40-49, it was found that mothers with the age of 30-39 and 40-49 were less likely to have short birth interval < 36 months [COR .42 and 95% CI= (0.283, .614)] and [COR .010 and 95% = C.I (.002, .041)] respectively. (See table 4)

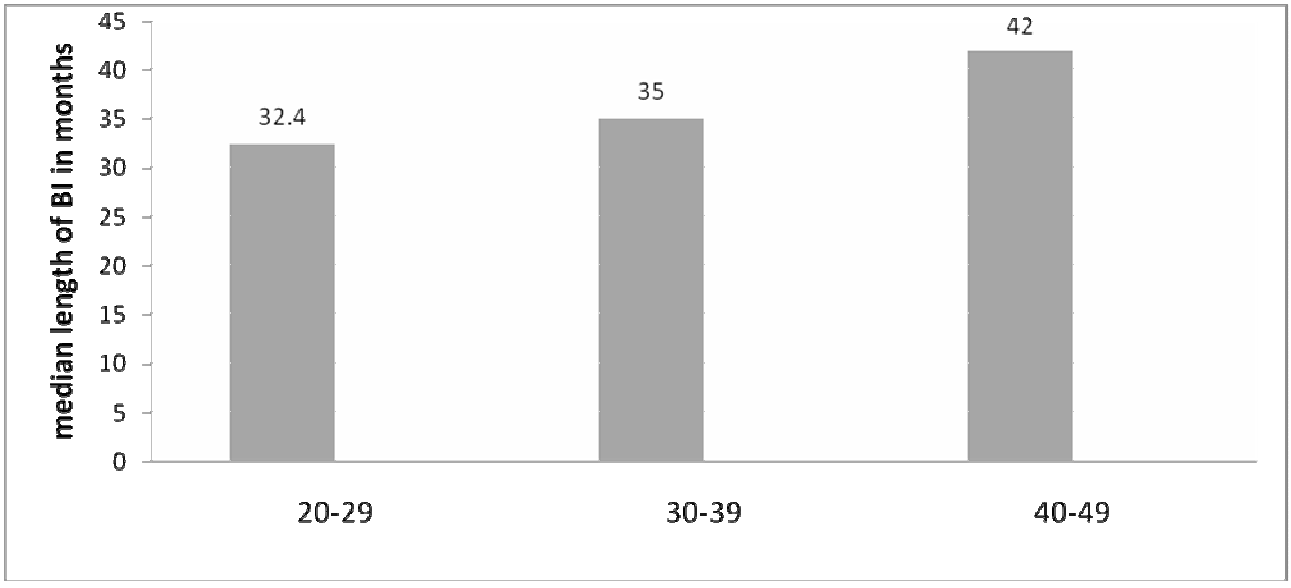


Figure 2: Median length of birth interval across age group in Maichew town, March to April, 2010.

5.1.2 Socio demographic characteristics of the study population

Six hundred five (605) multi-parous women of reproductive age group participated in the survey making a response rate of 100 %. The majority, 328 (54.2%) of participants were in the age group of 30-39 followed by the age group of 20-29 which accounts for 213 (35.2) and the mean and median age of the study subjects were 31.9 $\pm$ 5.8 and 31 years with range of 20-48 years respectively.

Among the total participants 178(29.3%) had no education, 215(35.5%) had primary and 212(35%) secondary and above in educational level. The partner's education also revealed that 189(31.2%) had no education, 240(39.7%) and 176(29.1%) had primary and secondary education and above respectively.

Orthodox is the major religion contributing for 547 (90.4%) of all followed by Muslim, 52(9.3%). About one third, 210(34.7%) and 190(31.4 %) of participants had more than one thousand and less than 500 monthly house hold income of Eth. Birr respectively. Furthermore, among the participants of the study, 342 (56.5%) had moderate social status followed by poor, 172(28.4%). About 317(52.4%) of sex of the index child were males and the rest, 288(47.6%) were females.(see table 1)

Table 1: The socio demographic status of the study population in Maichew town, March-April, 2010.

Characteristics N=605	Frequency	
	Number	%
Age		
20-29	213	35.2
30-39	328	54.2
40-49	64	10.6
Sex of Index Child		
Male	317	52.4
Female	288	47.6
Maternal education		
No education	178	29.4
Primary	215	35.5
Secondary +	212	35.0
Partner education		
No education	189	31.2
primary	240	39.7
secondary	176	29.1
Religion of mother		
Orthodox	547	90.4
Muslim	56	9.3
Others	2	.3
Perception of mother's social status		
very poor	12	2.0
poor	172	28.4
medium	342	56.5
rich	60	9.9
very rich	19	3.1
Monthly Income		
<500	190	31.4
500-1000	202	33.4
>1000	210	34.7
others	3	.5

As it is seen in figure 3, those who are engaged in private work accounts the majority, 177(29.3%) followed by a significant number of house wives, 174(28.8%) and 147(24.3%) were government employees by occupation.

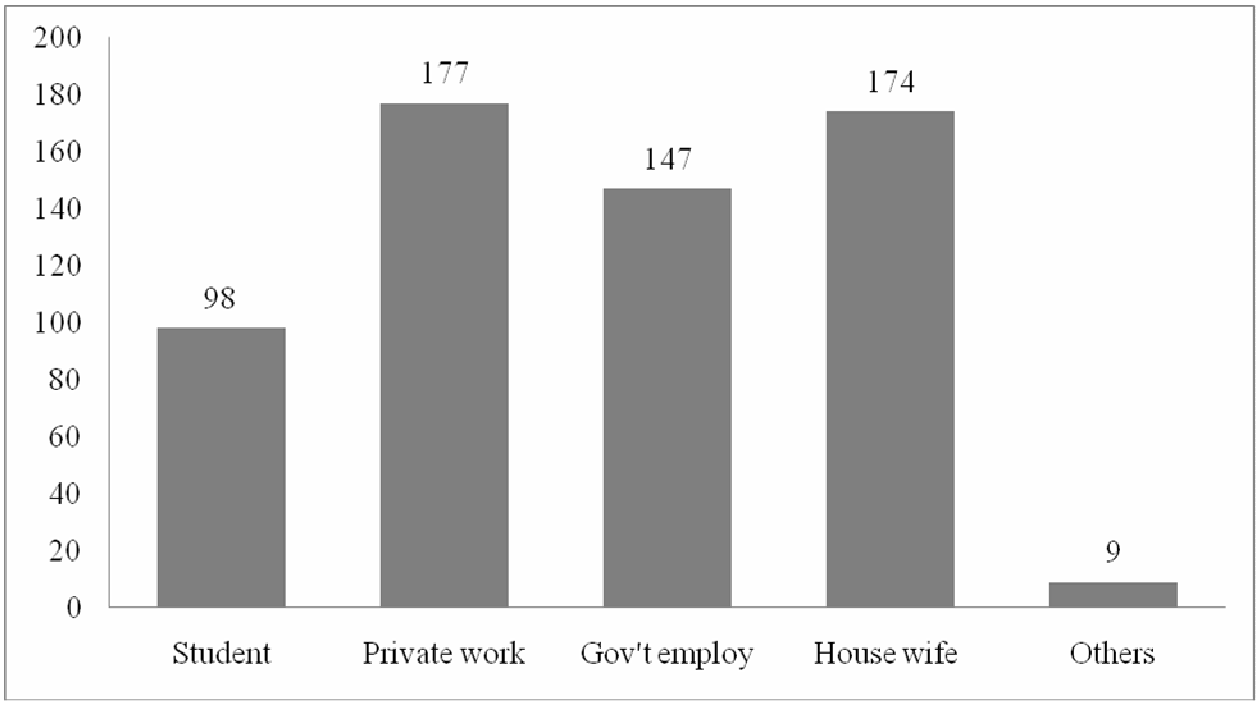


Figure3: Distribution of work status of mothers in Maichew town, March-April, 2010.

5.1.3 Reproductive characteristics of the study population

The mean birth intervals of the study population were 35.24 ± 5.06 months with a range of 22 to 64 months and the median birth interval was 34.6 months (2.84 years). Women who were 30-39 years old had about 3 months likelihood of increased birth interval compared to those in the younger age groups (20-29 years). Older women, 40 years and over, were about 10 and 7 months more likely to have a longer birth compared to those of 20-29 and 30-39 years old respectively.

An examination of the birth interval distribution by duration of months (< 36 months and >36 months) reveals that 357(59%) of women have intervals shorter than three years and 248(41%) women have interval in the recommended range (3-5 years).

Among the participants mothers with parity of 2-3 were the majority, 365(60.3%) followed by parity of 4-6 which accounts for 215(35.5%). Larger number of participants 244(40.3%) didn't prefer child sex and 194 (32.1%) prefers male sex. The majority of mothers in this study, 348(57.5%) breast feed their index child less than 24 months and 257(42.5%) breast feed more than 24 months. The median duration of amenorrhea in this study was 12.3 months and mothers abstain for a median of 2.6 months since the birth of the index child.

About 75% of the participants perceived that a child should stop breast feeding after 24 months and 1/4 to stop breast feeding before 24 months. Below half, 289(47.8%) of mothers discussed about contraceptive with their partner and 282(46.6) mothers didn't. Similarly, about 50% of participants didn't discuss about sexual issues with their partners.

On the other hand, 234(38.7%) participants preferred the time of spacing more than 36 months and 163(26.9%) prefer less than 36 months and a large number of participants didn't know about preferred time of birth spacing. (see table-2)

Table 2: Reproductive behavior of the study population in Maichew town, March-April, 2010.

Characteristics N=605	Frequency	
	Yes Number (%)	No Number (%)
Parity		
2-3	365(60.3)	240(39.7)
4-6	215(35.5)	390(64.5)
7+	25(4.1)	580(95.9)
Birth interval		
<36 months	357(59.0)	248(41.0)
>36 months	248(41.0)	357(59.0)
Sex preference		
male	194(32.1)	411(67.9)
female	167(27.6)	438(72.4)
no preference	244(40.3)	361(59.7)
Length of BF of index child		
<24 months	348(57.5)	257(42.5)
>24 months	257(42.5)	348(57.5)
Perceived duration to stop BF		
< 24 months	157(25.90	448(74.10
> 24 months	448(74.10)	157(25.90)
Discuss about contrac. with partner	289(47.8)	282(46.6)
Discuss about sex with partner	258(42.6)	311(51.5)
preferred time of birth spacing		
<36 months	163(26.9)	442(73.1)
>36 months	234(38.7)	371(61.3)
I don't know	208(34.4)	397(65.6)

Mothers have different reasons to stop breastfeed their child, accordingly the majority of mothers, 316(52.2%) stop breast feeding because the child is being old enough, followed by a considerable number of mothers, 191(31.6%) who stop breastfeed their child because of inconvenience due to work and other causes were health problem of the mother as well as occurrence of new pregnancy and because of child starts to eat food.

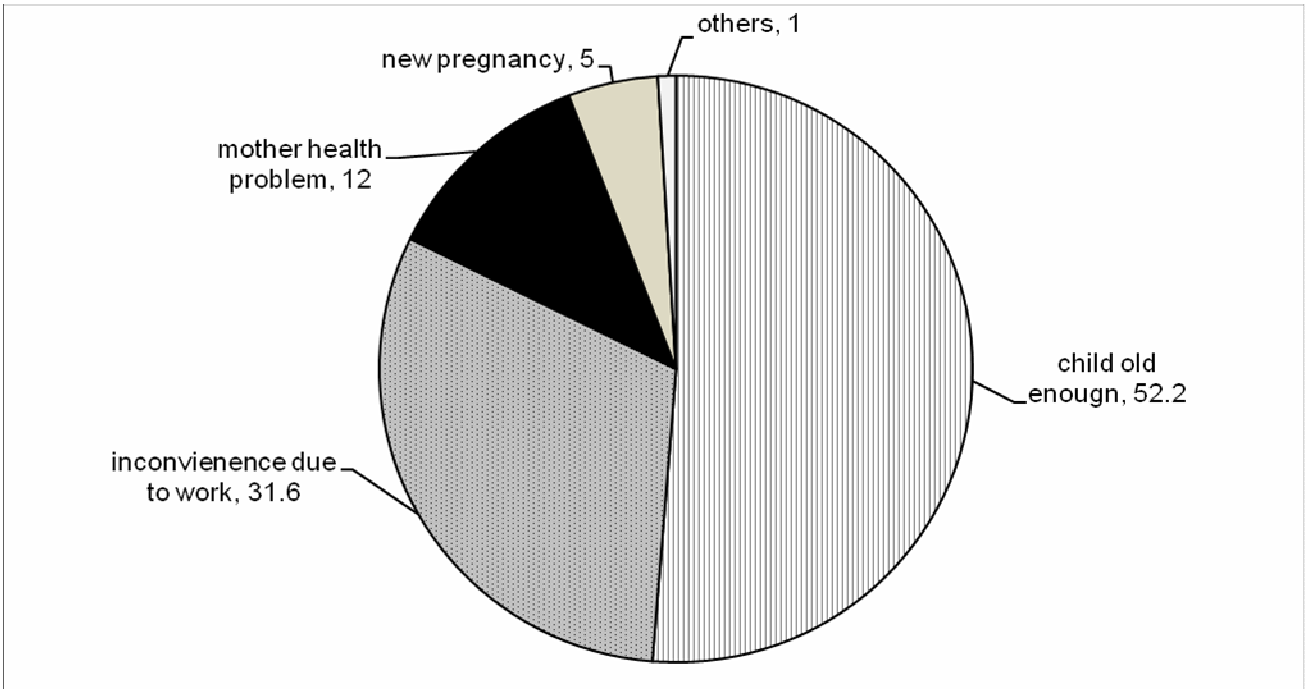


Figure 4 : Reasons to stop breast feeding to index child Maichew town, March to April, 2010.

5.1.4. Health service utilization of the study population

The study showed that almost all the participants have access for health institutions like health center and hospital as well as private clinics and practiced services such as antenatal care,133(22%), immunization, 603(99.7%) and family planning 270(44.6%).The larger portion of the respondents have information about contraceptive 574(94.9%) and the major source of information were from health sector, 566(98.6%) followed by mass media, 318(55.4%). Among the participants, 270(44.6%) use contraception and 335(55.4%) didn't use.

The length of contraception used were less than 24 months in 207(76.7%) participants and 63(23.3%) respondents used contraception over 24 months. Nearly half of the participants, 302(49.9) were well informed about birth spacing by the health workers, where as only, 90(29.8%) participants were informed about the newly recommended birth interval length of 3-5 years and a significant number of participants, 195(64.6%) didn't know the preferred time of birth spacing.(see table 3)

Table 3: Service utilization of the study population in Maichew town, March to April, 2010.

Health Service utilization (N=605)	Frequency	
	Yes Number (%)	No Number (%)
Access for health service		
Health center	389(64.3)	216(35.7)
Hospital	357(59.0)	248(41.0)
Private clinic	31(5.1)	574(94.9)
Service used		
Antenatal care	133(22.0)	472(78.0)
Immunization	603(99.7)	2(.3)
Family planning	270(44.6)	335(55.4)
Information about contraception	574(94.9)	31(5.1)
Length of contraception used		
<24 month	207(76.7)	63(23.3)
>24 month	63(23.3)	207(76.7)
Health workers inform birth spacing	302(49.9)	303(50.1)
Informed time of BI (n=302)		
<36 months	17 (5.6)	285(94.4)
>36 months	90(29.8)	212(70.2)
I don't know	195(64.6)	107(35.4)

The major source of information for contraceptives was largely from health sector, 565 followed by mass media, 318. (See figure 5)

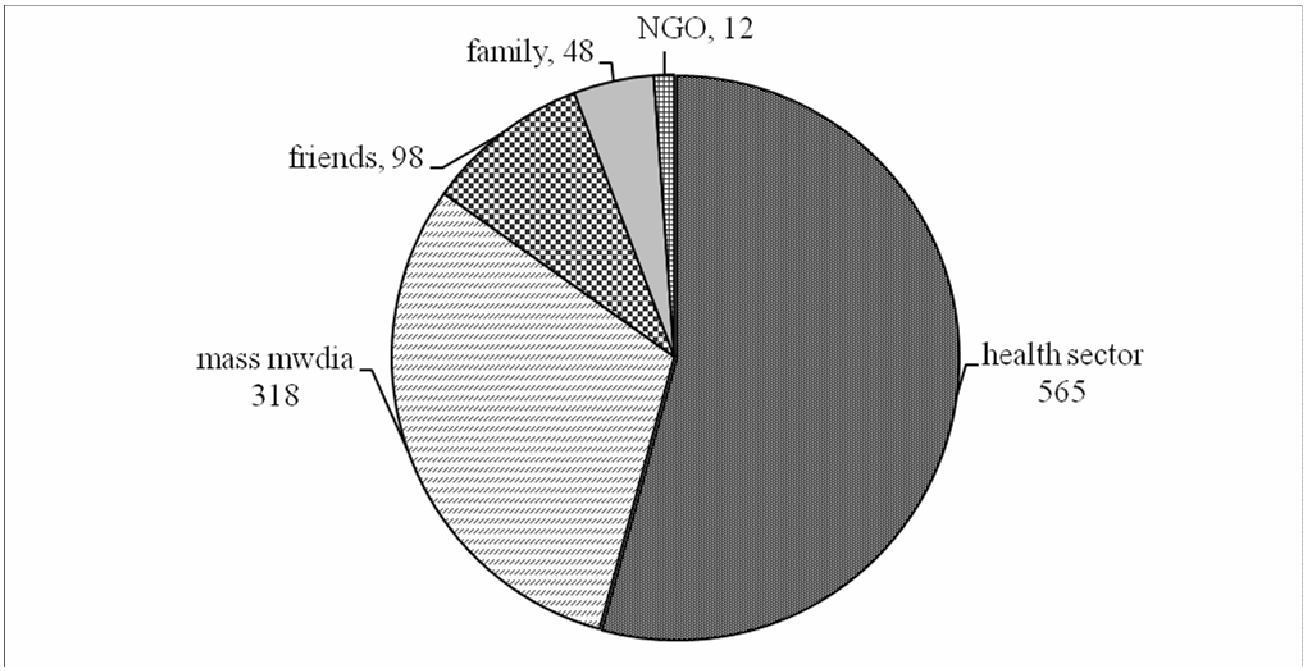


Figure 5: Source of information for contraception in Maichew town, March to April, 2010.

Among the participants of contraceptive users, the major type of contraceptive used were injectable, 170 followed by pills and implants which were 75 and 20 respectively.(See figure 6)

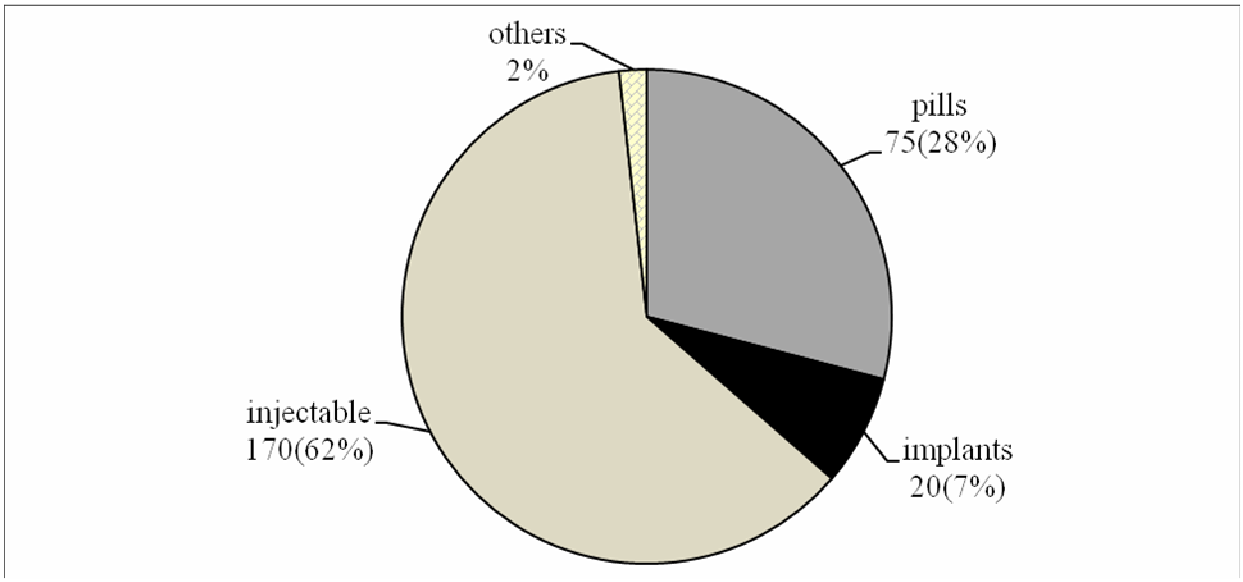


Figure 6: Types of contraceptive methods used in Maichew town, March to April, 2010.

More than half of the participants, 335 (55.4%) were not using contraceptive because of different reasons. Some of these reasons which have been raised by the respondents for not using contraception were due to health condition of the mother, 123(36.7%) (including fear of side effects and fear of infertility) which was followed by desire for more children, 104(31.04%), religious reason, 76(22.7%)and lack of knowledge of family planning, 31(9.2%) as it is seen from figure 7.

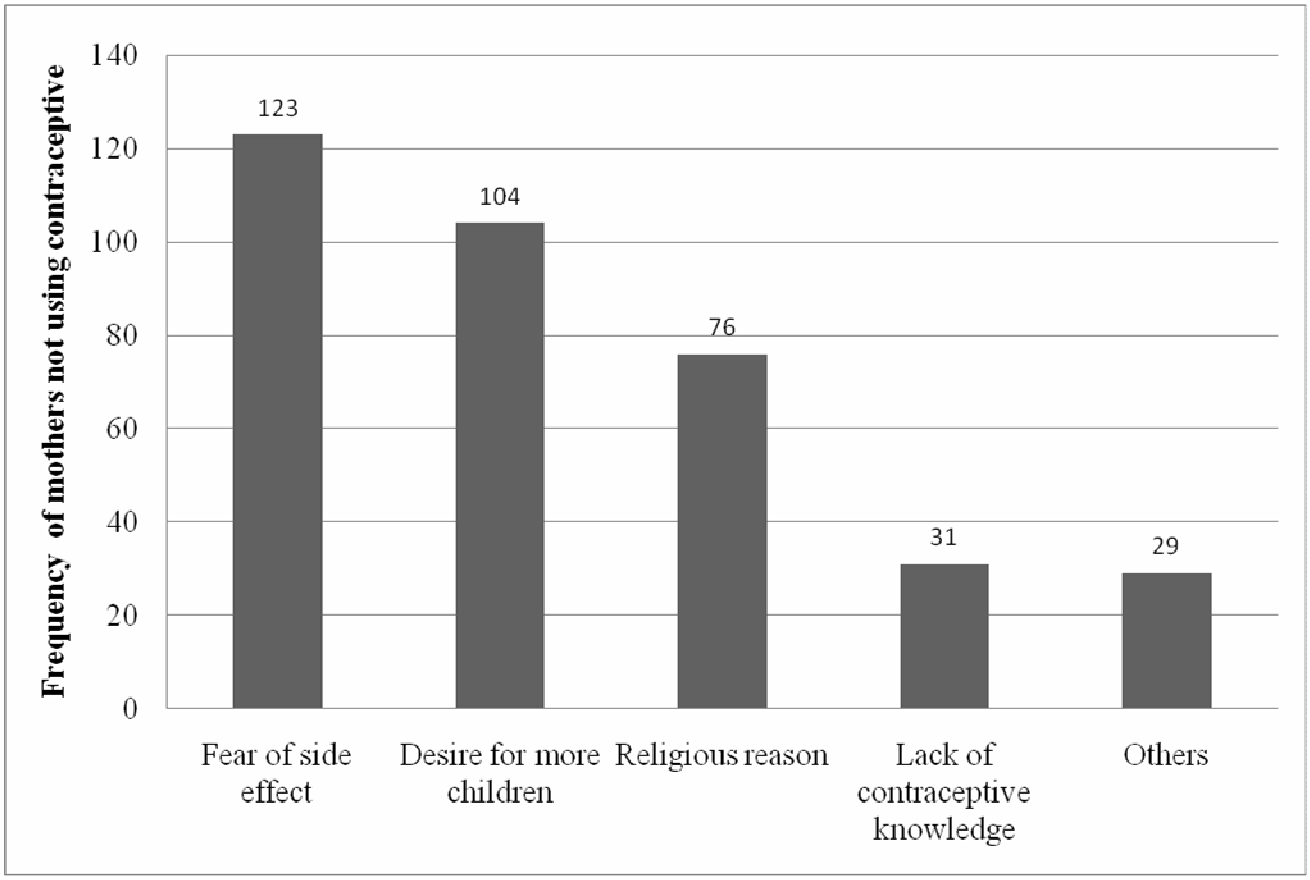


Figure 7: Reasons for not using contraceptive in Maichew town, March to April, 2010

5.2. Determinants of length of birth interval

5.2.1. Socio demographic factors associated with short birth intervals

Birth intervals are expected to vary between different populations or between groups within the same population. These variations are expected to be associated with the socioeconomic and demographic characteristics of participants. Therefore this section examines variations among women in the study area with respect to their socio demographic characters using the length of birth intervals less than 36 months which is computed by different characteristics of women.

To determine factors associated with the dependent variable (birth interval), binary logistic regression was done and computed with each independent variable as seen in table 4. Accordingly maternal age, maternal education, religion, maternal social status, partner education, maternal work status and monthly household income was analyzed using binary logistic regression. However, of these variables maternal age, maternal education, husband education, maternal social status, maternal work status and monthly income were found significantly associated with birth interval.

Among the participants about one third had no education (29.4%), and were found significantly associated with occurrence of short birth intervals below 36 months indicating that those with primary education were less likely to have short birth interval when compared with mothers of no education [COR .496 and 95%=C.I (.311, .791)] and those with secondary education and above were also less likely to have short birth interval when compared with mother of no education [COR of .121 and 95%= CI(.076, .193)].

The partners education was also significantly associated with short birth intervals showing that , women whose partners have no education were more likely to have short birth intervals by nearly 44% [COR .562 and 95%=CI(.369, .856)] compared to those with partners having primary education and those with partners having secondary education and above had less likely short birth interval when compared with those having no education and primary education [COR .189 and 95% = C.I (.121 , .297)].

The maternal social status was also found statistically significant with short birth interval indicating that those with lower social status were more likely to have short birth interval compared with those of moderate social status and higher social status [COR .068 at 95%= CI(.036, .130)] and [COR of .006 at 95%= CI (.002, .017)] respectively.

In this study, those who are working are significantly less likely to have intervals shorter than 36 months (three years) than those not working; it was about 39 % higher among those not working when compared to those of working [COR .614 and 95% = C.I (.441, .854)].

The household monthly income of participants was significantly associated with short birth interval. Mothers with monthly household income of less than 500 eth. Birr were more likely to have short birth interval by 44% compared to those who earn more than 500 eth. Birr [COR .561 and 95% = C.I (.390, .806)].

Table -4 Socio demographic factors affecting birth intervals in study population Maichew town, March to April ,2010.

Variables	Birth interval		
	< 36 months	> 36 months	COR (95% CI)
Age			
20-29	130	83	1.00
30-39	200	128	.417(.283-.614)
40-49	27	37	.010(.002 -.041)
Maternal education			
No education	133	45	1.00
Primary	127	88	.496(.311, .791)
Secondary +	97	115	.121(.076, .193)
partner education			
No education	127	62	1.00
Primary	144	96	.562(.369, .856)
Secondary+	86	90	.189(.121, .297)
Maternal social status			
Lower	152	32	1.00
medium	178	164	.068(.036, .130)
higher	27	52	.006(.002, .017)
Religion			
Orthodox	322	225	1.00
Muslim	33	23	.776(.447, 1.349)
Work status			
not working	176	96	1.00
working	181	152	.614(.441, .854)
Monthly Income			
<500	128	62	1.00
>500	228	184	.561(.390 -.806)

5.2. 2. Reproductive characteristics associated with short birth intervals

Reproductive variables such as parity, breast feeding, contraceptive use, age at birth of index child, and age at first marriage, sex preference, Perception when to stop BF, discussion about contraception and making decision on number of children were computed using binary logistic regression. Among all these variables parity, breast feeding, contraceptive use and age at birth of index child were found significantly associated with birth interval.

Birth intervals are closely linked with the number of children a woman has. Women who have 2-3 children have more likely to have short intervals than those who have children between 4-6 and 7 and more by 63.4% and 69.7% respectively. This implies that those with higher parity have longer birth interval than with lower parity, this could be because of the reason that mothers with higher parity fulfill their need to children and they are well experienced in regulating their fertility.

Among the studied participants about 58% of mothers breast feed for less than 24 months. Those mothers who breastfeed more than 24 months were found less likely hood of having short birth interval [COR .335 and 95% = CI (.254, .496)] compared to those mothers who breast feed for less than 24 months. The median birth interval of mothers who breastfeed for less than 24 months was 33.3 month where as the median birth interval for mothers who breast for more than 24 months was 37 months.

Another reproductive variable, age at birth of index child was also found significantly associated with short birth interval showing that those aged 25 years and above at birth of their index child were less likely having short interval by nearly 18% compared to those aged below 18 years [COR .178 and 95% = CI (.073, .434)]. The other variables relevant to reproductive behavior were not associated with birth interval as seen in figure 2. Some variables such as post partum amenorrhea and post partum abstinence were not analyzed for their effect in birth interval because more participants didn't report reliable information during interview. A binary logistic regression was also made for maternal education with their perception to time of birth spacing and the association was significant.

Table 5: Reproductive variables associated with short intervals Maichew town, March to April, 2010.

Variables	Birth Interval		
	< 36 months	> 36 months	COR (95% CI)
Parity			
2-3	220	145	1.00
4-6	121	94	.366(.259, .519)
7+	16	9	.303(.132, .695)
Sex preference			
male	117	77	1.00
female	107	60	1.237(.805,1.900)
no preference	133	111	.763(.521,1.118)
Breast feed index child			
< 24 months	223	125	1.00
>24 months	134	123	.335(.254, .496)
Age at birth IC			
<18years	24	17	1.00
18-24years	102	59	.442(.174,1.123)
25+ years	230	172	.178(.073,.434)
Decide number of child			
Husband	34	11	1.00
Wife	85	60	.836(.421,1.662)
Both	238	177	.875(.464,1.649)
Age at first marriage			
<18 years	33	27	1.00
>18 years	323	218	1.516(.888, 2.588)
Discuss contraception			
yes	227	180	1.00
no	129	68	1.094(.774,1.548)

A cross –tabulation of maternal education was done with mothers behavior to discussion about contraceptive with their partner show significant association [COR 2.02 at 95% = CI (1.38, 2.95)] at p-value .00014. This association implies that those who have some education discuss about contraceptive with their partner nearly two times more than women with no education. But there is no any significant association between mother's behavior to discuss about sexual issues and education. (See table 6)

Table 6.A cross-tabulation of birth interval * discussion about contraception and sexual issues with partner in Maichew town ,March to April, 2010.

Maternal education	Discuss contraception		Discuss sexual issues	
	Yes	No	Yes	No
no education	100(56.2)	78(43.8)	71(39.9)	107(60.1)
some education	308(72.1)	119(27.9)	202(47.3)	225(52.7)
P value	.00014		0.09	
COR 95% CI	2.02(1.38, 2.95)*		1.35(0.93,1.96)	
X^2	14.56		2.79	

P*= < 0.05

5.2.3. Health service factors affecting birth interval among the study population

This study examined some measures of service utilization with a focus on maternal and child health such as antenatal care, immunization and contraceptive use as these can be points for disseminating information on birth spacing. Women tend to use antenatal services—only 20 % of women had used antenatal care. Nearly 100% of mother immunizes their child and 44.6% of mothers used family planning service.

About 44.6% the mothers studied used a method of contraception after the birth of the index child. Those women who used contraceptive have were less likely to have short birth interval when compared with none contraceptive users [COR .321 and 95% = CI (.229, .450)]. Mothers who used contraceptive less than 24 months had 87.4 % of short birth interval when compared with those mothers who used contraceptive more than 24 months [COR .126 and 95% = CI (.057, .278)].

Table 7: Health Service factors associated with birth interval Maichew town, march to April, 2010.

Health Service utilization (N=605)	Birth interval		COR 95% = CI
	< 36 months	> 36 months	
Information about contraception			
yes	336	238	1.00
no	21	10	.836(.404,1.728)
Contraception use status			
Non users	229	106	1.00
user	128	142	.321(.229, .450)
Length of contraception used			
<24 month	105	102	1.00
>24 month	23	40	.126(.057, .278)
HW inform about birth spacing			
yes	168	134	1.00
no	189	114	1.062(.768,1.469)

5.3. Multi variat analysis of predictors with length of birth interval

Several socio demographic, reproductive and health service factors such as age, parity, religion, maternal education, partner education, maternal work status, maternal social status, monthly household income, length of breast feeding, age at birth of index child and contraception use status were tested for the presence of association with the outcome variable of short birth interval. These variables except religion and maternal social status were found significantly associated using binary logistic regression analysis.

Variables which were significant using binary logistic regression were furtherly analyzed using multiple logistic regressions to minimize the confounding effect of some variables. It was adjusted for age, parity, religion, maternal education, maternal age at birth of index child, partner education, maternal social status, monthly household income, length of breast feeding and contraception use status. Variables like age, maternal education, partner education, maternal social status, and monthly household income, length of breast feeding and contraception use were found significantly associated with short birth interval.

Among the predictors age was found significantly associated with short birth interval. Those mothers aged 30-39 years old were less likely to have short birth interval nearly by 40% compared to mothers aged 20-29 years [AOR .405 and 95% = CI (.185, .885)]. In another explanation mothers aged 20-29 years old were more likely to have short birth interval when compared with mothers aged 40 – 49 years [AOR .004 and 95% = CI (.001, .029)].

Maternal education was also found significant with short interval. There was no significant difference between mothers with no education and primary education but those mothers with no education were found significant showing that they are more likely to have short birth interval nearly by 85% AOR .155 and 95% CI = (.079, .302) compared with mothers with secondary education and above .

Another interesting predictor found associated with short birth interval was partner education. Those mothers with a partner having no education were more likely to have short birth interval nearly by 50 % compared to mothers having partner of primary education [AOR .488 and 95%=CI (.256, .932)] and by 80 % compared to mothers having partner of secondary education and above [AOR .199 at 95 % = CI(.099, .400)].

Moreover, maternal social status was also found significantly associated with short birth interval showing that those mothers with moderate social status were less likely to have short birth interval when compared to mothers of lower social status [AOR .062 and 95% = CI (.025, .154)]. Mothers of higher social status were also less likely to have short birth interval comparing with mothers of lower social status [AOR .006 at 95% =CI (.002, .020)]. Short birth interval among women of lower social status, moderate social status and higher social status was 75%, 63% and 36.4% respectively.

Length of breast feeding was also an important predictor showing significant association with short birth interval [AOR .460 and 95% = CI (.274, .772)]. Those mothers who breast feed the index child more than 24 months were less likely to have short birth interval by nearly 46% compared with those who breast feed less than 24 months. Among the health service factors, contraceptive use status was found statistically significant with short birth interval [AOR .406 at 95% = CI (.242, .681)] indicating that mothers of none contraceptive users were more likely to have short birth interval by about 60% when compared with contraceptive users. (see table 8).

Table 8. Predictors of short birth interval, Maichew town, March to April, 2010.

Variables	Birth interval		COR (95% CI)	AOR (95% CI)
	< 36 months	> 36 months		
Age				
20-29	130	83	1.00	1.00
30-39	200	128	**.417(.283, .614)***	**.405(.185, .885)***
40-49	27	37	**.010(.002, .041)***	**.004(.001, .029)****
Parity				
2-3	220	145	1.00	1.00
4-6	121	94	**.366(.259, .519)***	.773(.421, 1.420)
7+	16	9	**.303(.132, .695)***	.879(.220, 3.510)
Maternal education				
No education	133	45	1.00	1.00
primary	127	88	**.496(.311, .791)***	.655(.329, 1.301)
Secondary +	97	115	**.121(.076, .193)****	**.155(.079, .302)****
partner education				
No education	127	62	1.00	1.00
primary	144	96	**.562(.369, .856)***	**.488(.256, .932)***
secondary	86	90	**.189(.121, .297)****	**.199(.099, .400)****
Work status				
not working	176	96	1.00	1.00
working	181	152	**.614(.441 , .854)***	.836(.487, 1.436)
Maternal social status				
lower	91	49	1.00	1.00
moderate	244	170	.068(.036, .130)*	**.062(.025, .154)****
higher	22	29	**.006(.002, .017)***	**.006(.002, .020)****
Monthly Income				
<500	128	62	1.00	1.00
>500	228	184	**.561(.390, .806)***	.711(.370, 1.366)
Length of BF IC				
<24 months	223	125	1.00	1.00
>24 months	134	123	**.355(.254, .496)***	**.460(.274, .772)***
Age at BIC				
>18years	24	17	1.00	1.00
18-24years	102	59	.442(.174,1.123)	.931(.263, 3.304)
25+ years	230	172	**.178(.073,.434)***	.803(.211, 3.066)
Contraception use				
non user	229	106	1.00	1.00
user	128	142	**.321(.229, .450)***	**.406(.242, .681)***

P* = <.05 p**=<.001

6. Discussion

This study intended to identify the socioeconomic and demographic, the reproductive and service utilization determinants of birth interval as well as identifying the relative importance and contribution of each predictor variable to the outcome.

6.1. Pattern of length of birth interval across age category

In this study, mean birth interval of the study population was 35.24 ± 5.06 months with a range of 22 to 64 months and the median birth interval is 34.6 months (2.84 years). The median birth interval of this study (34.6 months) is lower than the recommended birth interval and it is a considerable difference when compared with the outcome of short birth interval. Across age category, this study found that the median length of birth interval among 20-29, 30-39 and over 40 years of age were 32.4, 35 and 42 months respectively. When comparing median intervals across age groups, the shortest median interval does occur among younger mothers than older. The reason for this could be because of younger women are more fertile and sexually active, in addition to this, the duration of breastfeeding practice is shorter than older women.

The result of this finding is consistent with the finding from Mozambique indicating that the pattern of birth spacing across age group 15-19 year old mothers have the shortest interval of 28.9 months while those 20-29 have slightly longer intervals of 32.7 months. Only those who are thirty and older have intervals longer than three years—36.3 months among 30-39 year olds and 41.7 months among those forty and over (13).

The study done in rural Saudi on pattern of birth interval across age group also support the finding of this study , showing that women 30-34 years old had about an eightfold increased birth interval compared to those in the younger age group (20-24 years). Older women, 35 years and over, were 19 times more likely to have a long birth interval (12).

The finding of this study is also more consistent with the EDHS 2005, which indicates median length of birth interval 31.6, 35 and 38.8 months for age group 20-29, 30-39 and 40-49 years respectively across age group. The national median birth interval was 33.8 months which is a little bite lower than the current finding of 34.6 months (9). This might be due to the increased access and information about family planning and the study is conducted in urban.

6.2. Socio demographic Determinants of birth interval

Maternal age and parity

Maternal age and parity were an important predictor variables found statistically significant determinants of birth interval using binary logistic regression. In multi variant analysis parity was not found statistically significant. This study indicated that the length of birth interval is increasing with age of mother and younger women are more likely than older women to have their next child within 3 years. (Table 4 and 5)

A similar study done in Mozambique showed that, younger women were more likely to have an interval less than three years than those older; the reason might be 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 (13).

Another study done in rural Saudi also support the current study showing that child-spacing is increased with age because of the relationship of breastfeeding practices with age and parity. The proportion of women with short birth interval was lower in high parity and older women because older mothers practiced breastfeeding as their primary contraceptive method (12).

Increasing birth intervals, with increasing maternal age, is probably due to an increase in experience and knowledge of mothers with age or due to different physiological characteristics of different age groups and decreasing fertility with aging. However, women must be educated that long birth intervals (>6 years) are problematic when it causes the women to be over age 35 years at the time of pregnancy since it is associated with adverse pregnancy outcomes (15).

The EDHS, 2005 also strengthen the finding of study that maternal age is a determinant factor for birth interval showing that the proportion of short birth intervals decrease with increasing age, alternatively those young women have short birth interval than older mothers (9).

Maternal education

In the present study maternal education was significantly associated using binary logistics with occurrence of short birth intervals below 36 months indicating that having primary education decrease short birth interval by nearly 50% when compared with mothers of no education [COR .496 and 95%=C.I (.311, .791)]. When further analysis was done using multivariate logistic regression, mothers with no education were more likely to have short birth interval compared to mothers with secondary education and above nearly by 85% [AOR .155 at 95 % CI= (.079, .302)].

Comparable study findings also indicate that women's educational level affect their birth interval differently from one place to another. 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. Differences in childbearing preferences may account for some birth spacing differences and women with more education are more likely to use contraception to prolong their birth intervals. Also, women with more education may work outside the home or live in urban regions, both of which can lead to longer birth spacing (7).

A similar study conducted in Vietnam and Egypt suggested that women with some education experiences a significantly lower probability of having a subsequent birth at every birth order, that the woman's education is a prime determinant of fertility and that increasing the educational attainment of women is one of the most beneficial measures to reduce fertility (5,21).

Education is a key variable in explaining birth interval differentials. Education is expected to have a negative impact on fertility and birth spacing through a change in the socio-cultural and reproductive behavior of married women including child loss, knowledge and practice of contraception as well as through changes in family size norms (2). In Pakistan, study indicated that educated females in major urban areas achieved their family size faster than women residing in other urban and rural areas (20).

The EDHS 2005 also indicated that the median birth interval is longer among births to women with at least some secondary education than among births to women with lower level of education (9).

Paternal education

The partners education was also significantly associated with short birth intervals in this study both in binary and multi variant logistic regression analysis showing that, women whose partners have no education were more likely to have short birth interval compared to mothers having partner of primary and secondary education by 50% and 80% respectively. This finding possibly implies that husbands with primary and secondary education influence their wives to use contraceptive and provide information about importance of long birth interval.

Similar finding from Mozambique showed that, 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 (13). In Bolivia, Women married to men with no schooling were 1.4-2.0 times more likely to have short birth interval compared to women with partners with some schooling (23).

Social and work status of mother

In this study, short birth interval was about 39 % higher among those not working when compared to those of working in binary logistic regression. This finding is consistent with study done in Mozambique indicating that those who are working are significantly less likely to have intervals shorter than three years than those working; 49 percent among those working versus 53 percent among those who are not.. This could be due to working women having better access to

knowledge on fertility regulation thereby contributing to a reduction in pregnancies (13).A study conducted in Bolivia also strengthened the present finding by indicating that mothers working were 1.3 times less likely to have a next birth at all parities compared to none working women (23).

Concerning to social status of participants, this study was found significantly associated with short birth interval showing that those mothers with lower social status were more likely to have short birth interval when compared to mothers of moderate social status and mothers of higher social status. Short birth interval among women of lower social status, moderate social status and higher social status was 75%, 63% and 36.4% respectively.

Other studies also showed those 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. In India women of lower social and economic status have median birth intervals of 14 months compared with 21months among women of higher status (7).

6.3. Reproductive Determinants of birth interval

Length of Breast feeding

When multi variat regression analysis was done, it was observed that breastfeeding duration had a significant association with short birth interval showing that those mothers who breast feed the index child more than 24 months were less likely to have short birth interval by nearly 50% compared with those who breast feed less than 24 months. The median birth interval of mothers who breast feed below 24 months was about 33.3 months compared to 37 months among those who breast feed above 24 months. Majority of women breast feed their index child less than two years in this study compared to the EDHS 2005, with median breast feeding of 25.8 months. The possible explanation for the difference may be being the current study is done in urban and the urban women are less likely to breast feed longer than the rural. The EDHS data are composed of both urban and rural community (9).

Basically the present study is consistent with many studies done in Pakistan and Manipur about the determinant effect of breast feeding on birth interval. These studies suggest that educated urban females with high parity (4+) had longer intervals due to greater contraceptive use and a diminished desire to have more children. Urban females also had shorter duration of breastfeeding and tended to have shorter median intervals at higher ages at marriage (18, 20).

In Babol, the mean birth intervals were 34.2 and 64.9 months for mothers who breastfed their index child <6 months and ≥24 months, respectively thus by increasing the duration of breastfeeding, the mean birth interval increased significantly (15).

Similarly a study in Manipur showed that duration of breast feeding is found to be the most influential factor on birth interval dynamics. The possible reason is the duration of breast feeding can lengthen the post partum amenorrhea. Breast feeding seems to have suppressed the ovulatory cycle and acts as a major form of protection against conception. Mothers in Manipur breastfeed for an average of 33 months which is longer than the minimum of 24 months recommended by WHO for most children (18).

Moreover, other comparative study to the present one in Saudi Arabia suggests the practice of breastfeeding as a contraceptive method has declined; the use of contraceptives sold freely over the counter can be taken as the major reason for a prolonged birth interval. It is nevertheless important to encourage mothers to breastfeed their infants in view of the mass of evidence of its beneficial and protective effects for both mothers and infants (12).

Postpartum amenorrhea and abstinence were significant predictors of length of birth interval in other studies such as EDHS, 2005. In this study further analysis was not done because of missing cases.

6.4. Service utilization determinants of birth interval

The present study examined some measures of service utilization with a focus on maternal and child health services as these can be points for disseminating information on birth spacing. Among the health service factors, contraceptive use status was found statistically significant with short birth interval indicating that mothers of none contraceptive users were more likely to have short birth interval by 75% when compared with contraceptive users. Most mothers better utilize immunization service than delivery, ANC and contraceptive services. (Table 8)

Educated urban females with high parity (4+) had longer intervals due to greater contraceptive use and a diminished desire to have more children. Communication programs in the health care service with the new message of 3 to 5 years may need to address the apparent conflict with the 2-year spacing message of the past (7). In this study only 38.5% of the respondents had preferred time of birth spacing in the range of the new norm, 3-5 years.

The differences between the results of the above studies and the current study may be due to differences in geographic, cultural and socioeconomic factors and the various studies were conducted in different years and thus the access and coverage rates of family planning varied.

7. Strength and limitation of the study

7.1 Strength of the study

The information is collected directly from clients (primary data) that avoid missed information and record error, measurements are done specifically for this study and data collectors are trained to do so. Study subjects were selected randomly and pre-tested questionnaires were used. Moreover, adequate sample size has been taken so that it is more representative to the study area.

7.2 Limitation of the study

- Poor reporting of their date of births and monthly household income of participants.
- Reproductive variable like postpartum amonerrhoe and sexual abstinence were not furtherly analyzed because of lack of adequate and reliable information but these were believed to be important determinant predictors in other studies so that it was not possible to examine the effects of these variables on birth spacing practices.
- The study is conducted only in the town that doesn't represent the great majority of the rural community lacking more information and service
- As any cross sectional study cause and effect relationship was not possible to establish for the factors in the study for it is impossible which factor occur first.

8. Conclusion and recommendation

8.1 Conclusion

It is well known that longer birth intervals are important for the health of mothers and their children. However, dissemination of information about the recommended range of birth spacing by health workers in the health service is not sufficient, only 22% of the participants were informed about it. The median birth interval of this study population was 34.6 months which implies 50% of the study population has birth interval less than the median that reflects majority of birth intervals are below three years.

Predictors such as maternal age, partner education, and maternal social status, length of breast feeding and contraceptive use were major determinants of short birth interval in multivariate logistic regression. Age of mother was an important factor for the difference in length of birth interval and showed a pattern that older women have longer birth interval than younger women.

The significance of partner education implies that considering other family members such as partner other than the mother is vital since most women do not make decisions about family planning by themselves; messages about birth spacing for husbands and other family members are useful because partners may influence their wives to use contraception.

The mother's education also plays a major role in determining length of birth interval, specially educating mothers up to secondary education and above. Women should be encouraged for education in order to make self decision in controlling reproductive behaviors like contraceptive use and sexual issues as well as to get adequate information about their reproductive issues. Moreover male education should also be encouraged by the local stakeholders

A significant relationship between longer breastfeeding duration and longer succeeding birth intervals has been demonstrated in this study. In population with low contraceptive use, this finding may help as a basis for promoting longer breastfeeding for non contraceptive mothers in the study area. The duration of contraception use in the majority was less than two years, which has less significant effect to reduce short birth interval.

8.2 Recommendations

Based on the above findings, the following recommendations are suggested:

A greater attention should be given to the delivery of family planning services to women, particularly younger ones (20-29 years old) being they are more vulnerable to have short birth interval. Health care providers in the study area should give more emphasis on disseminating information on health benefits of the recommended range of birth interval especially to younger mothers and continues support and education about the importance of prolonged contraceptive use and breast feeding beyond two years should be provided in order to prolong birth interval.

One of the findings of this study shows that women's social status was consistently significant with short birth intervals. Therefore, any concerned body working relevant to this issues, government and non government organizations should design projects (income generating and education) to support women especially to those none educated and having lower social status to increase their economic independency and decision making power in order to improve their status at home or in the community. By doing so, longer births interval could be maintained.

Since achieving longer birth interval is crucial for maternal and child health, encouraging women for education is important. Usually, women with lower or no education didn't decide and control issues about their reproductive behaviors like contraceptive use and sexual issues so that health workers should provide a counseling service to these mothers in every opportunity when they visit any health services. Government should support and encourage female education in long term program. Moreover male education should also be encouraged by the local stakeholders.

Most women do not make decisions about family planning by themselves, messages about birth spacing for husbands and other family members also should be given in different ways. Considering the proportion of the contraceptive users, mothers (30-49 years old) who breast feed longer should be promoted and those younger should be encouraged.

Since the proportion of short birth interval is high further study on the outcome and the knowledge of health workers about the recommended birth interval (3-5 years) in the study area needs further assessment by the Wereda health office or regional health bureau.

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10. ANNEX

10.1 – Annex-.1 Questionnaire

10.1.1 English version

A. Information sheet Questionnaire Number _____

Hello! How are you? My name is _____. I live in this district. Now I am a research team member of AAU. There is a research to be conducted here .The objective of the study is to assess the pattern and determinants of length of birth interval in Maichew town .If you agree to participate in the study as respondent you will have a probability to be selected with equal chance as other participants. If you are randomly chosen as a study participant you will not have any risk in participating in the study except losing part of your time. The study may be advantageous in providing some basic factors that can determine the problems related with short birth intervals and these factors may have a power in the implication of program and policy consideration. All the genuine information obtained from you will be strictly kept confidential and your participation is surely voluntary and you can withdraw any time during conducting the study and by doing so you will not face any problem. But I kindly request your willingness to participate in the survey to met its goal and benefit for future generation.

Are you willing to participate in the interview and stay with us for few minutes?

[ ] Yes, Go to next interview [ ] No, Thank! Proceed to next eligible participant

Institutional Review Board
Tel . 0115538734
P.O.B . 9086
aaumfirb@yahoo.com

B. Verbal consent form for the study participants

I have received sufficient information about the project. I have had opportunities to ask questions and these questions have been answered to my understanding and satisfaction. I consent voluntarily to this study and I understand I understand that I have the right to withdraw at any time without any consequence on the public service receives.

Name of the interviewer_____ Signature of the interviewer _____

If you have something to ask concerning the study, you can contact the principal investigator.

PI - Mache Tsadik	Institutional review board
Phone No.- 0914743841,	Tel . 0115538734
P.O.B- 306	P.O.B . 9086
email - machetsadik@yahoo.com ,	aaumfirb@yahoo.com

Thank you!

Part I. General information

Number	questions	Response	Skip to
ID			
001	Kebele	----------	
002	House hold no	…….	
003	Name of data collector	----------	
004	Date of interview (in Eth.calendar)	____ Date ____ month ____ year	
005	Supervisor Name	----------	

Part II. Socio-demographic and economic characteristics

S.No	Questions	Response	Skip to
101	Age of mother in completed years	…….	
102	How many children have you ever born alive (parity)?	Total …….M……..F……	
103	How many total children do you want to have?	……..	
104	Who decide the no of children you want to have?	1.Husband 2.Wife 3.Both 89.Others,specify	
105	Sex of the index child (name)	1. male 2.female	
106	Which sex of child do you prefer more?	1.Male 2.Female 3. Both	
107	Birth order of the index child	1. 2^{nd} 2.3^{rd} 3. 4^{th} 4. 5^{th} 5. $\geq 6^{th}$	
108	Religion of respondent	1.Orthodox 2.Muslim 3.Protestant 4.Catholic 8.Others,specify	
109	Mother's educational status at birth of index child	1.no education 2.primary 3.secondary +	

110	Husband's educational status	1.no education 2.primary 3.secondary + 9.I don't know	
111	Mother's occupation at birth of index child	1.Student 2.Private Business 3.Government or NGO 4.House wife 8.others, specify	
112	Mother's perceived social status at birth of index child	1.Very poor 2.Poor 3.Medium 4.Rich 5.Very rich	
113	Household Monthly income at birth of index child	1. < 500 2. 501-1000 3. >1000 8. others, specify	
114	Housing ownership at birth of index child	1. my own house 2. rent of private house 3. rent of gov't house 8. others, specify	
115	Does large family size harm economic condition?	1. Yes 2. No 9. I don't know	
116	Does large family size harm the health of mothers and children?	1. Yes 2. No 9. I don't know	

Part III. History of reproductive behaviors

No	Questions	Response	Skip to
201	What was your age at time of first marriage? (put in completed years)	……years	
202	Age of mother at time of birth of index child (name) (put in completed years)	……years	
203	Birth day of the index child (name)	……...Date ……. month…….. year	
204	Birth day of the last child	……...Date ……. month…….. year	
205	The age difference b/n the index child (name) the subsequent live birth? (Put in months)	…….. months	
206	What do you perceive about the preferred time of spacing b/n the index child and the subsequent live birth?	1. < 36 months 2. > 36 months 9. I don't know ⟶	Q- 208
207	Why do you prefer the time interval mentioned in Q. no 206? (circle all mentioned by the respondent)	1. Good for health of mother 2. Good for health of child 3.Does not harm economy 4.Does not harm work 8. others, specify	
208	Have you ever heard contraceptive?	1.yes 2.no ⟶	Q- 216
209	If yes to Q-208, what was your source of information about contraception? (circle all mentioned by the respondent)	1.Health sector 2.Family 3.Friend 4.Mass media 5.NGO 8. others, specify	
210	If yes to Q-208, have you ever used Contraceptive after the birth of the index child (name)?	1. yes 2. no ⟶	Q215

211	If yes to Q210, what type of contraceptive did you use after the birth of the index child? (circle all mentioned by the respondent)	1. Pills 2. inject able 3. Implants 4. traditional 8. others, specify	
212	Referring to Q-211 for how long did you use contraceptive after the birth of the index child?	1. < 12 months 2. <18 months 3. < 24 months 4. < 36 months 5. > 36 months	
213	According to your response on Q-211 for what purpose do you use contraceptive?	1. for spacing births 2.for limiting number of family ⟶ 8.others, specify 9. I don't know	Q216
214	If your response to Q- no 213 is "for spacing births", for how long had you intended to space consequent birth?	1. < 36 months (<3 years) 2. ≥ 36 months (≥3 years) 9. I don't know	
215	If your response to Q-210 is No, what was the reason for not using contraceptive after the birth of the index child (name)? (circle all mentioned by the respondent)	1. Desire for more children 2. Health condition 3. Religious reason 4. Lack of knowledge of Contraception 5. FP service not available 8. Other (specify)	
216	For how long did you breast feed the index child (name)	1. < 12 months 2. <18 months 3. < 24 months 4. > 24 months 5. Didn't breast feed	

217	Referring to Q-216, what was the reason for stopping breast feeding at the mentioned time? (circle all mentioned by the respondent)	1. The child being old enough 2. New pregnancy 3.The mother was sick 4. Inconvenience due to work 8. other(specify)	
218	When do you think breast feeding should stop completely?	1. < 12 months 2. <18 months 3. < 24 months 4. ≥ 24 months	
219	When did you see the resumption of your menstruation after birth of index child?	1…… months 9. I don't know	
220	For how long did you abstain from sexual intercourse after the birth of index child?	…… months 9. I don't know	
221	What is the health institution you used for any health service? (circle all mentioned by the respondent)	1. health center 2. Hospital 3.private clinic	
222	Does the distance of the health institution hinder you from using health service?	1. yes 2. no	
223	Did you use the following service after birth of index child? (circle all mentioned by the respondent)	1. ANC 2. Delivery 3. Immunization 4. F/P service 8. Others, specify	
224	Referring to response of Q no 223, Does any health worker informed you the preferred time of birth spacing?	1. yes 2. no ⟶	Q226
225	If yes to Q no 224, what is the preferred time of birth spacing being told to you?	1. < 36 months 2. ≥ 36 months 9. I don't know	
226	Do you communicate (discuss) about sexual relation with your husband?	1. yes 2.no	
227	Do you communicate (discuss) about contraceptive use with your husband?	1. yes 2.no	

10.2.2. Tigrigna Version (Questionnaire)

ሀ. ንተሳተፍቲ ዝወሃብ ሓፅር ናይ ሓበሬታ ቅጥዒ ቁፅሪ መሕቲት _____

ከመይ ሓዲርኪን/ዉዒልክን? ሽመይ _____ ይበሃል።ኣብዚ ወረዳ'ዚ ይነብር።ኣብ'ዚ ዝግበር ዕንዓት ኣሎ። ናይ'ቲ ዕንዓት ዕላማ ኣብ ከተማ ማይጨው ኣብ መንጎ ክልተ ብተኽታታሊ ዝዉለዱ ቆልዑ ዘሎ ናይ ዕድመ ኣፈላላይ ወሰንቲ ዝኾኑ ኩነታት እንታይ ምኺኖም ንምግንዛብ'ዩ።ስለዝኾነ ንስኽን ኣብቲ ዕንዓት ንምስታፍ ተተስማሚዕክን ንኩሉ ማዕረ ዕድል ክህልዎ ዝገብር ዕጫ ክህሉ እዩ። ኣጋጣሚ ናይቲ ዕንዓት ተሳታፊት ንክኾና ተተመሪፀን ኣብቲ ዕንዓት ብምስታፈን ብዘይካ ናይ ደቓይቕ ግዜ ምጥፋእ ምንም ዓይነት ዘስግእ ወይ ዘፍርሕ ነገር የብሉን ። ኣብ'ዚ ዕንዓት'ዚ ብምስታፈን ብዛዕባ ኣብ ተኽታተልቲ ዉላዳት ዝህሉ ናይ ዕድመ ኣፈላላይ ንምንታይ ከምዝኾነ ካብቲ መሕቲት ዝተወሰነ ግንዛበ ክረክብ ይኽእላ እየን።እዚ ዕንዓት'ዚ ክህልዎ ዝኽእል ጥቅሚ ኣብ ተኽታተልቲ ዉላዳት ዝህሉ ሓፅር ናይ ዕድመ ኣፈላላይ ከም ምኽንያት ክኾኑ ዝኽእሉ ኩነታት ኣብ ምፍላይን ናይዚ ዕንዓት'ዚ ዉፅእት ድማ ፖሊሲን ፕሮግራምን ኣብ ግምት ብምእታው ብዛዕባ ምጣነ ስድራ ቤተሰብ ጥዕና ዘሎ ግንዛበን ኣተሓሳስባን ብምርዳእ ነቶም ፀገማት ንምፍታሕ ይሕግዝ።

ንእትህባና ቅኑዕ መልስን ሓበሬታን ብጥብቂ ብሚስጥር ዝዕቀብን ነ'ዚ ዕንዓት'ዚ ዕላማ ጥራሕ ዝዉዕል እንትኸውን ብተወሳኺ ድማ ኣብ'ዚ ዕንዓት'ዚ እንትሳተፋ ብድሌት ጥራይ ምኻኑን ነቲ ዕንዓት ንምቁራፅ እንተደልየን ድማ ኣብዝኾነ እዋን ከቋርፃ ይኽእላ እየን። ብምቁራፀን ድማ ኣብ ዝረኽብኦ ክንክን ግልጋሎት ጥዕና ምንም ዓይነት ዕዕንቶ የብሉን። ይኹንደኣምበር ኣብቲ ዕንዓት ምስታፈን እቲ ዕንዓት ዝተበገሰሉ ዕላማ ዕዉት ንምግባርን ንቑፃሊ ወለዶ ዘለዎ ጥቅምን ግደን ዝዓበየ ስለዝኾነ ንክሳተፋ ብትሕትና ንሓትት።

ኣብቲ ዕንዓት ንክሳተፋን ዝተወሰነ ደቓይቕ ምሳና ንክፀንሓን ፍቓደኛ ድየን?

[ ] እወ፡ እቲ ቃለ መሕቲት ይቅዕል [ ] ኣይፋሉን ፡ የቕንየልና

ኢንስትቱሽናል ሪቪው ቦርድ

ስ፡ ቁ 0115538734

ፖስታ.ሳ.ቁ 9086

ኢ- መይል aaumfirb@yahoo.com

ለ. ናይ ተሓታታይ ፍቃድ መረጋገፂ

ብዛዕባ እቲ ፕሮጀክት እኹል ዝኾነ ሓበሬታ ዝተዉሃበኒ እንትኾን ብዝረኽብክዎ መብርሂ ዓጊበ ‘የ። ነዚ ቃለ መሕቲት ንምስታፍ ዝተስማዕማዕኹ እንትኾን እቲ ቃለ መሕትት ኣብ ዝኾነ እዋን ናይ ምቁራፅ መሰለይ ሕሉው እዩ።

ናይ ሓበሬታ ኣካቢ ፊርማ_____ ዕለት_____

ብዛዕባ እቲ መፅናዕቲ ሕቶ ተልይወን ምስቲ ዋና መፅናዕቲ ዘካይድ ሰብ በዚ ዝስዕብ ኣድራሻ ክራኽባ ይኽእላ’የን ።

ዋና መፅናዕቲ ዘካይድ ሽም ፡ ማቸ ፃዲቅ
ስ፡ ቁ 0914743841,
ፖስታ ሳ.ቁ 306
ኢ- መይል machetsadik@yahoo.com

ኢንስትቱሽናል ሪቪው ቦርድ
ስ፡ ቁ 0115538734
ፖስታ.ሳ.ቁ 9086
ኢ- መይል aaumfirb@yahoo.com

,

የቐንየለይ !

ቐዳማይ ክፋል ፡ ሓፈሻዊ ሓበሬታ

ተ.ቁ	ሕቶ	መልሲ	ናብ --- ዝለልል
መ.ቁ			
001	ቀበሌ/ጣብያ	…….	
002	ቁፅሪ ገዛ	…….	
003	ሽም ኣካቢ ሓበሬታ	.……. .	
004	ቃለ መሕቲት ዝተገበረሉ ዕለት (ብናይ ኢትዮድያ ኣቆጣፅራ)	……ዕለት……ወርሒ……ዓመት	
005	ሽም ተቆጣጣሪ	…… . .	

ካልኣይ ክፋል ፡ <u>ናይ ተሓታቲ ማሕበረ-ስነ ህዝባዊ ኩነታት ዝምልከት</u>

ተ.ቁ	ሕቶ	መልሲ	ናብ-- ዝለልል
101	ዕድመኺን ክንደይ'ዩ ?ብሙሉእ ዓመት	……. . ዓመት	
102	ብህይወት ዝተወልዱ በዝሒ ደቅኺን ክንደይ እዮም?	ጠቕላላ……. ኣነ…… . . ተባ…….	
103	ጠቕላላ ክንደይ ቆልዑ ክህልዉወን ይደልያ?	……. . .	
104	ክህልዉኽን ዝግባእ በዝሒ ቆልዑ ዝውስን መን እዩ?	1. በዓል ገዛይ 2. ባዕለይ 3. ኣነን በዓል ገዛይን 8. ካልእ ተልዩ ይጠቕስ	
105	ናይ እቲ/ታ ቆልዓ (ሽም) ዖታ ታይ'ዩ?	1. ተባዕ 2. ኣነስ	
106	ኣይናይ ዓይነት ዖታ ብዝበለፀ ይመርፃ	1. ተባዕ 2. ኣነስ 3. ኩሎም	
107	እቲ/ታ ቆልዓ (ሽም) መበል ክንደይ ዉላድክን እዩ/ያ?	1. 2ይ 2. 3ይ 3.4ይ 4. 5ይ	

		5. ≥6ይ	
108	ሃይማኖትኺን እንታይ እዩ?	1.ኦርቶዶክስ 2.መስልም 3.ፕሮተስታንት 4. ካቶልክ 8.ካልእ ይገለፅ	
109	እቲ/ታ ቆልዓ (ሽም) እንትወለድ ዝነበረክን ደረጃ ትምህርቲ	1.ምንም ኣይተምሃርኩን 2.ቀዳማይ ደረጃ 3.ካልኣይ ደረጃ ካብኡ ንላዕልን	
110	እቲ/ታ ቆልዓ (ሽም) እንትወለድ በዓል ገዛኺን ዝነበሮም ደረጃ ትምህርቲ	1.ምንም ኣይተምሃረን 2.ቀዳማይ ደረጃ 3.ካልኣይ ደረጃ ካብኡ ንላዕልን 9. ኣይፈልጥን	
111	እቲ/ታ ቆልዓ (ሽም) እንትወለድ ዝነበረክን ስራሕ እንታይ'ዩ?	1.ተምሃሪት 2.ናይ ዉልቀ ስራህ 3. መንግስታዊ/ዘይመንግስታዊ ሰራሕተኛ 4.መመሓደሪት ገዛ 8.ካልእ, ይጠቐስ	
112	እቲ/ታ ቆልዓ (ሽም) እንትወለድ ኣብቲ ሕ/ሰብ ዝነበረክን ናይ ማሕበራዊ ናብራ ብርኪ ታይ ይመስል?	1.ብጣዕሚ ዲኻ 2.ዲኻ 3.ማእኸላይ 4. ሃፍታም 5.ብታዕሚ ሃፍታም	
113	እቲ/ታ ቆልዓ (ሽም) እንትወለድ ዝረኽብኦ ዝነበራ ወርሓዊ ናይ ገዛ እቶት ክንደይ ነይሩ?	1. < 500 2. 501-1000 3. >1000 8. ካልእ፣ይገለፅ	
114	እቲ/ታ ቆልዓ (ሽም) እንትወለድ ዋንነት ዝነበራሉ ገዛ	1. ናይ ባዕለይ 2. ናይ ዉልቀ ሰብ ክራይ 3. ናይ ቀበሌ/መንግስቲ ገዛ 8. ካልእ፣ይገለፅ	
115	በዝሒ ቤተሰብ (ቆልዑ) ምህላው ኣብ ኢኮኖሚ ጉድኣት ኣለዎ'ዶ ይብላ?	1. እወ 2. ኣይፋሉን 9. ኣይፈሊጥን	

116	በዝሒ ቤተሰብ (ቆልዑ) ምህላው ኣብ ጥዕና ኣደታትን ቆልዑን ጉድኣት ኣለም'ዶ ይብላ?	1. እወ 2. ኣይፋሉን 9. ኣይፈሊጥን	

ሳልሳይ ክፋል፡ ባዛዕባ ኩነታት ስነ- ተዋልዶ ዝምልከት

No	ሕቶ	መልሲ ⟶	ናብ-- ዝለል
201	ንመጀመርያ ጊዜ ኣብ ክንደይ ዕድመኺን ተመርዕዊኺን ? (ብሙሉእ ዕድመ)	..... ዓመት ⟶	
202	ካብ/ታ ቆልዓ (ሽም) እንትወልዳ ዕድመኺን ክንደይ ነይሩ? (ብሙሉእ ዕድመ)	..... ዓመት	
203	ናይ ሕ.ቑ 203 መልሰን እወ እንተኾይኑ እቲ/ታ ቆልዓ (ሽም) ዝተወለደሉ/ትሉ መዓስ'ዩ?	.....ዕለት.....ወርሒ.....ዓመት	
204	ምንኣስ እቲ/ታ ቆልዓ (ሽም) ዝተወለደሉ/ትሉ እዋን መዓስ'ዩ?	.....ዕለት.....ወርሒ.....ዓመት	
205	ኣብ መንጎ እቲ ቆልዓን (ሽም) ኣብ ምንኣሱን ዘሎ ናይ ዕድመ ኣፈላላይ ክንደይ እዩ?ብወርሒ	.....ወርሒ	
206	ኣብ መንጎ እቲ ቆልዓን (ሽም) ምንኣሱን ክህሉ ዝግባእ ናይ ዕድመ ኣፈላላይ ክንደይ ተዝኾነ ይምረፅ ትብላ?	1. < 36 ወርሒ 2. > 36 ወርሒ 9. ኣይፈሊጥን	 ሕ.ቑ 208
207	ኣብ ተ.ቑ 206 ዝገለፅኦ ናይ ዕድመ ኣፈላላይ ንምንታይ መርፀንኦ? በቲ ተሳታፊ ዝግለፀ ኩሎም ኣኽብብ	1.ንናይ ኣደ ጥዕና ፅቡቅ'ዩ 2.ንናይ ቆልዑ ጥዕና ፅቡቅ'ዩ 3.ዓቕሚ ኣይጎድእን 4.ስራሕ ኣይጎድእን 8. ካልእ ተልዩ ይጠቕስ	
208	ብዛዕባ ጥንሲ መከላኸሊ እንትብሃል 'ዶ ሰምዕኺን ትፈልጣ?	1.እወ 2.ኣይፋሉን	ሕ.ቑ 216

209	ናይ ሕቶ ቁፅሪ 208 መልስኺን እወ እንተኾይኑ ዝሰማዕክንየ ሓበሬታ ካብ መን'ዩ? በቲ ተሳታፊ ዝግለፀ ኩሎም ኣኽብብ	1.ካብ ጥዕና ትካል 2.ካብ ቤተሰብ ⟶ 3.ካብ መሓዙት 4.ካብ መራኽቢ ማዕኸናት 5.ካብ ዘይመንግስታዊ ትካላት 8. ካልእ ተልዩ ይገለፅ	
210	ናይ ሕቶ ቁፅሪ 208 መልስኺን እወ እንተኾይኑ ድሕሪ እቲ/ታ ቆልዓ (ሽም) ምዉላድክን ጥነሲ መከላኸለ ተጠቒምኺን ትፈልጣ'ዶ?	1.እወ 2.ኣይፋሉን	ሕ.ቑ 215
211	ናይ ሕቶ ቁፅሪ 210 መልስኺን እወ እንተኾይኑ ዝተጠቐማሉ ናይ መከላኸለ ዓይነት እንታይ ነይሩ? በቲ ተሳታፊ ዝግለፀ ኩሎም ኣኽብብ	1.ክኒን 2.መርፊእ 3.ኣብ ቲሕቲ ቀርበት ዝቅበር 4. ባህላዊ/ 8. ካልእ ተልዩ ይጠቐስ	
212	ብመሰረት ሕ.ቑ 211 እቲ ዝወሰድኦ መከላኸለ ንክንደይ ግዜ ነይሩ? ብወርሒ	1.<12 ወርሒ 2.<18 ወርሒ 3.< 24 ወርሒ 4.<36 ወርሒ 5.≥ 36 ወርሒ	
213	ብመሰረት ሕ.ቑ 211 መልስኽን እቲ ዝወሰድክንኦ መከላኸለ ጥንሲ ንምንታይ'ዩ ነይሩ?	1. ናይ ወሊድ ግዜ ንምንዋሕ 2. ምዉላድ ጠጠው ንምባል 8. ካልእ ተልዩ ይጠቐስ 9. ኣይፈሊጥን	ሕ.ቑ 216
214	ናይ ሕቶ ቁፅሪ 213 መልስኺን "ናይ ወሊድ ግዜ ንምንዋሕ" እንተኾይኑ ንክንደይ እዋን ንምንዋሕ ተልመን ነይረን?	1. < 36 ወርሒ 2. ≥ 36 ወርሒ 9. ኣይፈሊጥን	
215	ናይ ሕቶ ቁፅሪ 210 መልስኺን "ኣይፋሉን'' እንተኾይኑ ናይ ጥንሲ መከላኸለ ንክይተጥቀማ ምክንያት ዝኾነክን ነገር እንታይ'ዩ?	1.በዝሒ ቆልዑ ስለዘደለ 2.ናይ ጥዕና ጉዳይ 3.ናይ ሃይማኖት ጉዳይ 4.ናይ ጥንሲ መከላኸለ ፍልጠት	

	በቲ ተሳታፊ ዝግለፀ ኩሎም ኣኽብብ	ዘይምህላው 5. ናይ ምጣነ ስድራ ግልጋሎት ዘይምህላው 8.ካልእ ተልዩ ይጠቕስ	
216	እቲ/ታ ቆልዓ(ሽም) ምስ ተወለደ/ት ንክንደይ እዋን ጡብ ጦብዩ/ያ?	1. <12 ወርሒ 2. <18 ወርሒ 3. <24 ወርሒ 4. ≥ 24 ወርሒ 5. ኣይጠበወን	
217	ብመሰረት ናይ ሕቶ ቁፅሪ 216 መልስኺን ኣብቲ ዝተጠቕሰ እዋን እቲ ቐልዓ ጡብ ምጥባው ዝሓደገሉ/ትሉ ምኽንያት ታይ ነይሩ?በቲ ተሳታፊ ዝግለፀ ኩሎም ኣኽብብ	1. እቲ/ታ ቐልዓ ስለዝዓበየ/ት 2. ብጥንሲ ምኽንያት 3. ብናይ ኣደ ሕማም 4. ብስራሕ ምኽንያት 8. ካልእ	
218	ቆልዓ ጡብ ምጥባው ክገድፎ ኣለዎ ዝብለኡ ግዜ መዓስ'ዩ?	1.<12 ወርሒ 2. <18 ወርሒ 3. <24 ወርሒ 4. ≥ 24 ወርሒ	
219	እቲ/ታ ቆልዓ(ሽም) ምስ ወለድክን ናይ ኣዴታትኺን ድሕሪ ክንደይ ግዜ ሪእኽን?	……..ወርሒ 9. ኣይፈሊጥን	
220	ድሕሪ ወሊድ ካብ ስጋዊ ሪክብ ንክንደይ እዋን ታዓቅብኺን?	……..ወርሒ 9. ኣይፈሊጥን	
221	ንጥዕን ግልግሎት እትጥቀማሉ ናይ ጥዕና ትካል ዕንታይ'ዩ? በቲ ተሳታፊ ዝግለፀ ኩሎም ኣኽብብ	1. ጣብያ ጥዕና 2. ሆስፒታል 3. ናይ ዉልቀ ክሊኒክ	
222	ናይቲ ጥዕና ትካል ርሕቐት ናይ ጥዕና ግልጋሎት ተጠቃሚት ንክይትኾና ኣፀግሙልክን ድዩ?	1. እወ 2. ኣይፋሉን	
223	እቲ/ታ ቆልዓ(ሽም)ምስ ወለድክን ታይ ዓይነት ናይ ጥዕና ግልጋሎት ረኽበን? በቲ ተሳታፊ ዝግለፀ ኩሎም ኣኽብብ	1. ግልጋሎት ክንክን ጥንሲ 2. ግልጋሎት ወሊድ 3. ግልጋሎት ክታበት 4. ግልጋሎት ምጣነ ስድራ	

		8. ካልእ ተልዩ ይጠቕስ	
224	ብመሰረት ናይ ሕቶ ቑፅሪ 223 መልስኺን ብዛዕባ ኣራሓሕቕካ ምዉላድ ትምህረቲ/ ሃበሬታ ዝሃበን ጥዕና በዓል ሞያ ኔይሩ'ዶ?	1. እወ ⟶ 2. ኣይፋሉን	ሕ.ቑ 226
225	ናይ ሕቶ ቑፅሪ 224 መልስኺን "እወ" እንተኾይኑ ብዝረኽብክንኡ ሓበሬታ እቲ ተመራሚ ግዜ ክንደይ'ዩ?	1. < 36 ወርሒ (3-ዓመት) 2. ≥ 36 ወርሒ (3-ዓመት) 9. ኣይፈሊጥን	
226	ብዛዕባ ዖታዊ ርክብ ምስ በዓል ገዝኣን ተዘራርረበን'ዶ ይፈልጣ?	1. እወ 2. ኣይፋሉን	
227	ብዛዕባ መከላከሊ ጥንሲ ምስ በዓል ገዝኣን ተዘራርረበን'ዶ ይፈልጣ?	1. እወ 2. ኣይፋሉን	

ANNEX -III

DECLARATION

I, the under signed, declared that this is my original work, has never been presented in this or any other University, and that all the resources and materials used for the thesis, have been fully acknowledged.

Name: *Mache Tsadik*

Signature_____

Place: *Addis Ababa, Ethiopia*

Date of subdmission: June 2010

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

Name: *Prof. Misganaw Fantahun (MD, MPH, PhD)*

Signature _____

Date_____