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ADDIS ABABA UNIVERSITY
COLLEGE OF DEVELOPMENT STUDIES
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**PROXIMATE DETERMINANTS OF BIRTH INTERVAL
LENGTH IN AMHARA REGION: THE CASE OF FAGITA
LEKOMA WOREDA, AWI- ZONE**

BY: AYANAW ASSAYE NEGUSSIE



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A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment for the Requirements for the Degree of Master of Science in Population Studies

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SCHOOL OF GRADUATE STUDIES**

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The Case of Fagita Lekoma Woreda, Awi-Zone***

By
Ayanaw Assaye Negussie

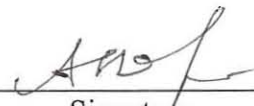
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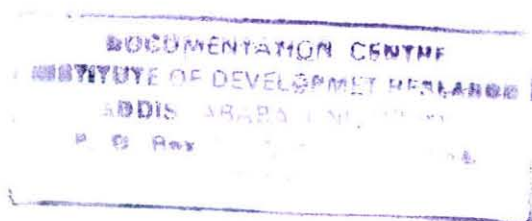
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ABSTRACT

Adequate child spacing is considered as a positive factor on the health of mothers and their children. The birth interval has been reported to have significant effect on the child's future physical and mental capabilities. However, little or no attempt has been made to identify the socio economic, demographic and biological determinants of birth interval length using primary data in the study area. The general objective of this study was an investigation of the key factors affecting birth interval length in Fagita Lekoma woreda. For this purpose, cross sectional study was conducted in three kebeles of Fagita Lekoma Woreda, Awi Administrative Zone. For this study, 504 eligible women (women who had at least two children) were selected by using systematic random sampling technique.

In order to investigate the effects of covariates on the dependent variable, Cox proportional hazard model was used. In bivariate analysis, the Kaplan Meier median length was used to examine birth interval differentials by socio economic, demographic and biological characteristics of women. The results indicated that almost in all birth intervals, educated women, working women, Protestants, urban women, women belonging to the Agew ethnic group, women whose index child has survived, women who had married at 18years of age or after and women who used family planning programs have longer birth interval lengths.

In multivariate analysis, work status, contraceptive use and survival status of the index child were consistently significant while age at first marriage and place of residence were significant in some birth intervals.

It is recommended that concerted effort be made to enhance female education, their labor force participation, expand coverage of family planning services and increase age at first marriage.

I. INTRODUCTION

1.1. Background of the study

Differences in a country's fertility levels can be attributed to the differences in the length of the reproductive life of women and differences in the length of time between births when women are exposed to the risk of conception. Analysis of those factors influencing the span and those affecting the spacing of fertility has proven useful, since in many cases they appear to vary quite substantially across populations (Rodriguez et. al., 1984). In recent years, policy makers and planners have focused a great deal of attention on the birth interval and its determinants. The reasons are that not only does the number of births a woman may have during her reproductive span depend on the spacing between the births but also there is significant link between birth spacing and maternal and child health (Miller et. al., 1992).

Birth intervals are growing longer over time in most countries. Of 34 countries with multiple surveys since 1986 conducted by USAID, the proportion of women waiting at least 3 years between births has risen between the first surveys in almost all countries (USAID, 2002). There are several reasons:

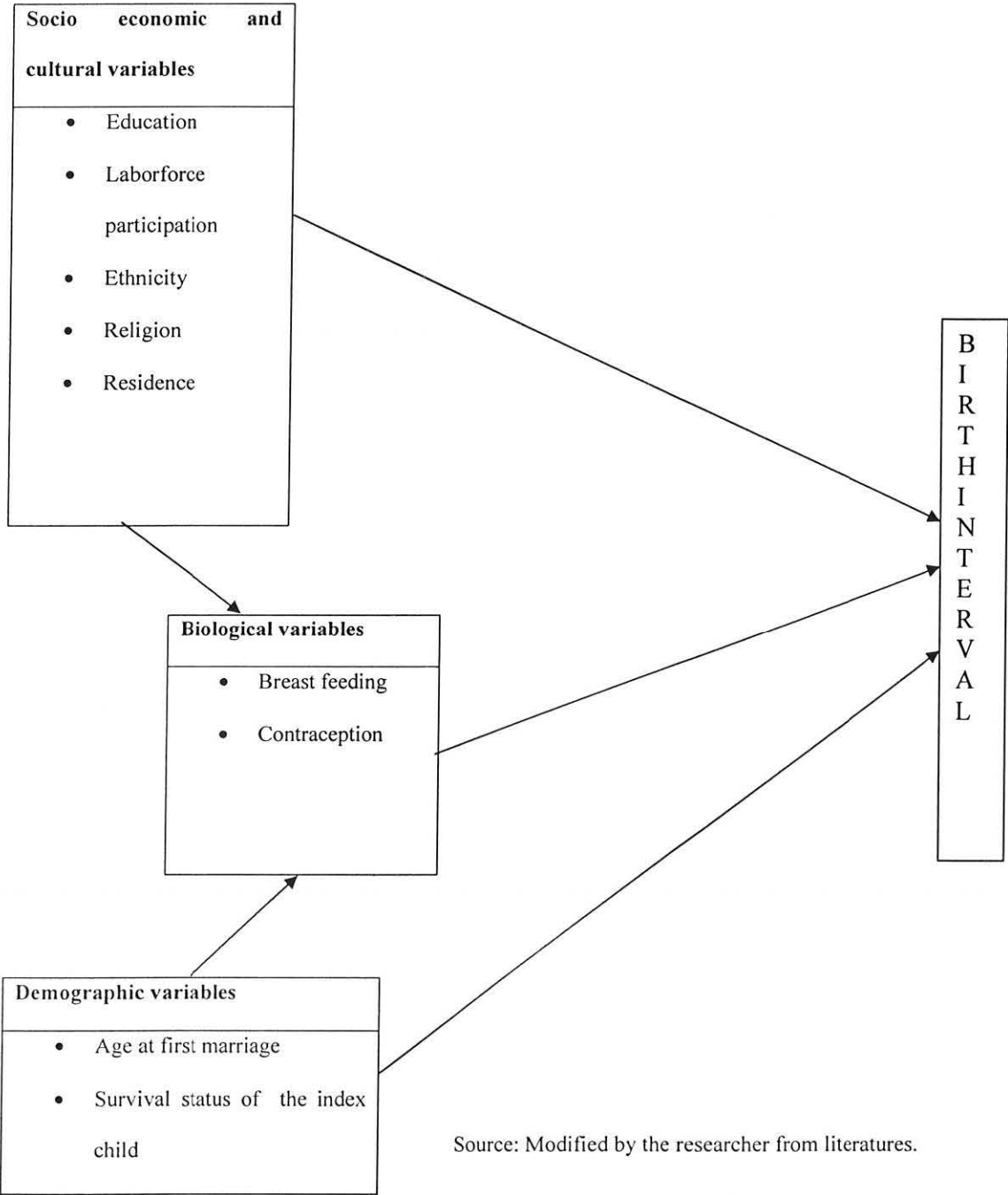
1. Women may be more motivated to space births because their opportunities for education and employment are expanding, and thus more may want to postpone the next pregnancy.
2. People have great means to control their fertility as family planning services have expanded, particularly in urban areas.
3. In some countries economic and political instability may have led more couples to postpone having children.

Birth intervals are lengthening faster in some countries, such as Indonesia and Zimbabwe, than in others. In Indonesia birth intervals are rising the fastest. Indonesia's median birth interval has increased from 34 months in 1978 to 45 months in 1997- an average increase of over 1 month every year. The percentage of women with birth intervals shorter than 3 years has dropped from 55% in 1987 to 36% in 1997, a reduction of almost two percentage points per year. Strong government support for family planning, increased access to

1.7. Conceptual Frame work

The independent variables can be classified into socio economic, demographic and biological factors while the dependent variable is birth interval length in months. The socio economic and cultural variables that should be considered in terms of their possible association with birth interval include: education; labor force participation; place of residence; ethnicity and religion. Age at first marriage and survival status of the index child are demographic variable while breast feeding and contraceptive use are biological variables. According to the diagram, women's background variables such as education, ethnicity, labor force participation religion etc, are important in determining birth interval length directly or indirectly, through the biological variables i.e. by altering the intensity and duration of breast feeding as well as the use of modern and effective contraceptive methods. Demographic variables can also influence birth interval length indirectly through their impact on the biological variables.

Fig.1.conceptual frame work.



1.8. Literature Review

1.8.1. Socio economic Determinants of Birth interval length

In this section an attempt has been made to briefly review some of the important socio economic, demographic, and biological variables which are related to birth interval length.

1.8.1.1. Education

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

Female education is strongly associated with fewer children and a lower probability of a recent birth and this partly operates through its effect on marital status (World Bank, 2007). A high education will delay the age of marriage by keeping women in schools and colleges and in the labor market .Education is positively associated with birth spacing, i.e., the higher the education, the longer the interval between one birth and another. Longer spacing may thus result in smaller completed family size and slower growth rate of population (Al_Nahedh, 1999). 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. Women with more education are more likely to use contraception to prolong their birth intervals. Educated women are more likely to be engaged in occupations that are not readily compatible with bearing children. As a result they tend to practice modern and effective contraceptive method more which affects exposure to conception. This is expected to be high in area where access to and availability of family planning methods is high. Under this circumstance, therefore, education is expected to lengthen birth intervals. A study made by Trussell et. al., (1985) on the determinants of birth interval length in the Philippines, Malaysia and Indonesia indicated that higher female education has a

significant and negative effect on the risk of pregnancy in Malaysia and negative but not significant effect in the Philippines. The lower risk of pregnancy for higher educated females implies a longer birth interval.

Education with its social and economic correlates exposes a woman to wide range of general information including attitudes favorable to knowledge and access to modern and effective means of family planning. Under this circumstances, therefore, education is expected to lengthen birth interval. 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 (CSA, 2006).

1.8.1.2. Labor Force Participation

Female participation in the labor force has often been considered one of the means of promoting the use of contraception and thereby indirectly to reduce fertility. Working women by attaining economic independence do not require support from their children as an old age security.

Women's employment is one of the indicators of their status. Different literatures in developing countries highlighted the importance of women's employment to their contraceptive behavior and fertility. For instance, the increasing status of women represented by education and employment decreases the number of children in Kazakhstan (Alsawi, M. and Adamchak D.J., 2000).

Many studies have found negative relationship between women's labor force participation and fertility (for example, Yohannes; 1994; Eshetu; 1994). Those women engaged in work outside the home tend to have smaller completed fertility as compared with those who work inside the home. As inter-births intervals are known to be inversely correlated with the number of children ever born, keeping other factor constant (e.g., Stevenson, 1994) a positive association is expected to exist between women's labor force participation and birth interval length. Women with lower status, whether within the household or within the society and women who are not employed tend to have shorter birth intervals than women of higher status or who are employed. According to Trussell et. al., (1985), women with greater socio economic status, assuming work away from home is associated with

such status, are better and longer users of contraception leading to longer waiting time to conception and birth interval.

1.8.1.3. Religious and Ethnic Differentials

Among the various socio _cultural factors influencing fertility, religion has been considered very important. Religion prescribes a code of life, refers to system of beliefs, attitudes and practices which individuals share in groups, is one of the factors that could affect birth interval length. The difference in birth interval length between different ethnic and religious groups can be largely explained by variation in their cultural practices.

Some cultures encourage a prolonged lactation and sexual abstinence after birth which other cultural practices prohibit the use of contraceptive method, leading to shorter birth interval. Cultural norms and customs that influence women's birth spacing practices include social pressure for women to prove their fertility and breast feeding and postpartum abstinence practices. Preference for sex is another factor affecting birth interval length. Couples who prefer sons tend to have their next child soon after the birth of a daughter. The differences in fertility between religious groups are in part, to the different values attributed to family size, to differences in the practices and customs governing sexual relations and to differences among religious groups in other socio economic variables such as rural urban residence, educational attainment, etc. Further more, in some ethnic or religious groups, marriage is more stable than other groups. Thus, certain cultural practices tend to influence one or more of the reproductive processes thereby affecting the birth interval length.

1.8.2. Demographic and Biological Determinants of Birth interval

Length

1.8.2.1. Age at first Marriage

In Ethiopia, marriage has been an early and universal social institution. A considerably high proportion of women (over 50%) marry before they reach age 20 and by 30, the proportion of married women exceeds well over 95 % (Assefa, 1992). As a result female SMAM is low. Child bearing begins early in Ethiopia. Among regions, Addis Ababa has

the highest median age at first birth (23.5 years), while the Amhara region has the lowest median age at first birth (18years). This indicates that women in the Amhara region initiated child bearing more than 5 years earlier on average than women in Addis Ababa (CSA, 2006).

Family size is positively related to the duration of marriage in the reproductive age span, i.e., the higher the duration of marriage within the reproductive span, the higher the number of children and thus the shorter birth interval. TU (1991), in his study on the birth spacing patterns and correlates in Shaanxi, China, found that age at first marriage was the principal determinants of the first birth interval length. Age at first marriage is inversely correlated with the length of inter-birth intervals for a group of women with the same completed family size (Stevenson, 1994). An inverse relationship also exists between age at first marriage and fertility in population where little or no fertility control is practiced and child bearing outside wedlock is uncommon (Assefa, et. al., 2007). In Ethiopia, early marriage is seen as a way to improve the economic status of the family, to strengthen ties between families, to ensure that girls are virgins when they marry, and to avoid the possibility of a girl reaching an age where she is no longer desirable as a wife. The practice of early marriage is now understood to have very harmful effects on the health, psychological socio economic well being of young girls (as well as for new borns). Girls who marry before the age of 18 are disproportionately affected by complicated pregnancies that may lead to maternal mortality and morbidity, girls aged 10-14 are 5 times more likely to die in pregnancy or child birth than women aged 15-19 are twice as likely to die. Many of these deaths take place within marriage (UNICEF, 2001, cited in Pathfinder International Ethiopia, 2006). Ethiopia is known to have one of the most severe crises of child marriage in the world. Available studies show that although a high prevalence exists nationwide, the practice occurs in its extreme forms and at higher numbers in the northern regions, particularly in Amhara and Tigray Regions. According to NCTPE (2003), the rate is 82% in Amhara, 79% in Tigray, 64% in Benishangule, 64% in Gambella, and 46% in Afar Region. The proportion married before the age of 15 was highest in both rural and urban areas of Amhara. Table 1.1 shows the percentage of women married before the age of 15 years in the urban and rural areas of selected Regions.

Table 1.1 Percentage of women married before the age of 15 years in the urban and rural areas of selected Regions.

Region	Rural	Urban
SNNPR	6.7	13.7
Oromiya	13.3	10.1
Amhara	48.3	27.8
Tigray	26.6	18.8

Source: Path finder International/ Ethiopia 2005; Report on KAP survey in FP.

1.8.2.2. Survival Status of the Index Child

The death of the index child (i.e. the child initiating the interval under consideration) can also affect the likelihood of the timing of having a subsequent birth through its effects on breastfeeding, replacement behavior and the insurance motive. The health of a woman's previous child often affects the timing of her next birth. If a child dies, particularly within the first year of life, couples tend to have their next child sooner than if the child survives. Similarly, if new born is unhealthy in infancy, couples are more likely to have another child without waiting as long as they otherwise would. When a child dies, mothers' subsequent birth intervals are 60% shorter, on the average, than when the child survives (USAID, 2002). A DHS study conducted by USAID (2002) found that the longer the previous child survives, the less the effect on the subsequent birth interval. After age 2, a child's death appears not to influence the mother's subsequent birth interval at all. A child's death result more rapid child bearing. Some couples unintentionally have their next child quickly because a child's early death ends breast feeding and women return to menses and resume ovulation sooner. Some studies have found, however, that the early cessation of breast feeding in explaining why the next child is born sooner when a previous child dies. In Ethiopia, we find significant higher risk of a conception in the months following the death of an index child, even after controlling for postpartum amenorrhea and breastfeeding status. Most Ethiopian women are more eager to replace a dead child when they are near to reach their desired family size (Lindstrom and Gebre-egziabher kiros, 2007).

Studies have shown that the death of a preceding child leads to a shorter birth interval than when the preceding child survived. The median birth interval is more than 8 months shorter for children whose sibling is dead than for children whose previous sibling is alive

(26.1 months and 34.6 months respectively). It is presumed that the difference in the birth interval is related to the desire of parents to replace a dead child as well as to the loss of fertility delaying effects of breastfeeding (CSA, 2006).

1.8.2.3. Breastfeeding and Contraceptive Use

In nearly all developing countries almost all women breast feed their new born children. However, breast feeding differs among cultures both in duration and frequency. Among developing regions the duration of breast feeding ranges from an average of 14 months in Latin America and the Caribbean to 21 months in Sub-Saharan Africa (USAID.2002). Breast feeding practices help determine how long women will remain amenorrheic-without menses and thus less likely to get pregnant-after giving birth. Women who fully or nearly fully breast feed their infants remain amenorrheic longer. Breastfeeding has been established to be a principal determinants of the length of birth intervals through hormonal suppression of ovulation after birth mainly by delaying resumption of ovulation after birth and thus inhibiting fertility (Mainland Bongaarts ,1981 cited in Assefa et. Al., 1994). The prevalence and duration of breastfeeding is well documented to be strong and positively associated with birth interval length (Singh, Kumar and Rana, 1992). The positive influence of the duration and intensity of breastfeeding on birth intervals has been demonstrated to be strong among less educated, rural and unemployed women. A larger proportion of these women practice breastfeeding intensively and for longer duration compared with women with more education, urban residence and employment in a modern sector. The effect of a country's contraceptive use level on the median birth interval varies among countries but appears to be less influential where contraceptive use is lower. Women who want to limit births are motivated to prevent pregnancy; they are the first users of temporary contraception in a country. As the percentage using contraceptives for spacing grows birth intervals begin to grow longer. This trend is reversed in Sub-Saharan Africa: however, where most contraceptive users have been for spacing births.

Ethiopia historically had a very low level of contraceptive use. One of the national population policy objectives was to achieve a total fertility rate (TFR) of 4.0 Children per woman in 2015 by expanding access to family planning Program such that contraceptive use would reach 44 %(Transitional Government of Ethiopia ,1993; reiterated in the PASDEP, 2005 ,cited in World Bank, 2007).

II DESIGN OF THE STUDY / METHODOLOGY/

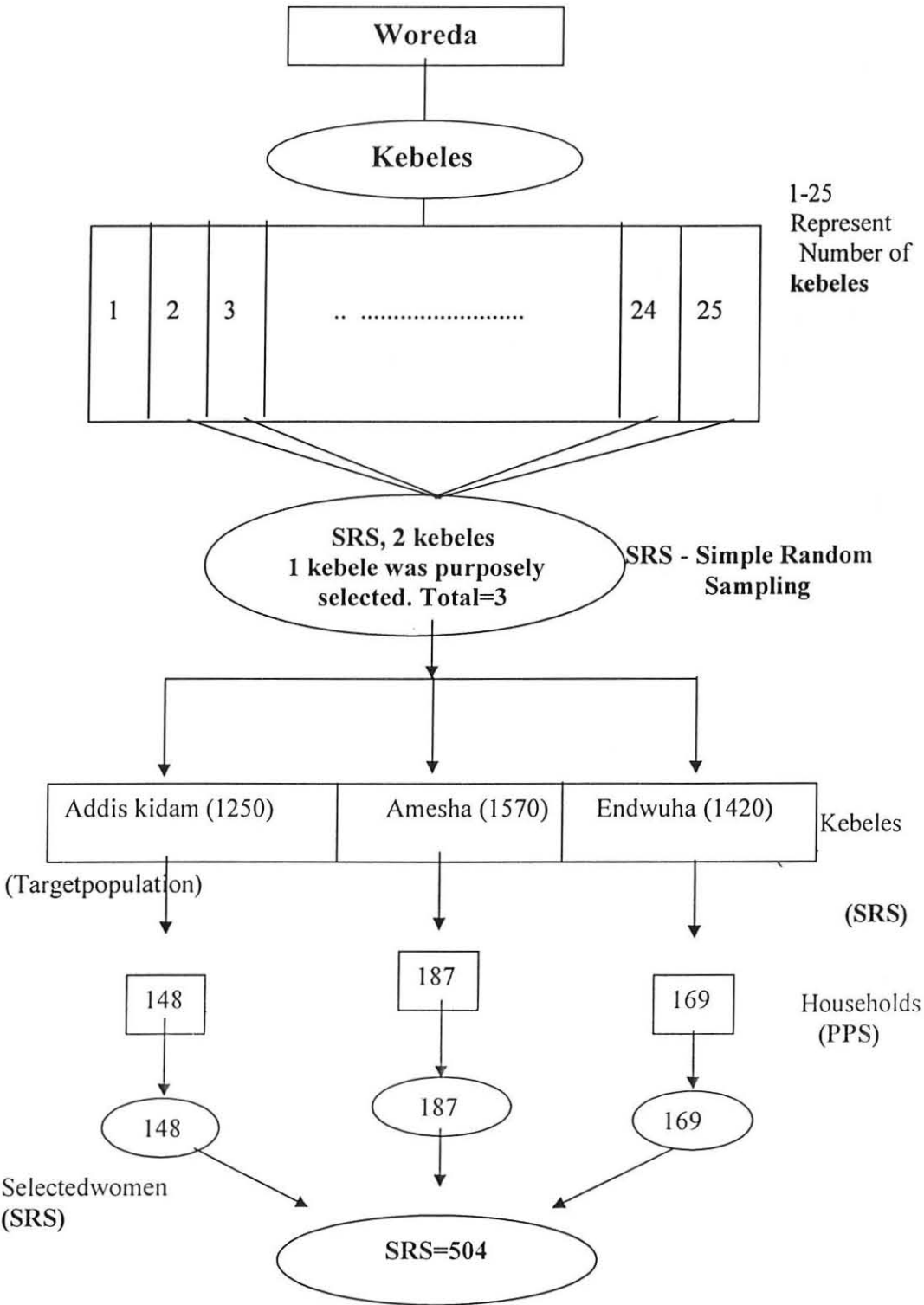
2.1. Target population

The subjects of the study are married women's of Fagita Lekoma Woreda aged from 15 to 49 years who have at least two children are target population for this study

2.2. Sample Size Determination

In this study an attempt was made to adopt a two stage sampling technique. The first stage involves the selection of kebeles. Addis Kidam town was purposely selected so as to see whether some independent variables have differentials across rural and urban residents or not, the other two kebeles namely Amesha Shinkurie and Endwuha were randomly selected using lottery method among the 25 kebeles. Figure 2 shows that schematic presentation of sampling design.

Fig. 2 schematic presentation of sampling design



- How to implement the fundamental principles of research ethics? (Respect for persons, beneficence and justice)
- Discussion on the questionnaire
- Conclusion

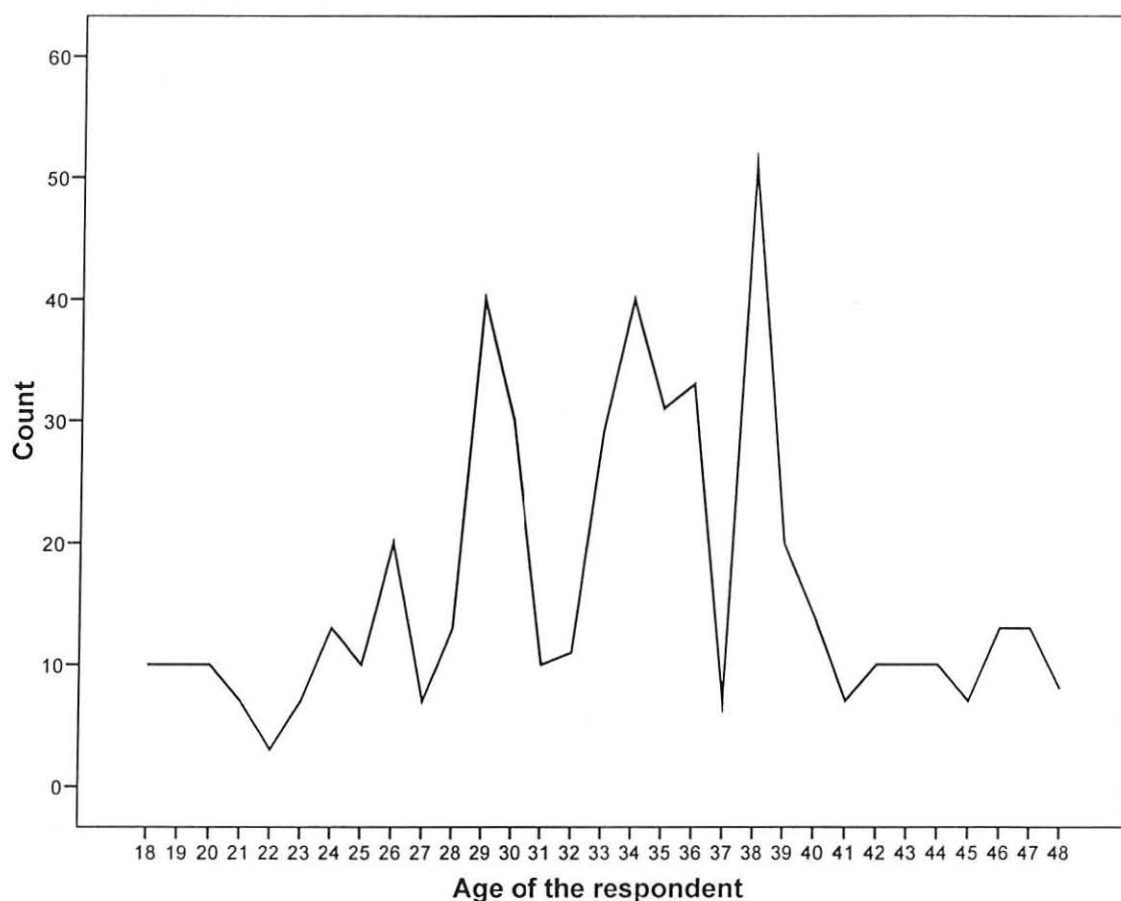
A pilot survey was conducted on 50 eligible women to test the content, ordering and clarity before launching the main survey.

2.4 Assessment of Data Quality and Management

To ensure the quality of data to be gathered through house to house survey, a range of mechanisms was used to monitor the quality of survey implementation. First, the questionnaire was pre- tested on similar settings and necessary modification were made on their clarity, ordering and nature of questions. The researcher has made a day today on site supervision during the whole period of data collection. At the end of each day, the questionnaire were reviewed and cross checked for completeness, accuracy and consistency by the investigator and corrective discussion was under taken with all the research team members. A reminding remark was given during morning time on how to eliminate or minimize errors and take corrective actions timely. More over, the data collected was entered in to computer soft ware immediately after the questionnaire is reviewed. Data was cleaned and edited after it is entered in to the soft ware.

Data obtained from sample surveys are hardly error free. They suffer from two types of errors: coverage and content errors (UN, 1983). Coverage errors refer to failure to enumerate all members of the sampled population whereas content errors refer to poor reporting or providing incorrect information. Assessing the quality of data before carrying out any in depth analysis is a common practice in any demographic research. The accuracy of age and birth data can be affected by errors arising from age misreporting due to omission associated with memory laps or lack of knowledge of exact date of events and omission of births. This could cause serious problem by distorting and creating bias in the results of demographic studies (Shryok and Siegel, 1976).Figure2 presents the distribution of women 15-49 in Fagita Lekoma woreda by single year age.

Figure 3. Percentage distribution of women 15-49 by age in Single year.

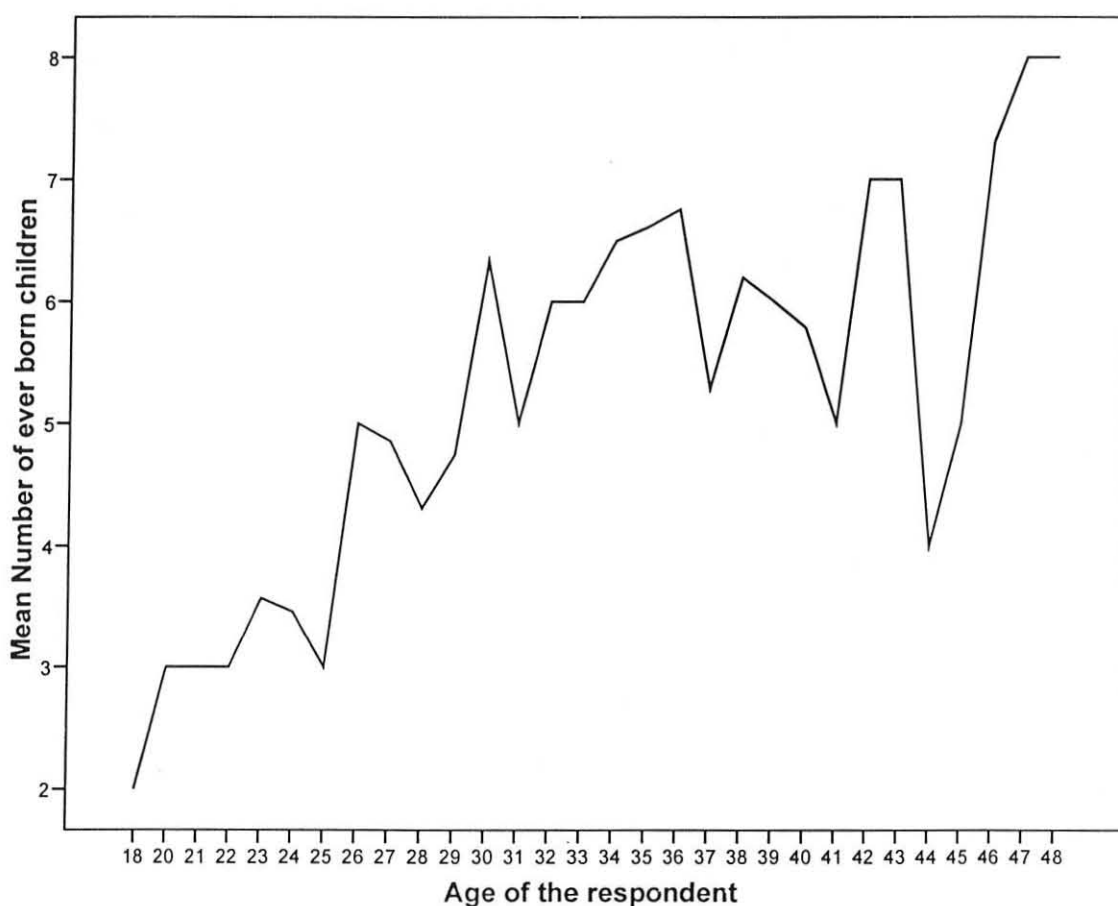


Another important demographic data which is likely to be affected by errors is data on children ever born. The number of children ever born to a woman refers to the number of live births in her life time up to the survey date irrespective of their survival status. Mostly, the error in the number of children ever born is due to omission. Women usually tend to omit some of their live born children especially if they are living away from home or if they are dead. As a result, data on children ever born are usually subject to under reporting.

To assess the accuracy of data on children ever born, average parity by single year age of women is computed in order to see whether there was such omission in this study. The

average parity is expected to increase with the age of women until it reaches its peak at the end of child bearing age and remains constant then after (UN, 1983).

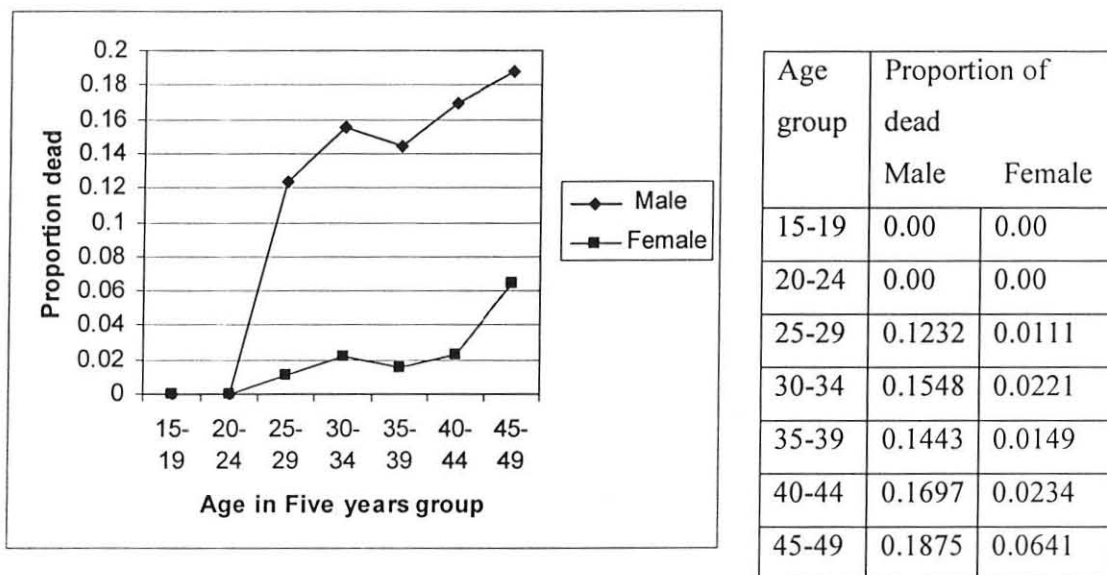
Figure 4. Average parity by single Year of mothers.



As it is shown in the figure, the average parity of women shows increasing trend with an increasing age of the mothers except in the ages from 40 to 44. This indicates that data on children ever born is not accurately reported by women during the survey time i.e., the figure shows the presence of omission of CEB in the study area. But omission of CEB could be minimized when broad age groups are taken, such as 5 year age groups. However, data obtained from sample surveys are hardly error free ((UN, 1983).There fore, the data can be used for analysis purpose.

Calculating the proportion of dead will help to assess the accuracy of data on the survival status of children. The proportion of dead children is expected to increase as the age of the mother increases.

Figure 5. Proportion of children dead by the age group of mothers



In figure 4, dead children is absent in the first two age groups(15-19 and 20-24).This may be due to omission or under reporting of dead children by women during the survey time. For the rest age groups, the proportion of dead children consistently increases for 35-39 age group. The data are not error free. Nevertheless, it can be used for further analysis.

2.5. Data Analysis

Bivariate and multivariate analyses are used to investigate the relationship between the dependent and independent variables. In order to analyze the effects of the covariates on the dependent variable, the Cox proportional regression method was employed. The hazard function is a measure of the potential for the event to occur at a particular time t , given that the event did not occur.

The proportional hazards model assumes that the time to event and the covariates are related through the following equation.

$$h_i(t)=h_0(t)\exp(\beta_{1xi1}+\beta_{2xi2}+\dots+\beta_{kxi k})$$

Where,

$h_i(t)$ =the hazard for the i^{th} case at time t .

$h_0(t)$ =the base line hazard at time t .

β_k = The value of the k^{th} regression coefficient.

x_i = the i^{th} value of the k^{th} covariate.

k = the number of covariates.

The odds ratio ($\exp\beta$) values are used to compare the odds of giving birth at time t with different categories of socio economic, demographic and biological variables (Singer and Willet, 1993). The values of ($\exp\beta$) represent the relative risk of other groups in relation to the base line group. When there is no effect of a covariate in the model, then $\exp\beta$ becomes unity. Value greater than unity indicates that the relative risk of having a child is greater for that group when compared with the reference group and a lesser value of $\exp\beta$ from unity means lower chance of having the next child as compared to the reference group.

2.6 Limitation of the study

1. Omission of CEB and poor reporting of births.
2. Lack of adequate and reliable information on biological variable like frequency of sexual intercourse hinders the study to examine the effects of this variable on birth spacing practices.
3. As it is known the duration and intensity of breast feeding is one of the main determinants of birth interval length. To see its effect on birth interval length, data have to be collected for each parity. But, in this study data are collected for only the penultimate and ultimate children. Hence, breast feeding is not included in the analyses. This is the major drawback of this study.

2.7 Data Collection Instruments

2.7.1 Questionnaires

Interviewer administered structured questionnaires were employed to collect information from the field.

The questionnaires for the main survey had seven parts. Section one was about general information on the background characteristics of women, section two deals with fertility, Section three was about birth history, section four on breastfeeding and section five on the knowledge and practice of family planning methods and section six marriages and sexual activity and the last section on husband characteristics.

2.7.2 Focus Group Discussion

Focus group discussion was held on March 16, 2008 for one day. The FGD was composed of two groups, one group was from urban residents and the other group was from rural residents each having six members. Both literate and illiterate participants were included in the discussion. All participants were in the age group from 25-35 assuming this age group was the most fertile age group and could genuinely explain questions raised by the researcher. Before commencing the actual discussion, the objective of the FGD was explained and consensus was reached.

The researcher forwarded socio economic, demographic and biological related questions supposed to have effects on birth interval length. The discussants actively participated and answered questions openly what they felt. On the same day, the FGD was completed.

CHAPTER III

BACKGROUND OF THE STUDY AREA AND POPULATION

3.1 The study area

Fagita Lekoma woreda is found in Amhara Regional State, Awi_Administrative zone. The study area has 25 kebeles with a total population of 129,650 (Male 64,102; Female 65548, CSA, 2004).

It is bounded by Dangila woreda in the north, Guangua woreda in the west, Sekela woreda in the east and Banja woreda in the south. The Woreda has both Dega and Woina Dega agro ecological zone (55% of the area comprised of Dega and 45% Woina Dega). The woreda is situated at 1800-2950 meters above sea level and has an average temperature ranging from 22°C to 26 °C. The annual rain fall is 2371 mm per year. More than 97% of the population is engaged in agriculture. There are 34 primary schools (1-8), one high school and 20 basic alternative schools. In addition to this, the woreda has 26 health institutions (23 clinics, 2 upgrading to health centers and one health center). According to the woreda's annual plan of 2007/8, prenatal and post natal care is expected to be 65% and 30% respectively (Woreda Economic and Finance Office, 2007/8).

3.2 Characteristics of the study population

In this study different socio economic, demographic and biological characteristics of women that are expected to have association with the timing and spacing of consecutive births are considered. This chapter deals with the proportion and distribution of the women under the study by their back ground variables. Table 3.1 presents the number of cases and their percentage distribution. The number of cases in each category decreases as it goes to higher birth interval since women who did not progress to the next order are excluded.

**Table 3.1: Demographic, socioeconomic and biological characteristics of
the study population.**

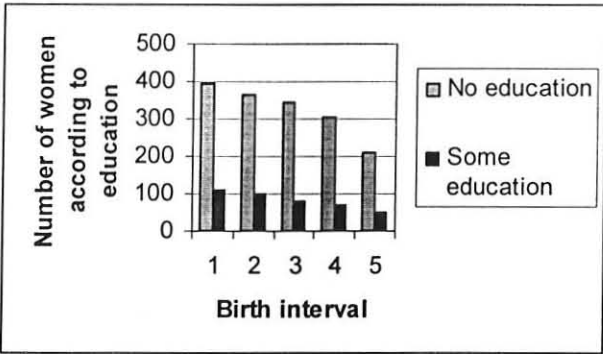
Variables	First birth interval		Second birth interval		Third birth interval		Fourth birth interval		Fifth birth Interval	
	N	%	N	%	N	%	N	%	N	%
Education										
No education	393	78.0	363	78.2	343	80.9	303	81.0	212	80.6
Some education	111	22.0	101	21.8	81	19.1	71	19.0	51	19.4
Work										
Working	162	32.1	142	30.6	122	28.8	112	29.9	71	27.0
Not working	342	67.9	322	69.4	304	71.2	262	70.1	192	73.0
Religion										
Orthodox	433	85.9	403	86.9	373	88.0	333	89.0	233	88.6
Protestant	71	14.1	61	13.1	51	12.0	41	11.0	30	11.4
Ethnicity										
Agew	383	76.0	353	76.1	333	78.5	293	78.3	192	73.0
Amhara	121	24	111	23.9	91	21.5	81	21.7	71	27.0
Age at first marriage										
<18 Years	191	37.9	171	36.9	171	40.3	141	37.7	101	38.4
18 and above years	313	62.1	293	63.1	253	59.7	233	62.3	162	61.6
Survival status of the index child										
Alive	464	92.1	433	93.3	384	90.6	343	92.0	212	80.6
Dead	40	7.9	31	6.7	40	7.1	31	8.2	51	19.4
Duration of breast feeding										
< 12 months	60	11.9	50	10.8	50	11.8	40	10.7	30	11.4
12 months and above	444	88.1	414	89.2	374	88.2	334	89.3	233	88.6
Contraceptive use										
Yes	231	45.8	201	43.3	171	40.3	161	43.0	111	42.2
No	273	54.2	263	56.7	253	59.7	213	57.0	152	57.8
	504		464		424		374		263	

Continued....

	First birth interval		Second birth interval		Third birth interval		Fourth birth interval		Fifth Birth Interval	
Residence										
Urban	193	38.3	183	39.4	153	36.1	133	35.6	92	35.0
Rural	311	62.7	281	60.6	271	63.9	241	64.4	171	65.0
	504		464		424		374		263	

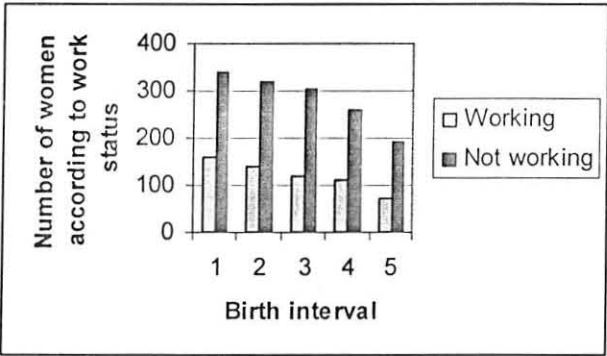
The percentage distribution of women according to their educational level is presented in Table 3.1. The majority (78 %) of the women are not educated while the remaining (22 %) have some education. As birth interval increases from one to five, the number of cases decreases and the proportion of women in the educated category declines for each birth interval except at the fifth birth interval. Figure 5, indicates that the number of women in each birth interval according to educational category. For instance, there are about 393 and 111 women with no education and some education category in the first birth interval. Likewise, the same explanation can be given for the rest birth intervals.

Figure6. Number of women according to education.



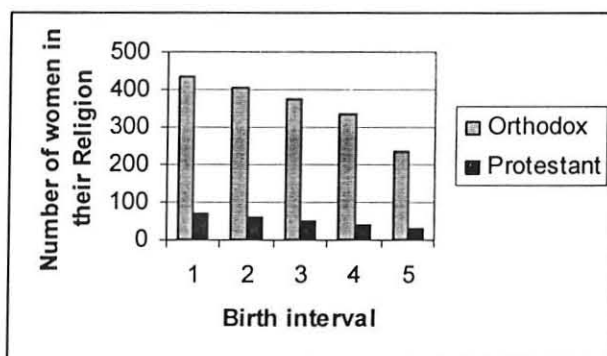
In this study work status of women is classified into two groups as working and not working. Those who have worked other than domestic activities like rearing of children, cooking, washing etc, are categorized as working. As presented in Table 3.1, the distribution of women according to their work status for first birth interval is 32.1% and 67.9% for working and not working women respectively. Though, the number of cases declines with increasing birth intervals, the percentage distribution in the working and not working categories become unproportional. Figure 6 presents the number of women along with each birth interval by work status. For instance, there are about 162 and 342 working and non-working women respectively in the first birth interval.

Figure 7. Number of women according to work status



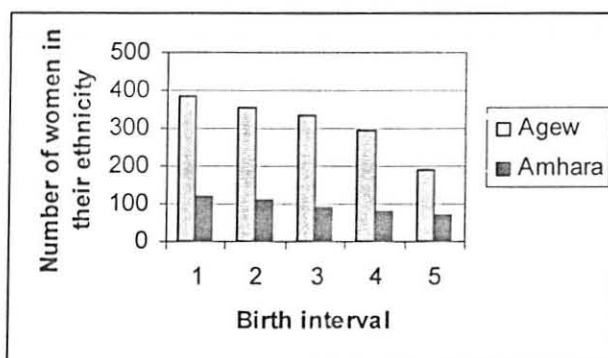
Religion is classified in to two groups in this study: Orthodox and Protestants. Table3.1 shows that 85.9% are Orthodox and 14.1% are Protestants for first birth interval and likewise the same variation is observed for the rest higher birth intervals. Figure7 indicates the number of women along with each birth interval by religion. In the first birth interval, there are about 433 Orthodox followers and 71 Protestant followers respectively.

Figure 8. Number of women according to Religion.



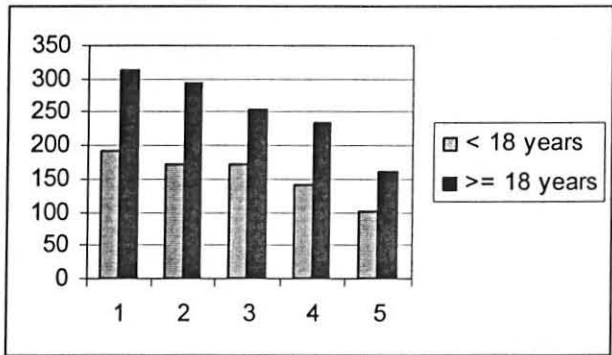
Ethnicity according to Table 3.1 is classified into two groups: ‘Agew’ and ‘Amhara’. Agew comprises 76% and Amhara 24% for first birth interval. Almost the same trend is observed for higher birth intervals. Figure 8 presents the number of women along with each birth interval by ethnicity. In the study area, Agew and Amhara are the two most dominant ethnic groups. In first birth interval, the number of Agew ethnic group is 383 and that of Amhara ethnic group is 121.

Figure 9. Number of women according to Ethnicity.



Age at first marriage in this study is classified into two categories as those women who have married with age less than 18 years and those married with age 18 and more years. Even though, the cases are declining in all birth intervals, the proportion of married women follows inconsistent pattern. Figure 9 indicates the number of women along with each birth interval by age at first marriage. For instance, women who had married at age 18 or after are about 313 while women who had married at age less than 18 years are about 191 in number. The number of women who had married at age 18 and greater exceeds to women who had married at age less than 18 years in each consecutive birth intervals.

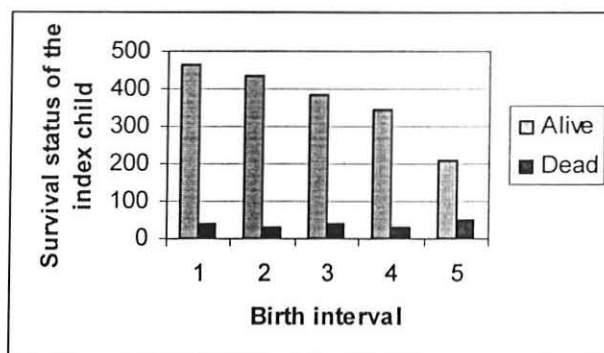
Figure 10. Number of women according to Age at first marriage



The survival status of the index child at the time of the occurrence of the next birth was computed using data on age at the death of the index child and date of birth of the next child. Accordingly, women who experienced the death of the previous child at the birth of the next child are considered as women who lost the index child and grouped under the ‘dead’ category. Those women whose child was alive preceding to the next child are classified under the ‘alive’ category of the variable ‘survival status of the index child’.

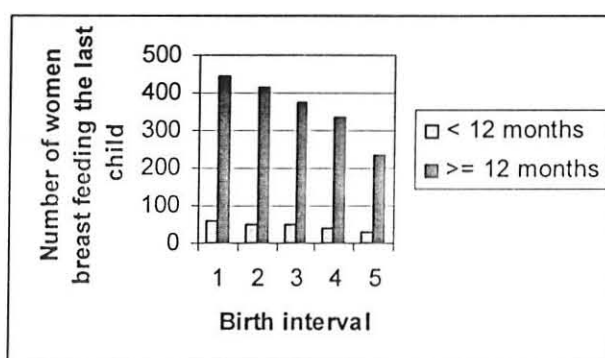
The percentage distribution for women who lost their first child is 7.9% and women whose first child was alive at the birth of the second child accounted for 92.1%. The same explanation can be given for successive birth intervals. Figure 10 presents the number of women along with each birth interval by survival status of the index child. For instance, the number of children under the alive category is 464 and while that of children under the dead category is 40. In each birth interval, the number of dead children varies inconsistently.

Figure 11. Survival status of the index child.



Duration of breast feeding of the last child (in months) is categorized into two groups. The first group includes those women whose last child breastfed for less than 12 months; the second group includes women whose last child breast fed for 12 months and more. As it is observed in Table 3.1 for each successive birth interval, more than 88.1% of women breast fed their last child for 12 months or more while 11.9% or less breast fed their last child for less than 12 months. Figure 11 indicates the number of women along with each birth interval breast feeding their last child. In the figure it is clearly observed that the majority women breastfed their last child for more than 12 months while smaller number of women breastfed their last child for less than 12 months.

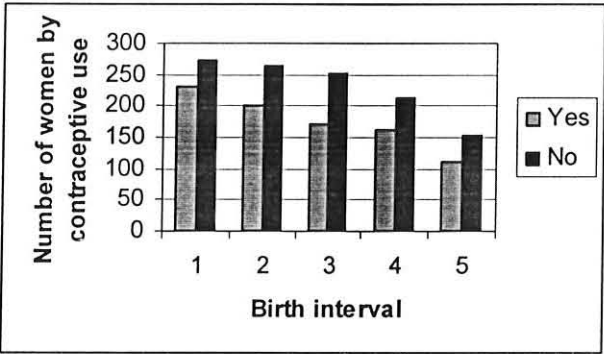
Figure 12. Number of women breastfeeding their last child.



As it is observed in Table 3.1, women who have ever used any one of the family planning methods are classified as 'yes' while those women who had never practiced any family planning methods are grouped under 'no' category. The number of women who use contraceptive methods and do not use any contraceptive methods show significant

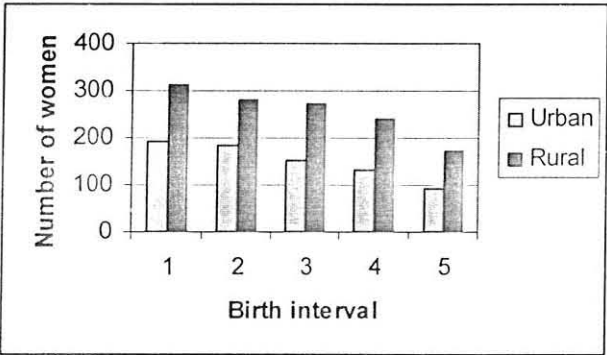
variation in each successive birth intervals. Figure12 presents the number of women along with each birth interval by contraceptive use. As figure12 clearly indicates that majority women do not use contraceptive methods indicating that the desire to have many children. The desire to have many children had already been explained during focus group discussion.

Figure 13. Number of women according to contraceptive use.



Women’s place of residence is categorized as rural and urban in which 61.7% are found in rural settings while 38.2% are found in urban settings. The proportion of urban and rural residents in each birth order does not following regular pattern. Figure 13 indicates the number of women along with each birth interval by residence.

Figure 14. Number of women according to Residence.



CHAPTER IV

DETERMINANTS OF BIRTH INTERVAL LENGTH

Inter-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 socio economic, demographic and biological characteristics of women. This chapter therefore tries to investigate these variations among women in the study area with respect to their back- ground variables using the median length of birth intervals in months for birth interval one up to five is computed by different characteristics of women. For this purpose, Kaplan's Meier median length was used for each birth interval and the results are summarized as follows:

Table 4.1 Median Length of Birth Interval by Socio economic, demographic and biological variables

Variables	First birth interval	Second birth interval	Third birth interval	Fourth birth interval	Fifth birth interval
Education					
No education	18	18	18	19	19
Some education	30	32	36	36	35
Work					
Not working	28	30	28	30	34
Working	17	18	18	18	19
Religion					
Orthodox	18	19	18	19	19
Protestant	24	20	22	25	20
Ethnicity					
Agew	18	19	19	20	20
Amhara	18	19	18	18	16
Age at first marriage					
<18 years	16	18	18	18	18
18 and above	18	20	20	20	20
Contraceptive use					
Yes	19	26	20	21	21
No	17	18	18	18	18
Residence					
Urban	19	20	22	25	21
Rural	17	18	18	19	19
Survival status of the index child					
Alive	18	19	19	20	20
Dead	16	16	18	19	19

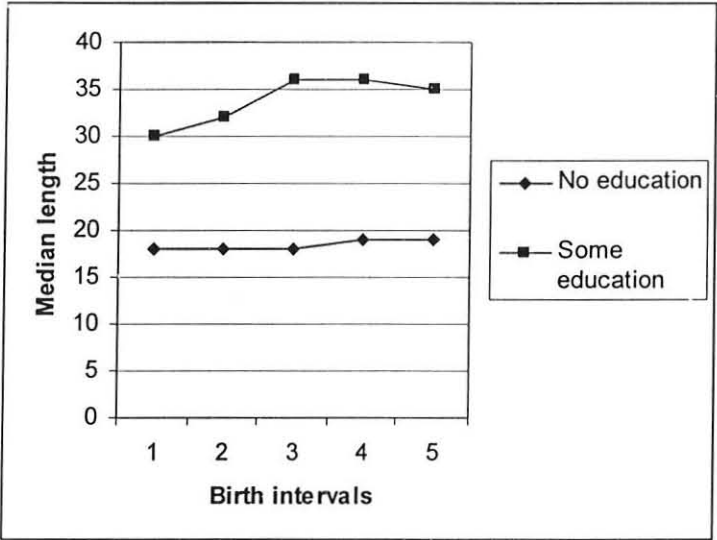
4.1. Socio-economic variables

4.1.1. Maternal education

The median length of birth intervals for the first and consecutive birth orders varies between women having some education and those with no education groups. The median length of first and second birth intervals for women with some education is 30 months and 32 months respectively, while for women having no education it is 18 months. There is a difference of 12 and 14 months for first and second birth intervals. The variation is highest for the fourth interval where women with no education have a median length of birth interval 19 months as compared to those with some education that having an interval of 36 months.

Variation in the median length of birth interval by educational level could be due to the fact that educated women tend to use modern contraception than the uneducated ones for limiting or spacing purpose. Education is excluded in the Cox Proportional Hazard Model because of its multicollinearity effect with work status of women. Education and work status of women has about (.611) symmetry. Due to this multicollinearity it was removed from the model. Figure14 indicates women with some education have longer birth intervals as compared with those with no education in all birth intervals. Women with some education have longer birth intervals especially from 3rd to 5th intervals.

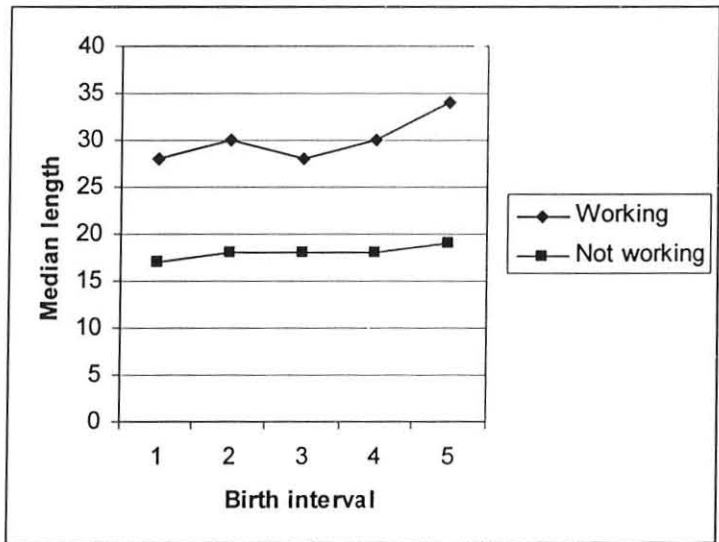
Figure 15. Median lengths of birth intervals by maternal education



4.1.2 Work Status of mothers

The median length of second birth interval for working women is 28 months while that of non-working women is 17 months (Table 4.1). The difference in the median length of birth interval between working and non-working women is longer (15 months) in the fifth birth interval. Table4.1 shows that working women have longer birth interval when compared to non working women. According to Trussel et. al., (1985) women with greater socio economic status, assuming, working away home is associated with such status, are better and longer users of contraception leading to longer waiting time to conception and birth interval. In general, labor force participation of women and birth interval has positive relationship. Figure15 shows that women who participated in work away from home have longer median birth interval than those women who worked in home for all birth intervals. As birth interval increases from 3rd to 5th, the median length sharply increases for working women.

Figure 16. Median length of birth interval by maternal work status.

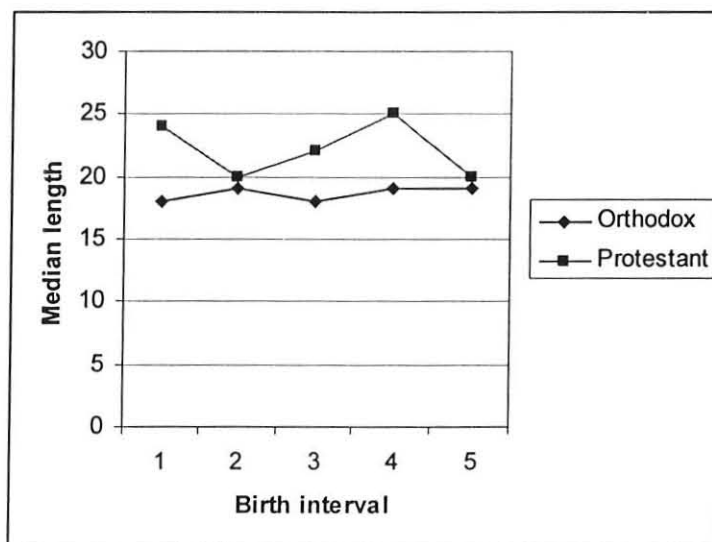


4.1.3 Religion of the mother

According to Table 4.1, Protestant women tend to have longer birth interval in each birth order as compared with Orthodox women.

The disparity is largest for first and fourth birth intervals with a difference of 6 months. Variation in birth spacing is clearly observed between the two religious groups. This variation in birth spacing between the two religious groups may be accounted for mainly by differences in their socio economic, demographic and cultural factors, leading to differences in their attitudes, knowledge and practice of modern contraceptive methods and intensity and duration of breast feeding.

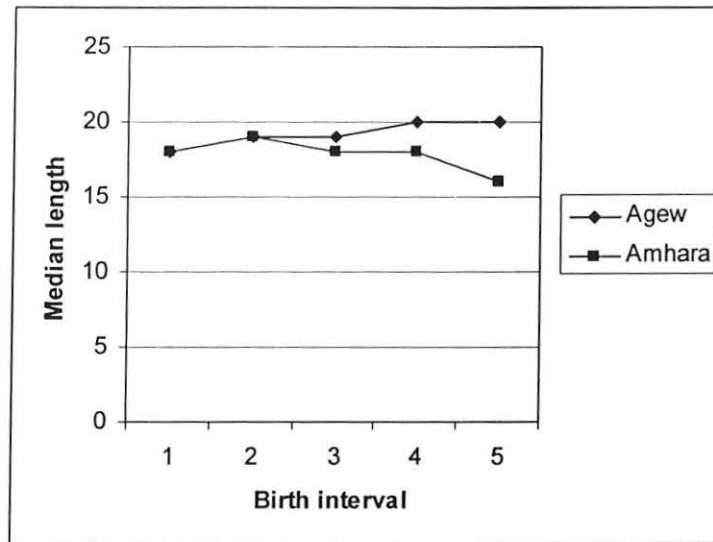
Figure 17. Median lengths of birth intervals by Religion.



4.1.4 Ethnicity

The median length of birth interval for Agew is longer in each birth order as compared with the Amhara except in the first and second birth intervals where the median length for the two ethnic groups is equal. There is a difference of 4 months in the fifth birth interval for the two ethnic groups. Agew women in general tend to have longer birth spacing as compared with the Amhara. This is because Agew women use contraception better than the Amhara women. This was assured during the FGD. In certain ethnic groups, culture encourages prolonged lactation, sexual abstinence after birth or during certain months of the year leading to prolonged waiting time to conception and lengthening birth intervals. Both the Amhara and Agew ethnic groups have almost similar religion and cultural practices. Figure 16 presents the median length of birth intervals between Protestant and Orthodox women indicating that the median length of birth interval for Protestant women is longer as compared to Orthodox women.

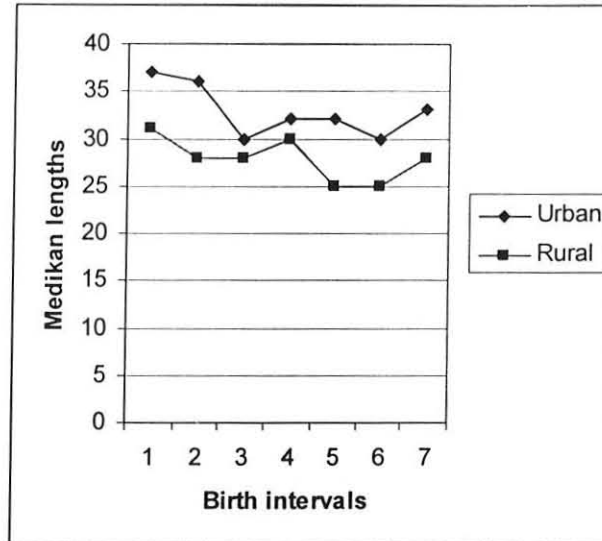
Figure18. Median length of birth interval by Ethnicity of mothers



4.1.5 Residence of Mother

Place of residence is another factor which is considered to have influence on consecutive birth interval lengths. The urban rural differential of birth interval length shows that the median length for the first and consecutive birth intervals is longer for urban residents as compared to their rural counterparts indicating that rural women give birth more frequently than urban women. The difference is found to be highest for the fourth birth interval which is about 6 months. The effect of place of residence on birth interval length can be explained by the fact that urban residents have better knowledge and are likely to use contraceptives than their rural counterparts. Figure18 indicates that urban women are more likely to use contraceptives than their rural counterparts. As a result of this, urban women have longer median birth interval length as compared with rural women.

Figure 19. Median length of birth interval by mothers' residence

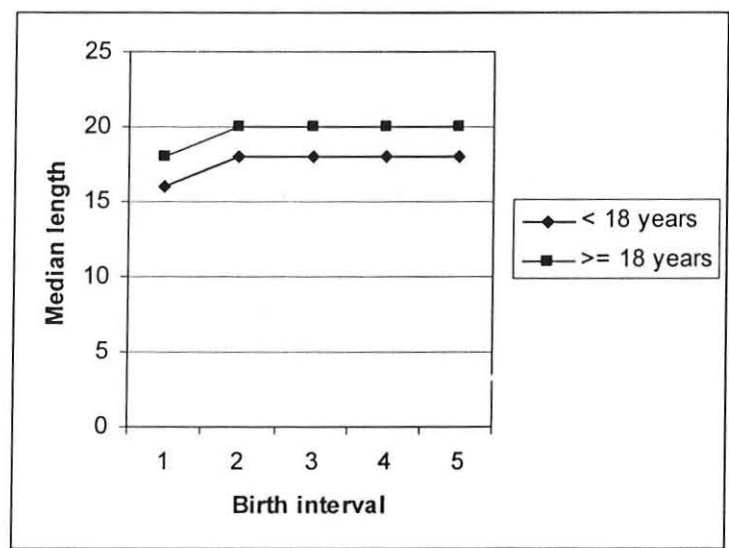


4.2. Demographic variables

4.2.1 Age at first marriage

Several studies have reported that early marriage provides more years in which conception can occur in addition to its indirect effect through limited schooling and employment opportunity. Age at first marriage has a major effect on child bearing because women who marry early have on average a longer period of life time births (CSA and ORC Macro, 2006). Table 4.1 shows that women who married before 18 years have shorter birth intervals as compared to women who had married at 18 years and after 18 years in all birth intervals. As figure19 clearly shows that women who had married at age 18 or more slightly have longer median birth interval length as compared to those who had married at age less than 18 years. Nowadays, early marriage is becoming less prevalent in the study area. The main reason for this is that the woreda women's affairs office has strongly working to mitigate harmful traditional practices particularly early marriage.

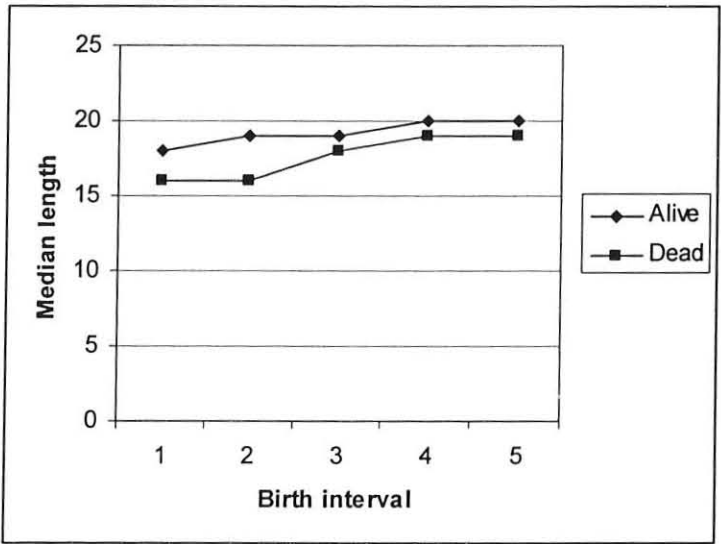
Figure 20. Median length of birth interval by Age at first marriage of mothers.



4.2.2 Survival status of the index child

The birth interval following the death of the index child has been shown to be shorter than when the child survives. The death of the index child greatly affects the likelihood on the timing of having subsequent birth through its effects on breastfeeding, replacement behavior and the insurance motive (Preston, 1978). The death of an index child is found to reduce the timing of the next birth for all birth orders. Figure20 indicates that those women whose preceding child survives have longer median birth interval length as compared with those whose preceding child does not survive. During focus group discussion the discussants explained in such a way that they became more eager to replace the lost child as much as possible. The number of dead children is small as compared with the alive category. During FGD the discussants confirmed that infant and child mortality was less due to the existing favourable climatic conditions in the area.

Figure 21. Median length of birth interval by the survival status of the index Child

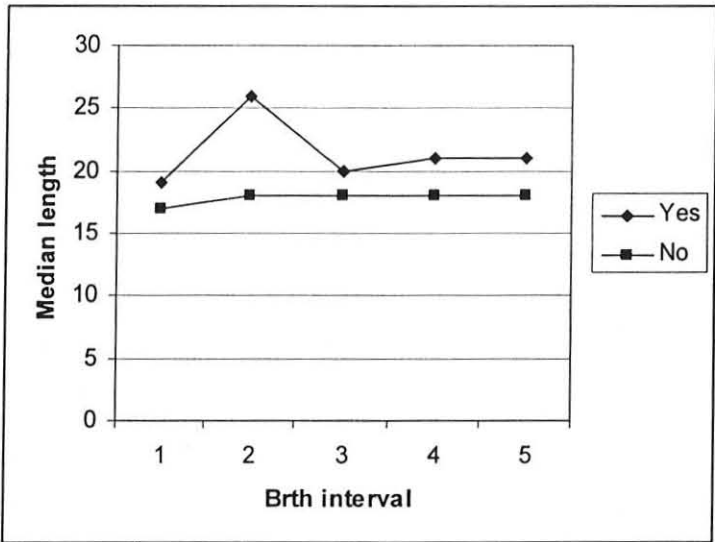


4.3 Biological variable

4.3.1 Contraceptive use

The expected positive (lengthening) effect of contraceptive use on birth spacing is clearly confirmed from the table for each birth order. Women who practice family planning after the birth of the second child, for instance, take on the average about 26 months to have their third child compared with about 18 months among the non-users. In each birth interval, the median length is longer for users as compared with non- users. The median length is longer (8 months) in the second birth interval. Figure 21 shows that the median birth interval length for contraceptive users is relatively longer especially for the 2nd birth interval than those who do not use.

Figure 22. Median length of birth interval by contraceptive use



CHAPTER V

DETERMINANTS OF BIRTH INTERVAL LENGTH: RESULTS OF MULTIVARIATE ANALYSIS

In the previous part, we have tried to show the differentials in birth interval across different socio economic, demographic and biological characteristics of the study population. The median length of birth intervals has been used to see the variations and each of the variables was treated independently.

In this section the net effect of each of these variables when the effect of other covariates is controlled will be presented. A hazard regression model is used for the multivariate analysis and the results for the intervals from first to five are presented in Table5.1. In the table, the parameter estimates, the standard errors and the relative risks for each of the variables are displayed. Measures of the relative risk ($\exp\beta$) in the hazard regression model imply the hazard of progressing to the next birth when controlled for socio economic demographic and biological variables while the standard error indicates the band of confidence for each coefficient (Bryman and Cramer, 2005). The results of multivariate analyses are interpreted and discussed below.

Table 5.1 Results of Cox Regression model for first to fifth birth intervals.

	1st Birth interval		2 nd Birth interval		3 rd Birth interval		4 th Birth interval		5 th Birth interval	
Variables	SE	Expβ	SE	Exp β	SE	Expβ	SE	Exp β	SE	Expβ
Work status										
Not working		1		1		1		1		1
Working	.18	.30*	.19	.24*	.22	.21*	.24	.15*	.30	.20*
Religion										
Protestant		1		1		1		1		1
Orthodox	.18	1.58*	.18	.25	.16	1.35	.18	1.20	.28	1.98*
Ethnicity										
Amhara		1		1		1		1		1
Agew	.11	1.17	.12	1.08	.14	.89	.15	1.10	.18	.30*
Residence										
Rural		1		1		1		1		1
Urban	.16	1.16	.15	.53*	.16	.66*	.20	1.17	.27	1.83*
Age at first marriage										
>=18years		1		1		1		1		1
<18 years	.68	1.97*	.14	1.04	.15	2.12*	.15	.92	.18	1.76*
Survival status of the index child										
Dead		1		1		1		1		1
Alive	.19	.29*	.26	.09*	.24	.12*	.22	.64*	.23	.35*
Contraception										
No		1		1		1		1		1
Yes	.14	.47*	.14	.54*	.16	1.12	.17	.64*	.22	.52*

*p<0.05

5.1 Work Status of women

Many studies have confirmed that labor force participation and fertility are negatively correlated (for example, Eshetu, 1994, Yohannes, 1994,). Those women engaged in work outside their home tend to have smaller completed fertility as compared with those who work inside the home or house wives. As inter-birth intervals are known to be inversely correlated with the number of children ever born, keeping other factors constant, (e.g. Stevenson et al., 1994), a positive association is expected to exist between women's labor force participation and birth interval length. As Table 5.1 indicates that work status is consistently significant for all birth intervals ($p < .05$). The chance of having their next births for working women is lower as compared to non-working women in all birth intervals. For instance, the hazard of having the next child decreases by 70%, 76%, 79%, 85% and 80% for first, second, third, fourth, and fifth birth intervals respectively for working women than non-working women. Table 5.1 shows that the hazard of having the next child decreases for working women than non-working women in each consecutive birth intervals. Therefore, working women have longer inter-birth intervals as compared with non-working women in each consecutive birth intervals. As a result of this, work status of women is the most significant explanatory variable in affecting birth interval length in the study area.

5.2. Religion of women

As Table 5.1 shows religion of women is significant for first and fifth birth intervals. In all birth intervals, the risk of having their next child is higher for Orthodox women than Protestant women. Thus, Orthodox women have shorter birth intervals in each successive birth intervals as compared with Protestant women. The effect of religion on the timing of birth intervals is significant in only two birth intervals. The effect is insignificant for the rest of the birth intervals indicating that the overall effect of religion on the timing of birth among women residing in Fagita Lekoma Woreda is marginal. Religion has no significant effect in determining birth interval length in the study area because it is the traditional norms and values shared by both the Protestants and Orthodox that have influence on the patterns of child bearing and rearing than being a Protestant or Orthodox.

5.3 Place of Residence

Place of residence is one of the crucial socioeconomic variables in affecting birth interval length. In Table 5.1, place of residence is significant at the second, third and fifth intervals with ($p < .05$). Urban women have lower chance of having their next child as compared with rural women in the first and fourth birth intervals though not statistically significant and in the fifth birth interval (significant). The reason for having longer birth interval for women in the fifth birth interval could be rural women, where the majority of them are illiterate, breast fed their children for longer duration and intensity than urban women. The relationship between education of women and duration of breast feeding reveals that as the level of education increases, the duration and intensity of breast feeding tends to decrease (Yeshewamebrat, 1995). On other hand, urban women are less likely to progress to the next child than their rural counter parts in the 2nd and 3rd birth intervals. Consequently, urban women have longer inter-births than rural women in the 2nd and 3rd birth intervals where these birth intervals are statistically significant. Therefore, Place of residence is one of the socio economic variables that affect birth interval length in the study area.

5.4 Ethnicity

In Table 5.1, ethnicity is significant at fifth birth interval. In the study area the Agew ethnic group comprised of about 76% while that of the Amhara is about 24%. In the model the Amhara ethnic group has longer birth interval as compared with the Agew ethnic group as far as statistical significance is not taken in to account. Hence, women having the Agew ethnicity have lower chance of progressing to the next child in each successive birth orders.

5.5. Survival Status of the index child

It is often postulated that infant and child mortality have a direct effect on fertility either because mothers tend to consciously replace their children who have died or women whose children die at infancy have reduced periods of breast feeding and amenorrhea. Both of these conditions tend to shorten birth intervals. In Table 5.1 survival status of the index child is consistently significant in each birth intervals. For instance, women whose index child survives have lower risks by 71% to have their next child in the first birth interval as compared to women whose index child did not survive. Likewise, the hazard of progressing to the next child decreases by 91%, 88%, 46%, and 65% in the 2nd, 3rd, 4th and 5th birth intervals for those women whose preceding child survives than those women

whose preceding child do not survive. Many studies also confirmed that the birth interval following the death of the index child has been shown to be shorter than when the child survives (for example, Preston, 1978). In a situation where breast feeding prevalence is universal and duration is long, the effect of early death of a child on the length of the subsequent birth interval was noted to be significant (TU, 1991). Therefore, survival status of the index child is one of the demographic variables that strongly affect birth interval length in the study area.

5.6. Age at first marriage

The Ethiopian CSA reports that 13% of girls in Ethiopia are married by age 15 (a slight decline from 14% reported by CSA, 2000) but those married before 18 remained high at 66%. The median age also remained at about 16 years for the nation and 15 for the Amhara region (Pathfinder International Ethiopia, 2006). Table 5.1 indicates that age at first marriage is significant at the first, third and fifth birth intervals. In all birth intervals women who had married at age 18 and after, wait for longer time to have their next child as compared with women who had married before age 18. Those women who had married at age less than 18 years have shorter birth interval length (higher chance of progressing to the next child) than those women who had married at age 18 or after.

A study by the National Committee on Harmful Traditional Practices of Ethiopia (NCTPE) estimated the proportion married before the age of 15 at 57%. A recent study conducted in two woredas of the Amhara region shows that 14% of women were married before age 10, 39% before age 15 and 56% before age 18 (Population Council, 2004 cited in Pathfinder International, 2006). Age at first marriage is one of the explanatory variables that determine the timing of births in the study area.

5.7. Contraception

In most developing countries aside from Sub-Saharan Africa, contraception is used much more for limiting than for spacing. In Sub Saharan Africa, however, majority of contraceptive use is for spacing; because many people want large families and birth spacing is common in many African traditions (USAID, 2002). During FGD the discussants assured that they used contraception for spacing rather than limiting purposes

and they wanted to have many children as much as possible. In each successive birth orders the relative risk of having their next child is lower for contraceptive users than the non users except in the third birth interval though it is not statistically significant. In the first birth interval, the relative risk of having the next child for users is lower by 53% as compared to the non users. Likewise, the relative risk of progressing to the next child is less in the 2nd, 4th, and 5th, birth intervals (46%, 36%, and 48%) respectively for contraceptive users than non- users. As table 5.1 indicates use of contraception is consistently significant in all birth intervals indicating that contraception is influential in determining inter- births in the study area.

determines her completed fertility. Keeping other factors constant, women with closely spaced births tend to have larger family sizes when compared with women with longer inter-birth intervals.

Differences in fertility levels between different populations or between groups within the same populations can be attributed to differences in exposure to the risk of pregnancy and differences in the length of time between births when women are exposed to child bearing.

Helping women achieve healthy pregnancies and safe births is one of the priorities of every country's family planning program. One of the best ways is through birth spacing which not only results in healthier pregnancy but also reduces under five mortality. About 504 eligible women (women having at least two children) were selected in three kebeles (two from rural and one from urban) using systematic random sampling. Data collectors were trained for 4 days on interviewing techniques, purpose of the study and importance of privacy, discipline and approach to the interviewee and confidentiality of the respondents. Before conducting the main study, pre-test was carried out on 50 eligible women.

The purpose of this study is to examine and investigate the underlying socio economic, demographic and biological variables that play a crucial role in determining birth interval length in the study area. In order to achieve the objectives of this study, primary data was collected using structure questionnaire and focus group discussion guides. The survey was conducted between February and March, 2008 in the study area. Both bivariate and multivariate methods of analysis were used in analyzing 1st to 5th birth interval lengths.

In bivariate analysis, the following results were obtained:

- 1 Women with some education have longer median birth interval length as compared with women with no education.
- 2 Working women have longer median length of birth spacing pattern than non-working women.
- 3 Protestant women have longer median birth interval length than women belonging to the Orthodox Church.
- 4 The Agew ethnic group has longer median birth interval length as compared to that of the Amhara ethnic group.
- 5 Those women whose index child survives have longer median birth interval length than those women whose index child did not survive.

- 6 Those women who had married before age 18 have shorter birth spacing as compared to those who had married at age 18 or after.
- 7 Urban residents have longer birth spacing than their rural counter parts.
- 8 The median length of birth interval for contraceptive users is longer than for non-users.

In the multivariate analysis, seven explanatory variables were included in the analysis of birth interval length. Of the seven explanatory variables that have been included in the analyses of birth interval length, work status of women, survival status of the index child and contraception happen to be the most significant and consistent ones. Some of the other explanatory variables such as age at first marriage, place of residence and religion appear to have significant effect on some birth intervals. The death of the index child during infancy and child hood has been found to be the most important factor affecting the timing of births in the study area. The other explanatory variable that has a paramount importance in determining birth interval length is work status. Work status is found to be consistently significant in all birth intervals indicating that work status has a strong effect in determining length of births in the study area. The other explanatory variable that has consistent effect for all births except the third birth interval is contraception. Those women who used contraceptive methods are found to have longer birth spacing than the non users. The next explanatory variable that seems to have effect in determining consecutive births is age at first marriage. Women who had married at age 18 and more have longer birth interval than women who had married at age less than 18 years.

Place of residence is another crucial variable in affecting birth interval length. Women residing in urban area have longer birth interval than their rural counter parts. This is attributed to the fact that urban women have better access to IEC (information, education and communication) than rural women.

This research attempted to answer the leading research questions that have been stated in the first part of this thesis:

- Work status, survival status of the index child, contraception, age at first marriage and place of residence are important socio economic, demographic and biological variables that determine birth interval length in the study area.
- Survival status of the index child, contraception and work status have strong and consistent effects in affecting or determining the dependent variable (birth interval in months).

- These explanatory variables that are found to be significant obviously affect birth spacing of women either to be shorter or longer. If the birth interval is shorter, it will be harmful to the health of both mothers and children. If the birth interval is longer, child and maternal mortality could be reduced.

6.3 Recommendations

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

- Women should be assisted with the development and implementation of comprehensive family planning programs that have effective outreach services and are accessible geographically, socially and financially.
- One of the findings of this study shows that women's labor force participation is consistently significant in all birth intervals and affect inter-births. Therefore, government and non government organizations should create job opportunities for women, so that economic dependency and considering children as a source of income and old age security became low. By doing so, longer inter-births between consecutive births could be maintained.
- Urban women have longer birth interval than their rural counterparts. This is because of the fact that urban women have better access to social institutions. Therefore expansions of infrastructures and accessible service providing facilities such as clinics, hospitals and schools have to be expanded in the rural areas.
- Early marriage is prevalent in the Amhara Region in general and the study area in particular. Early marriage is detrimental to the health of both mothers and children. This increases infant, child and maternal mortality. Therefore, to alleviate these problems, priorities should be given to enhance women's educational opportunity and increasing the median age at first marriage, to at least 18 and preferably beyond.
- By increasing birth intervals between consecutive births, infant, child and maternal mortality could be averted. A short birth interval adversely affects both the preceding and the succeeding child. Educating families about the health risks associated with unfavorable reproductive patterns and providing access to modern methods of contraception could lengthen inter-births

- Since women are the first to be affected by harmful traditional practices, governmental and non governmental organizations should strongly work to strengthen IEC campaigns so as to increase people's awareness about the adverse consequences of harmful traditional practices.

Finally, it is better to conduct further research that clearly focuses on gaining a better understanding of other unexplained variables such as religion and ethnicity in the model.

REFERENCES

- Abedin, S. (1979). Birth Interval Dynamics in Rural Community of Bangladesh, Studies in Africa and Asia Demography, Research Monograph series No. 12, Cairo, Demography Center, Cairo, 1984, pp.451-492.
- Al-Nahedh, N.N.A., (1999). The Effect of Socio Demographic Variables on Child Spacing in Rural Saudi Arabia, .5 (1).
- Alsawi, M. and Adam Chalk D. J., (2000). Women's Status, Fertility and Contraceptive Use in Kazakhstan, 24 (7): 48-753.
- Arkutu, A.A., (1995). Healthy women, Healthy Mothers: An Information Guide, Family Care International, Inc, New York, USA.
- Assefa Haile mariam (1991). Fertility Levels and Trends in Arssi and Shoa Region of Central Ethiopia, Journal of Bio Social Science, .23 (24)
- _____ (1992). An over view of the Determinants of High Fertility in Ethiopia: Ethiopian Journal of Development Research, Vol, no.2
- Assefa Hailemariam, Teller, C. H., and Tesfayi Gebre selassie, (2007).The Lagging Demographic and Health Transition in Rural Ethiopia: Socio Economic, Agro_ Ecological and Health Service Factors Affecting, Mortality and Nutrition Trends. Paper presented at session 104, population growth and poverty linkage in Africa; Fifth African population conference , union of African population studies (UAPS), Arusha, Tanzania.
- Betemariam , Berhanu (1991). Socio Economic Factors Influencing Fertility in Ethiopia: The Case of Shoa Region; Thesis, A.A.U., A.A., Ethiopia.
- Bongaarts, J. and Potter (1983). Breast feeding in Central Africa, Population Studies, 6(3), 413-430.
- Bryman A. and Carmer D. (2005). Quantitative Data Analysis with SPSS 12 and 13: A guide for social science, Taylor and Francis Group, London and New York
- Central African Census Commission (2003). Ethiopian Agricultural Sample Enumeration , 2001/2002. Results for Amhara Region , Ethiopia.
- CSA (2006). Ethiopian Demographic and Health Survey, A.A., Ethiopia.

- Choe, Mk. et. al., (1991). Analysis of First Birth and its Affecting Factors, Fertility in China, Beijing.
- Economic and Finance Office (2007/2008). Fagita Lekoma woreda Annual Plan. Unpublished.
- Eshetu Grumu (1994). Fertility and Female Labor Force Status in Urban Ethiopia: The Case of Akaki town, unpublished M.Sc thesis, Addis Ababa, Ethiopia.
- Ford, K. (1984). Timing and Spacing of Births, WFS Comparative Studies, No.38, London, U.K.
- Gebre-egziabher Kiross and Lindstrom, D.P., (2007) . The Impact of Infant and Child Death on Subsequent Fertility in Ethiopia. Population Research and Policy Review, Vol.26, No. 1 Springer Netherlands.
- Hagos Ahmed (1996). Determinants of Closed Birth Interval Length in Urban Ethiopia, unpublished M.Sc Thesis, Addis Ababa University, Ethiopia.
- Miller E., J. et.al. (1992). Birth Spacing and Child Mortality in Bangladesh and the Philippines, Demography, 29(2):.305-317.
- Mostafavi, S.F.(1991) Fertility Regimes and the Determinants of Birth Intervals, Ann Arbor, Michigan, University Microfilms.
- Mturi, J.A. (1997). The determinants of Birth Intervals among non contracepting Tanzanian Women, African Population Studies, 12(2).
- Nitai, C., Sayema, S.M., Ataharu, I. (1996). Differentials Pattern of Birth Intervals in Bangladesh, Asia- Pacific Population Journal, 11(4): 73-86.
- Pathfinder International Ethiopia, (2005). Causes and consequences of Early marriage in Amhara Region. A research report prepared by Birhan Research and Development Consultancy, Addis Ababa.
- Preston, S.H. (1978)''Introduction.'' In the Effects of Infants and Child mortality on Fertility, Preston(ed.), Newyork, Academic Press, pp1-17.
- Rahman, M., Hale, L., Ahmed, K., etal. (2004). The Effects of Birth Spacing on Infant and Child Mortality, Pregnancy Out comes, and Maternal Morbidity and Mortality in Mat lab, Bangladesh, Paper presented at the annual meeting of the Population Association in Boston on April 12,2004.

- USAID (2002). Findings from the DHS Study. Population Information Programs. The Johns Hopkins University, Maryland, USA. Vol.30 (3). Issues in World Health.
- World Bank (2007). Capturing the Demographic Bonus in Ethiopia ; Gender , Development and Demographic Actions. Poverty Reduction and Economic Management2 (AFTP2) Country Department t for Africa Region.
- Yacob Zewoldi (1991). Fertility Behavior of Selective Elites and their Attitudes Towards Population growth in Ethiopia, Thesis, A.A., Ethiopia.
- Yeshewamebrat Ejigsemahu, (1995). Breast feeding: Determinants and Birth Interval Effects In Addis Ababa-The Case of Zone One, unpublished M.Sc thesis, Addis Ababa, Ethiopia.
- Yohannes Hilawi, (1994). Economic Value of Children and Some Correlates and Determinants of the Demand for Children. An Empirical Study from North-Western Ethiopia, unpublished M.Sc thesis, Addis Ababa, Ethiopia.

APPEDEX

Informed Consent:

Dear Respondent:

This questionnaire is designed to collect data about the socio economic, demographic and biological determinants of birth interval length. You have been selected to complete the questionnaire as part of a sample the study. I would very much appreciate your participation in this study.

The data collected from this questionnaire will be used for the purpose the research. Your genuine responses are very important in order to meet the purpose of the study. To this end, whatever information you will provide will be kept strictly confidential and will not be shown to other persons.

Participation in this study is voluntary and you can choose not to answer any individual questions or all of the questions. However, I hope that you will participate in this study since your views are important.

Do you have any question with respect to this study?

Do you agree to take part in this study?

1. Yes (continue)
2. No (thank you).

Part I Background Characteristics

No.	Questions	Responses
101.	How old are you?	_____ years.
102.	In what year and month were you born?	_____ Years . _____ month
103.	What is your religion?	1. Orthodox 2. Moslim. 3. Protestant. 4. Other (Specify)
104.	What is your Ethnicity?	1. Amhara 2. Age 3. Other (specify)
105.	Can you read and write for e.g., a letter or news paper?	1. Yes 2.no
106.	Have you ever attend any formal schooling?	1. Yes 2. No(skip to 108)
107.	What is the highest grade of school you completed?	1. Illiterate 2. Basic education 3. Elementary education 4. Secondary education 5. Institute and college 6. Other (specify)
108	Respondents place of residence	1. Urban 2. Rural
109.	Apart from house hold duties such as cooking, rearing children etc. do you have any other work?	1. Yes 2. No. (skip to 201)
110.	What kind of work do you do?	-----.
111.	Whom are you working for?	1. Self employed. 2. In a family business
112.	Do you do this work at home or away from home?	1. At home 2. Away from home
114.	How long have you been doing this work?	----- Years.
115	How much are paid for your work? -- Birr (if in kind estimate the value of goods)	

Part II Fertility

The following questions are about the total number of children that a mother born irrespective of their survival status.

201. How many children have you ever born alive? Boys -----, Girls-----
202. How many of these children are living with you? Boys - - - - - Girls-----
203. How many of these children are living else where? Boys --- ----- Girls-----
204. Have you ever given birth to any children who died later? 1. Yes 2. No
205. How many of your children died? Boys----- Girls -----
206. Have you given birth to any child during the last 12 months? 1. Yes 2. No
207. Sex of the child 1. Male 2. Female
208. If dead, for how long did the child live? ----- Month

Part III Birth History

Now I would like to ask you about the history of all of your births, whether still alive or not starting from the first you had.

301 Birth Order	302 Sex 1. Male 2. Female	303 In what month and year did (name) born 1 Year 2 Month	304 Is he /she alive? 1. Yes 2. No	305 How old was (name)he/she died 1-----year 2----- Month
1				
2				
3				
4				
5				
6				
7+				

Part IV Breast feeding Practice

	Name Last Child Birth Order	Name Next to Last Birth Order
401. Did you breast fed (name)?	1. Yes 2. No	1. Yes 2. No
403. How long was (name) Breastfed?	1. -----months 2. Never breast fed	1.-----months 2.Never breast fed
404. Reason for stopping breast feeding?	1. the child being old enough 2. New pregnancy 3. the mother was sick 4. other(specify)	1. the child being old enough 2. New pregnancy 3. the mother was sick 4. other (specify)
405. When do you think breast feeding should stop completely?	After ----- months.	After ----- months.

Part V. Knowledge and practices about modern Contraceptive Use

501. Have you ever heard of Family Planning methods? 1. Yes 2.No
502. Do you know any method that women and men can use to delay or avoid
Pregnancy?
503. Which of the following methods do you know about? 1. Pills 2.Injectable
3. Condom 4. Norplant
5. IUD 6. Other (specify)
504. Are you using any of the method? 1. Yes 2. No
506. What is the purpose if you are currently using contraceptive method?
1. Birth spacing
2. Limiting birth

3. Other (specify)

507. If your answer for question 506 is yes please, mention its name.

508. If you were not using any contraceptive method to delay or avoid pregnancy, would You tell me the main reason?

1. Desire for more children
2. Health condition
3. Religious reason
4. Moral and cultural
5. Lack of knowledge of
Contraception
6. FP service not available
7. Other (specify)

Part VI Marriage and Sexual Activity

601. Are you currently married or living together with a man as if married?

1. Yes, currently married
2. Yes, living with a man.
3. No, not in union.

602. Have you been married or lived with a man only once or more than once?

1. Only once
2. More than once

603. In what month and year did you start living with your husband/partner/

Year ----- Month -----

604. How old were you when you had sexual intercourse for the very first time you first started living with him?

605. How old were you when you had sexual intercourse for the first time?

1. Never had sex
2. Age in years

606. Do you intend to wait until you get married to have sexual intercourse for the first time?

1. Yes
2. No
3. Don't know

607. When was the last time you had sexual intercourse?

Section VII Husband Information

701. Age of husband -----

702 Has your husband attended any formal schooling? 1. Yes 2. No

703. The highest grade completed by your husband? -----
- 704 What type of work does your husband do most of the time? 705 Is he paid for his work? 1. Yes 2. No
706. How much income does he bring to the house hold per month? -----
Birr (if in kind estimate the value of goods)

Focus Group Discussion

Objective: The objective of this FGD is to collect additional information on the socio economic, demographic and biological variables that are expected to have influence on birth spacing pattern.

Questions of the FGD:

1. Do you think that religion and cultural values that you follow can bring any effect on birth spacing?
2. Does education has an effect in determining spacing of births?
3. Do you think that laborforce participation of women away from home can bring differences in duration and intensity of breast feeding? Differences in birth spacing?
4. Do you think that the death of an index child has an effect on the conception and birth of the next child?
5. Do you agree urban rural variation can bring:
 - a. Differences in spacing?
 - b. Differences in FPPs?
 - c. Differences in health facilities?
 - d. Differences in age at first marriage?
 - e. Differences in the number of children?
6. Are there variations in using contraceptive methods between ethnicity?
7. Does the prevalent climatic condition in the area contribute to the reduction of infant and child mortality?

Declaration

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

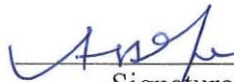
Ayandaw Assaye
Student


Signature

July 10, 2008
Date

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

Assefa Hailaymariam
Advisor


Signature

18/07/08
Date