

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

Determinants of Teenage Fertility and Their
Maternal Health Service Utilization in Ethiopia

By
Tewodros Alemayehu (BSc)

Thesis submitted to the School of Graduate Studies, Addis
Ababa University in partial fulfillment for the requirements of
Masters of Public Health (MPH) in the school of public Health

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Dereje Habte (MD, MPH)

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Approved by examining board

Chairman, department graduate committee

Advisor

Examiner

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Dedication

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List of abbreviation

AF	age specific fecundability
AIDS	Acquired immunodeficiency syndrome
ANC	Antenatal care
AOR	Adjusted odds ratio
ASFR	Age specific fertility rate
Ca	index of abortion
Cc	index of contraception
CI	confidence interval
Ci	index of postpartum infecundability
Cm	index of marriage
Cp	index of primary sterility
CSA	central statistics agency
DHS	demographic and health survey
EA	enumeration area
EDHS	Ethiopian demographic and health survey
HF	health facility
HIV	Human immunodeficiency virus
ICPD	International conference on population and development
MCH	maternal and child health
NGO	non governmental organization
OR	odds ratio
SD	standard deviation
SNNPR	south nation nationality peoples region
STD	sexually transmitted diseases
STI	sexually transmitted infection
TF	total fecundability
TFR	total fertility rate
UNFPA	united nation fund for population
UNICEF	United nation children fund
WHO	world health organization

Abstract

Introduction: Fertility and pregnancy during adolescence period is associated with increased risk of maternal mortality and morbidity, premature termination of education and high rate of population growth rate. When teenagers become pregnant they are less likely to use antenatal and delivery care from health workers.

Objective: To identify the determinants of teenage fertility and assess the pattern of use of antenatal care service utilization of women in the age group 15-19 years of age in Ethiopia

Methodology: Raw data collected from all part of the country using stratified cluster sampling method by the Ethiopian Demographic Health Survey 2005 with supplemental in-depth interview was used. Analysis was based for women aged 15-19 years at the time of interview and at recent child birth in five years. Bongaarts model of fertility and multivariate logistic regression models were used to identify the determinants.

Result: the teenage fertility rate was 13.6% and another 3.1% were pregnant for the first time at the time of interview. Delayed marriage or non marriage and postpartum infecundability were the determinants of fertility both in urban and rural part of the country while use of contraceptive was determinant in urban area. The other differential of fertility were age at first marriage, women education, place of residence and age. Similarly, only 27.3% of most recent child births had got at least one antenatal care from health workers. The determinants for the use of antenatal care among the teenagers were women as well as partner level of education, wealth index and place of residence.

Conclusion: A range of factors including level of education, place of residence use of family planning and breastfeeding has influenced teenage fertility and their use of maternal health service. So strong behavioral change communication, strengthening school health program, empowering of young women specially the rural one, and promoting parent-children discussion on sexuality matters is recommended to improve the situation.

1 INTRODUCTION

Adolescence is the transitional period from childhood to adulthood characterized by significant physiological, psychological and social changes. World health organization (WHO) defines the age group 10-19 and 15-24 years of age as adolescents and youth, respectively. Those in the age group 10-24 years are called young people (1).

Adolescents are characterized by immature behavioral decision-making, exploration, experimentation, subjection to peer influences, and lack of knowledge about disease and protective measures against it. Moreover, behavior, which starts in adolescence frequently, leads to health problems that only emerge in later life at increased cost to both the individuals themselves and their societies. (2, 3)

World wide, adolescents suffer from a disproportionate share of early marriage, unwanted pregnancies, unsafe abortions, sexually transmitted infections (STIs) including HIV/AIDS, female genital mutilation, malnutrition and anemia, infertility, sexual and gender based violence, and other serious reproductive health problems (4).

According to UNFPA report, each year, an estimated 14 million adolescents between the ages of 15 and 19 give birth globally, of which more than 90% occurs in developing countries. In the poorest countries, young motherhood often becomes a death sentence. An estimated 70,000 girls aged 15 to 19 die each year during pregnancy and childbirth and more than 1 million infants born to adolescent girls die before their first birthday. At least 2 million more are left with chronic illness or disabilities that may bring them life-long suffering, shame, and abandonment. Moreover, each year 2.2 to 4 million adolescents resort to unsafe abortion (5-7).

Adolescent pregnancy and childbearing have important deleterious consequences at global, societal and personal levels. Globally, the rates of population growth are more rapid when women have their first child in their teen years because early initiation into childbearing lengthens the reproductive period and subsequently increases fertility (8).

At the societal level, the strong association between adolescent childbearing and low levels of educational achievement for young women brings about a negative impact on their position and potential contribution to society. Teenage fertility substantially reduces human capital investments of

young women by substantially reducing years of formal education and early adult work experience. In a multi country study conducted in sub-Saharan African countries, teenage fertility has contributed to the observed gender gap in education (5, 8-10).

In many countries, unmarried adolescent mothers are likely to experience social ostracism, which may result in rejection by their family and peers. Very young mothers also tend not to be emotionally or financially prepared to care for and bring up a child. (5, 8)

Beyond these social and economic consequences, the psychological and physical health consequences of early motherhood for the mother and her child are even more problematic. Many researches have shown that teenage fertility is associated with adverse maternal and child health outcomes including obstructed labor, low birth weight, fetal growth retardation, and high infant and maternal mortality rate. (5, 8, 10-16).

Complications from pregnancy and childbirth are the leading cause of death for adolescent girls between the ages of 15 and 19 in poor countries. Girls in this age group are twice as likely to die from pregnancy and childbirth-related causes, compared with older women. Children born to teenage mother are 50% more likely to die before the age of one than those born to women in their twenties. Further more, among teenagers who become pregnant only few of them seek antenatal and delivery care from health professionals (6, 17, 18).

Because of these well documented adverse consequences of early childbearing, major international conferences convened under the recognition of the United Nations, including the International Conference on Population and Development (ICPD) held in Cairo in 1994, the Fourth World Conference on Women held in Beijing by the year 1995, and the millennium Summit held in New York in 2000, provide international recognition of adolescents' reproductive rights. The issue of adolescent reproductive health was reaffirmed in the millennium development goal (MDG) through the 62nd general assembly of united nation and the 2005 world assembly. Ethiopia is one of the countries that have agreed and signed the ICPD program of action. (2, 3)

Adolescents and young people ages 10-24 are the largest group ever to be entering adulthood in Ethiopian history. This cohort of 21 million makes up 30% of total population. Adolescents' sexual and reproductive health is of national concern to Ethiopia because the country has a youthful age structure with a broad-based population pyramid, typical characteristic of

developing country. In the country, young people are defined as those in the age group 10-29 years of age while the age group 10-19 are said to be adolescents (19).

Currently, the country has developed strategy to address adolescent reproductive health problems. On the strategic document early sexual debut, early age at first marriage, early child bearing, unwanted pregnancy, abortion, knowledge and use of family planning methods, and HIV/AIDS/STIs have been identified as major problems of adolescent reproductive health. To address these problems the strategy was published by the year 2006 (19).

Rationale of the study

As described in the introduction part above, teenage fertility is associated with high population growth rate, high risk of maternal and infant morbidity and mortality, and other social consequences such as lose of education which ultimately may lead to intergenerational poverty.

Furthermore, adolescents' use of preventive maternal health service such as antenatal and delivery care from health professionals is low although they are at greater risk of experiencing complications during pregnancy and childbirth.

Various reports and publications have identified different determinants of teenage fertility but most of the finding were from small scale studies or done in other countries. Additionally, much of the focus of fertility and use of maternal health service is among the general population of reproductive age group rather than this specific age group.

This thesis has mainly used the data collected for Ethiopian DHS 2005 through further analysis to identify possible determinants of teenage fertility in Ethiopia and the pattern of selected maternal health services utilization. So the finding of the paper will benefit policy makers and program planners to design and implement appropriate and feasible programs and strategies to the nation at large. It will also give direction about the current policies and programs being implemented.

2 LITRATURE REVEIW

2.1 Adolescents sexuality

An important consequence of a rising age at marriage combined with a decline in the age at menarche is a substantial increase in the number of year between menarche and marriage. This trend resulted in increased number of sexually mature but unmarried adolescents. This potentially leads to higher prevalence of sexual activity among unmarried, that expose them to unplanned pregnancies, unsafe abortion and contracting STIs (15).

The circumstances of adolescents in developing countries with respect to sexual behavior vary tremendously both across and within regions. Adolescents aged 15-19 years who had practiced sexual intercourse in Latin America varies from 18.4% in Peru to 30.1% in Paraguay. Similarly, in sub Saharan African countries, it ranges from 30% in Zimbabwe to 73% in Côte d'Ivoire and 70% in Mozambique among women aged 15-19 years of age (20).

Premarital sexual activity is common practice among teenagers. The extent to which single women report that they are sexually experienced varies across countries. Less than 10% of single women in Senegal and Zimbabwe have had sexual intercourse. By contrast, 45% of women in Côte d'Ivoire are sexually experienced but not yet married, followed by 31% in Zambia (20).

In six out of 11 sub-Saharan African countries, nearly one fifth of teenage women had first sexual intercourse before age 15. Experience of first sexual intercourse before the age of 15 years ranges from 5% in Zimbabwe to 32 percent in Côte d'Ivoire. (20)

In Ethiopia, sizable proportion of both in-school and out-of-school adolescents are sexually active. The proportion of sexually active students was 31.9% in Koladiba, 30.7% in north Gonder and 58% in Addis Ababa and most of these were conducted in out of wed lock situation. Out of female adolescents 21.8% in North Gonder and 20% in Harar were sexually active. Among out of school students the proportion was 49.3% and 17.5% Awasa, and Butajira, respectively (21-24).

According to EDHS 2005, among women age 25-49, 32 % had first sexual intercourse before age 15 years, 65% before age 18, and by age 25 most (88%) of them had sexual intercourse. The median age at first sexual intercourse for women age 25-49 years was 16.1 years which indicates that adolescent sexual activity is common in Ethiopia (25).

2.2 Teenage fertility

Teenage fertility (also called adolescent fertility), refers to a condition where woman has given live birth before the age of 20 years. Teenage fertility rate is calculated as the proportion of women aged 15-19 who are mothers (have ever given live birth) by the time of interview (25, 26).

Girls living in developing countries are the most at risk of adolescent pregnancy. The average fertility rate among women aged 15-19 year in the least developed countries is more than five times greater than that of the more developed regions (6).

While adolescent pregnancy is declining overall worldwide, high rates in many countries persist, mostly where poverty and poor health are endemic. On average, one third of young women in developing countries give birth before age 20 years (6). The proportion of teenage women who are mothers or are currently pregnant is highest in Sub-Saharan African countries that accounts for average of 20-40% (27).

In sub-Saharan Africa, the average birth rate per 1000 girls aged 15–19 years is 143, varying from 37 in Mauritius to 229 in Guinea. This rate is high as compared with the worldwide average of 65 live births per 1000 women aged 15-19 years. In some sub-Saharan African countries, one in five adolescent girls gives birth each year (17).

Considerable proportions of pregnancies and child births that have occurred to adolescents are unplanned. In Brazil 51% of adolescents has reported that, their most recent birth was unplanned (28). In Uganda, 10% of births to women aged 15–19-years were not wanted at all and 23% were mistimed (4).

In Ethiopia pregnancy and delivery during adolescence period is common. In a study conducted in Harar, eastern Ethiopia, among women aged 15-49 years, the mean age at first pregnancy was 19 years and about 41% of those women who had been pregnant at least once had their first pregnancy between the ages of 15 to 19 years. Almost half (48.3%) of pregnancy was unwanted in this age group and after controlling for potential confounders, the pregnancy of teenagers was more likely to be unwanted (29).

Other studies conducted in Ethiopia have also showed that teenage pregnancy and childbearing is common phenomenon. Among sexually active students 45% had history of pregnancy at least once

50% in Koladiba, 15% in Harar, and 18% in Addis Ababa. From out of school teenage women 43% had at least one pregnancy in East Gojam (2, 23, 24, 30). In North Gonder 78.2% of women in reproductive age group has said that they were pregnant before the age of twenty years. Age at first pregnancy was significantly associated with place of residence (31). A nation wide survey of DHS 2005 also has shown that 17% of adolescents has live child or are currently pregnant (25).

2.3 Determinants of fertility

2.3.1 Proximal determinants: Bongaarts model:

In 1978, John Bongaarts published a simplified model that shows the determinants of fertility by modifying previously proposed fertility determinants of Davis and Blake. According to him, any detailed and comprehensive analysis of factors influencing fertility requires the distinction to be made between two classes of determinants: namely proximate variables (also called direct or intermediate determinant of fertility) and socioeconomic and environmental "background" variables. The latter include the social, cultural, economic, institutional, psychological, health, and environmental variables whereas the proximate variables includes proportion of reproductive age who are married or in union, frequency of sex, contraceptive use, lactational infecundability, duration of the fertile period, sterility, spontaneous abortion, and induced abortion (32).

Proximate determinants consist of all biological and behavioral factors through which the background variables must operate to affect fertility. The proximate determinants of fertility refer to the behavioral and biological mechanisms by which fertility is reduced below its biological maximum. The principal characteristic of a proximate determinant is its direct influence on fertility. In contrast, socioeconomic variables can affect fertility only indirectly by modifying the proximate determinants (32, 33).

If a proximate fertility variable, such as the prevalence of contraception, changes then fertility necessarily changes (assuming the other proximate fertility variables remain constant), while this is not necessarily the case for an indirect determinant such as income or education (32). In general a socioeconomic variable can have negative fertility effects through one set of proximate variables (such as education's effect on use of contraception) and positive effects through another set (such as education's effect on length of breastfeeding). The overall net effect of a socioeconomic variable on fertility can therefore be positive, negative, or insignificant depending on the relative contributions of the positive and negative effects of the proximate determinants (32, 33).

Consequently, fertility differences among populations, sub-population (specific age group), and trends in fertility over time can always be traced to variations in one or more of the principal proximate fertility variables (32, 33).

He has presented evidence that most of the variation in fertility level among national population is attributable to just four proximate determinants -marriage, contraception, abortion and postpartum infecundability. Later he has added a fifth variable called primary sterility as a proximate determinant of fertility in areas where the prevalence of sterility is high such as sub-Saharan African countries. The model envisages that any factor –environmental, social, economical or cultural which affect fertility, must go through one or more of these proximate determinants (32-34).

The Bongaarts model expresses the impact in terms of the extent to which it reduces overall fertility. Other proximate variables that were not included in his model such as frequency of intercourse, spontaneous intra-uterine mortality, natural sterility were excluded from the model with the assumption that they would not vary greatly across population (32, 33).

The five principal proximate determinants are considered inhibitory of fertility because fertility is lower than its biological maximum value as a result of delayed marriage and marital disruption, the use of contraception, induced abortion, postpartum infecundability (induced by breastfeeding or abstinence) and primary sterility (33, 34).

Based on Bongaarts model, each of the proximate determinants are represented by five indices: the index of proportion married (C_m), index of contraception (C_c), index of induced abortion (C_a), index of postpartum infecundability (C_i) and index of primary sterility (C_p). Each of the indices assumes a value between 0 and 1. When an index is close to 1, it will have a negligible inhibiting effect on fertility, whereas when it takes a value of 0, it will have the maximum inhibiting effect. When all the proximate determinants have negligible effect on fertility, the model assumes that fertility will reach its biologically maximum achievable level of fertility which is called the Total Fecundity Rate (TF). In such condition the predicted total fertility rate (TFR) equals TF. Based on studies of historical populations with the highest recorded fertility, Bongaarts recommends using 15.3 as an estimate of TF, that is, the maximum number of births a woman could have over her reproductive life time is 15.3 children. The main equation of the model which includes the fifth index of primary sterility is given by

$$\text{TFR} = C_m \times C_c \times C_a \times C_i \times C_p \times \text{TF} \text{ ----- (1)}$$

Where

C_m = index of married (equals 1 when all women of reproductive age are married and 0 in the absence of marriage)

C_c = index of contraception (equals 1 in the absence of contraception and 0 if all women use 100% effective contraception)

C_a = index of abortion (equals 1 in the absence of induced abortion and 0 if all pregnancies are aborted)

C_i = index of post-partum infecundability (equals 1 in the absence of lactation and postpartum abstinence and 0 if the duration of infecundity is infinite)

C_p = index of primary sterility (equals one when no women are sterile and zero when all women are sterile)

TF = total fecundity rate (the ideal number of children a woman would have if she is remained married from menarche to menopause, without practicing breastfeeding, postpartum abstinence, contraception and induced abortion)

TFR = total fertility rate (the number of births a woman would have at the end of the reproductive years if she were to bear children at prevailing age-specific fertility rates while living throughout the reproductive period (excluding illegitimate births but based on all women of reproductive age whether married or not)

This mathematical model shows that TFR of women in reproductive age group is the function of marital status, contraception, abortion, post-partum infecundability, primary sterility and total fecundity rate. In populations where reliable information about induced abortions is not available and where primary sterility is high, Bongaarts et al. had recommend the use of the index of primary sterility in place of the index of induced abortion (34).

The predicted TFR may typically differ from the observed TFR because of the underreporting of births, underreporting of any of the behaviors measured by the indexes, or the omission of proximate determinants that are influential in determining fertility levels in the population under study (33, 35).

This aggregated model can be adapted for other application related with determinants of fertility at total or sub-total population level such as analysis of determinants age specific fertility or trend over time. If information is missing or not available for some of the indices, the model can be used with the available information. For instance, if index of abortion could not be calculated because of absence of adequate information, the model can be applied by considering the index of abortion as 1 (32, 33).

Marital status and age at marriage

Bongaarts defined marriage as relatively stable sexual union to which socially sanctioned child bearing is limited in most society. Marital fertility is affected by proportion of women in union and the average age at marriage. The proportion of women in union is in turn influenced by the age composition of population, incidence of widowhood, divorce and remarriage (32, 33).

Union (formal, i.e. marriage, as well as informal, i.e. free union or cohabitation) represents the primary context where sexuality is practiced, particularly, with reproductive purposes and, because of this; it is the context where fertility occurs, especially in developing countries. If sexuality took place only into the union's framework, the age at marriage would define the beginning of exposure to the risk of getting pregnant (33, 36).

In population or population subgroup where age at first marriage is high, the level of fertility is generally low because of lost child bearing years. On the other hand early and universal marriage is often associated with high fertility. Age at first marriage identifies the commencement of exposures to the risk of social sanctioned child bearing and it is therefore a principal determinant of fertility of woman (15, 33). Variation in age at entry into marriage has contributed to the existing differences in fertility across populations and also trends in fertility within individual populations over time (5).

Delayed age at marriage directly affect completed fertility by reducing the number of years available for childbearing. In addition, populations with later mean ages at first marriage also tend to be more urbanized, to have higher levels of educational attainment, and, more often, to use family planning within marriage. Fertility may be lower not only because of delayed marriage, which reduces the proportion of the adolescent cohort that is married, but also because marital fertility is lower in these populations. Later marriage also permits women to complete their educations, build labor force

skills, and develop career interests that compete with childbearing within marriage. These career interests may, in turn, motivate women to limit family size and/or widen the spacing of their children (5).

Data collected from developing countries has shown that early adolescent fertility is strongly associated with early adolescent marriage (5). Marriage is the most important factor causing women to initiate early childbearing in Eritrea, where almost all teenage first births (97%) occur within marriage (37). In Mali, Uganda, and Mozambique, about one out of two young women ages 15 to 19 have married (20).

In Ethiopia, early marriage is common practice. The median age at first marriage was 16.5 years among women aged 20-49 years by the year 2005 (25). In Oromia region the median age at first marriage was 16 years of age. The index of marriage (C_m) for Oromia region was 0.71 which shows marriage is common among women of reproductive age group in the region (38).

For the observed TFR below replacement level in Addis Ababa, delayed age at marriage has played significant role. Between 1990 and 2000 Addis Ababa has experienced fertility decline from TFR of 3.08 to 1.94. By the year 2000 the index of marriage was 0.35 which accounted for 65% reduction of the observed TFR from its biological maximum. Similarly Ethiopia has experienced TFR decline between the year 1990 and 2000. The decline in the proportion of women married was the most important factor behind the period decline in fertility both in urban and rural areas of the country but the fertility inhibiting effect was stronger in urban areas (35).

Use of contraceptive

Contraceptive use is a second key proximate determinant of adolescent fertility. In population where there is high rate of contraceptive use, the prevalence of unwanted pregnancy and therefore the fertility rate is low. The effectiveness of the contraceptive method used matters on its effect on fertility (32).

The use of contraception was the most important factor that explains the strong fertility decline that took place over the last decades in the world and in some part of Africa, particularly in the last 30 years. As a matter of fact, use of totally efficient contraceptive makes irrelevant the other proximate determinants because the fertility regulation would depend mainly and only on contraceptive use so

that the exposure to the risk of pregnancy would depend exclusively on the use of contraception. However, it has been proved that sexually active adolescents have, on average, a lower probability to use effective contraception compared to adult women (36, 39).

Some evidences indicate that the use of family planning by women in this age group is less important determinant of their fertility than age at entry into union. However, the extent to which contraceptive use rather than rising age at marriage has been significant in determining declines in fertility rates has varied from country to country. Generally, during the past two decades, contraceptive use has not been the dominant proximate determinant of fertility for women in the age range 15 to 19 in developing countries. Age at marriage is the telling factor in determining exposure to pregnancy and childbearing for adolescent women (5).

Utilization of contraceptive is low among adolescents even if they are sexually active which result in unintended pregnancy and abortion and they do have high unmet need for contraception (12). Almost one fifth of married women in developing countries have an unmet need for family planning services. This need is more than twice as high among adolescents as it is in the general population (6).

Proportions of married adolescent women, who were using any method of family planning, are generally low, but with sizeable intraregional and interregional variation. In some countries including Brazil, Costa Rica, Jamaica, Mauritius, and Thailand, more than 40 percent of married adolescent women were using some kind of contraception. However, in 12 out of 22 sub Saharan African countries contraceptive prevalence was below 10 % among married adolescents (5).

In sub-Saharan Africa, very small proportions of unmarried, sexually experienced girls aged 15–19 years used medical contraceptive methods at most recent sexual relation as evidenced by only 4% in Benin, 10.7% in Kenya, 12.4% in Mali, 8% in Uganda, and 5.2% in Zimbabwe (17).

Even if contraceptive knowledge and approval of contraception among adolescents is high, the level of actual use among sexually active adolescents is low. In Ugandan it was shown that 96% of married 15–19-year-old women know at least one contraceptive method but only 30% of them have ever used a method. Some of the reasons given for contraceptive nonuse include side effects, lack of appropriate knowledge about methods, opposition to use (personal, social and religious), misconceptions attached to safety of use, and costs related to purchase (4).

Similarly, in Eritrea, knowledge of any contraceptive method is generally high (about 90%). However, only 3.5% of all and 8.2% of ever married teenagers had ever practiced contraception. The main reasons reported by teenagers for not using family planning were related to the desire for more children, opposition to use, ignorance, health concerns, and side effects (37).

The situation in Ethiopia is not different which is characterized by high level of knowledge of family planning, but low rate of utilization and high unplanned pregnancy among teenagers who are sexually active. In Northeastern Ethiopia, only 12% has used contraceptive while 57% of the unmarried teenagers were sexually active. Maternal education and place of residence were significantly associated with use of family planning (40). The rate of family planning utilization among teenagers was 5.8% while it was 9.6% for women age group 20-25 years in Jimma, West Ethiopia (41).

The prevalence of unplanned pregnancy in Harar, Eastern Ethiopia, was 48.3% for the age group 15-19 and 35% for the age group 20-24 (29). EDHS 2005 has reported that, significant proportion of teenage women has never used any form of contraceptive. Current and ever use of family planning was lowest in the age group 15-19 years next to age group 45-49 (25).

The effect of use of family planning on fertility rate was observed to be very low in Ethiopia. In a study conducted among woman of reproductive age group in Oromia region, the index of contraception was 0.88 and its fertility inhibitory effect was almost negligible in rural area (C_c of 0.72 for urban and 0.98 in rural area) (38).

Similarly, another study has shown that the use of contraceptive was proximal determinant among woman aged 15-49 years living in Addis Ababa ($C_c = 0.55$) and other urban area ($C_c = 0.68$). But its effect was very minimal among women in rural area ($C_c = 0.96$) by the year 2000 (35).

Postpartum infecundability

Postpartum infecundability is a situation where a woman is unable to conceive pregnancy after giving birth because of postpartum amenorrhea or sexual abstinence. Postpartum amenorrhea is the temporary disappearance of menstruation that a woman experiences in the period immediately following childbirth. Postpartum abstinence refers to the period of voluntary sexual abstinence that follows childbirth (33).

The primary cause of prolonged postpartum infecundability is breastfeeding which results in postpartum amenorrhea. In society where breast feeding is generally prolonged and universal and contraception use is rare, the first determinant of birth interval length is the duration of breast feeding because breastfeeding induce the secretion of prolactine which ultimately leads to the inhibition of ovulation through hormonal system (33).

Longer and more intensive breastfeeding is associated with longer duration of fertility inhibiting effect. Full breastfeeding, where the infant has no other sources of food except breastfeeding, suppresses ovulation almost totally, whereas less intense and frequent suckling suppresses it partially. Thus ovulation can resume while a woman is still breast feeding. But, in population with long total duration of breastfeeding tend to have extended periods of intensive breastfeeding that cause pronged amenorrhea (33).

Long intensive breastfeeding is evidently universal throughout sub-Saharan African countries. However duration of breastfeeding varies between and within countries. The mean during of breast feeding was about 19 months in Lesotho, 18 in Ghana, and 16.5 in Kenya. The corresponding duration of postpartum infecundability was 13, 12 and 11 months in Lesotho, Ghana, and Kenya respectively. The general observation is that the duration of breast feeding declines with urbanization and education (34).

The length of postpartum abstinence is strongly influenced by cultural norms and prescriptions that vary across ethnic and religious groups regarding the appropriate waiting period before resuming sexual relations(33, 42).

Postpartum non susceptible period is usually defined for each woman according to which ever period is longer; that of postpartum amenorrhea or that of postpartum sexual abstinence. Prolonged duration of postpartum amenorrhea is observed in sub-Saharan African countries. The most notable observation is that the period of postpartum sexual abstinence is becoming shorter, especially in east Africa and this is likely to raise fertility. However the demographic role of abstinence is much reduced by the relative stability of lactation (34, 42).

In Ethiopia, postpartum amenorrhea has been observed to be determinant of fertility because of prolonged breastfeeding among woman of reproductive age group while duration of postpartum abstinence is short. According to further analysis of EDHS 2000, the average duration of

breastfeeding, postpartum amenorrhea and postpartum abstinence for Ormia region was 19.8, 12.4 and 2.9 months respectively. Its respective index (C_i) was 0.57. Preventive effect of breastfeeding was stronger in rural than urban area (38).

Similarly, in urban areas out side Addis Ababa and in rural areas, postpartum infecundability was the most important proximate determinant of fertility among women of aged 15-49 years (C_i was 0.55 in urban areas out side Addis Ababa and 0.57 in rural areas) while the C_i for Addis Ababa was 0.59 which shows protective effect of breastfeeding is longer in rural than urban areas (35).

Induced Abortion

Induced abortion, a practice that deliberately interrupts the normal course of gestation, directly reduces fertility through averting pregnancy. Induced abortion depends on its legality in a nation. In many developing countries abortion is restricted by the law unless for medical reason and the levels of induced abortion are likely to be low or negligible with the possible exception of some urban areas and in Latin America. It was also found to be relatively common among young woman than older once. But because of its legality issue and under reporting in developing countries, its analysis is usually omitted (32, 33).

Sterility

Sterility, whether primary or secondary, has been known to affect fertility particularly in area where there is high incidence of sterility. In Gabon, for example, the key determinate of the exceptionally low fertility (TFR of 4.1) was noted to be widespread primary sterility. If sterility is reduced, fertility is likely to rise particularly in countries where sterility is high. However sterility seems to be relatively lower in east and West Africa as compared to central Africa (42).

It was noted that the highest level of infertility is found in central Africa where over a larger area more than 20% of woman aged 45-49 years were childless whereas the rate was 12-20% and 3-12% in Eastern and western African countries respectively. This implies that sterility is low in east Africa and therefore its impact is minimal in this part of the continent (34, 42).

Studies done in Ethiopia have also showed that the effect of primary sterility on fertility is low. For instance in a study conducted from EDHS 2000 and 2005 has found that the index of sterility

(C_p) was 0.97 and 0.98 among urban woman aged 15-49 years in the year 2000 and 2005 respectively (42). Similarly, in studies conducted in Oromia region, Addis Ababa and other urban areas outside Addis Ababa and rural area was almost one indicating very low rate of infertility among woman of age 15-49 years in Ethiopia (35, 38).

2.3.2 Socio-cultural economic and environmental variables

The influence of socio-cultural and environmental variables such as education, place of residence employment, media, ethnic group, and religiosity, are important in teenage fertility, given that these characteristics are not only fundamental in defining sexual, marriage and reproductive behaviors, but also for the definition of the role of adolescents in society. Additionally these background factors influence proximal determinants of fertility by modifying their direction (33, 36).

Place of residence

Place of residence, especially the distinction between urban and rural area, affects the reproductive behaviors. This is due, in part, to the "value" differences between the two areas (more traditional behaviors and hence less propensity to the use of contraception in rural area), higher level of education and working opportunity in urban areas than rural areas), and in part to health services access (5, 36). In contrast women living in rural area are more likely to breastfeed for long period of time than those living in urban area (34).

Currently about 24% of rural women in the developing world begin childbearing in their teenage years versus 16% of urban-resident women. Both percentages are higher in Sub-Saharan Africa — 30% of rural and 21% of urban adolescents (5).

In most countries adolescent fertility rates are higher in rural than urban areas with some variation between countries. In the majority of the countries, rates for adolescents living in rural areas are twice that of adolescents living in urban areas. Ghana and Senegal present the largest differences with the ASFR for rural adolescents being almost three times as high as that for urban adolescents. The two rates are similar in countries where adolescent fertility rates are low, such as Comoros, Ghana, Namibia, and Rwanda in Africa, and Kazakhstan, Turkey, and Uzbekistan in Asia. However, some countries where adolescent fertility is still very high, such as the Central African Republic,

Chad, Malawi, and Zambia in Africa, and Bangladesh in Asia, also present rates that are more or less the same between rural and urban areas (8).

Similarly, teenage women living in rural area were more likely to be pregnant or bear children than their urban counterparts in various part of the developing world including Ethiopia (8, 12, 27, 37, 43). Age at first pregnancy was significantly associated with place or residence with urban being advantageous among women of reproductive age group in Northern Gonder, Ethiopia (31).

Education

It has been widely demonstrated that there exists a strong relation between women's education level and fertility control. Effect of education on fertility has been described in terms of three causal paths. Education reduces the demand for children by directly affecting the desired family size. It also reduces the economic utility of children, creates aspirations for upward economic growth that are not entirely consistent with having a large family, and increases the opportunity cost of women's time. (5, 8, 36)

Second, education has mixed effects with respect to the supply of children. Staying in school longer delays entry into marriage. However, in the absence of contraception, more education also may have a positive effect on the supply of children because better educated women may breastfeed less, and for shorter duration. Better educated women tend to have lower rates of infant and child mortality, directly contributing to the "supply" of children but indirectly affecting fertility in the opposite direction, as birth intervals lengthen in response to higher infant and child survivorship (5, 8, 32, 36).

Finally, female educational attainment influences the cost of fertility regulation where the predominant methods of contraception are female methods. Education reduces barriers to the adoption of family planning, in terms of awareness, willingness and decision making to use contraception (5, 32, 36).

It is worth mentioning that this relationship is bidirectional: Having no child during adolescence is a condition that makes the educational process easier (36).

The United Nations' analysis of World Fertility Survey data indicated that in the late 1970's and early 1980's women with seven or more years of schooling married nearly four years later, on average, than women with no education (reducing adolescent and, potentially, lifetime fertility). The

same women also had about 25 percentage points higher contraceptive use (another fertility reducing effect) and breastfed children 8 months less than women with no education (a counterbalancing effect that could increase fertility) (5).

Compared with the fertility rates for adolescents with a secondary or higher education, the fertility rates for adolescents with no education are three times as high in Africa, twice as high in Asia, and four times as high in Latin America and the Caribbean, on average (8).

In Brazil, young women education was the factor most strongly associated with probability of giving birth during adolescence. An adolescent with no more than primary schooling is more than twice more likely to have had a first birth than adolescent with at least a secondary education (28).

In Ethiopia, educational status of women has been shown to be associated with the use of contraceptive, age at marriage and TFR among women aged 15-49 years. According to EDHS 2005 report, the TFR of woman having none, primary and secondary or more level of education was 6.1, 5.1 and 2.0 births per woman, respectively. Women with at least some secondary education marry 5 years later than women with no education (25).

Those who have primary level of education were three times more likely to use contraceptive in Debia district, north Ethiopia (44). Similarly, in Jimma, the odds of couples current contraception use was three and six times higher when the wives had elementary and high school education, respectively, than the illiterates counterparts (45). In Harar, eastern Ethiopia, women having secondary or more level of education were less likely to experience unintended pregnancy than those who have primary level of education (29).

In Ethiopia, there was a 38% increase in childbearing among adolescents with no education, and a 70% decrease among adolescents with secondary or higher level of education between 2000 and 2005 (46).

Economical status and employment

Labor market participation has a direct effect on fertility because it increases the opportunity cost for women: working women are characterized by lower fertility levels than non working ones. However, in the case of adolescents the relation between labor market participation and fertility is more

complex given that the entrance in the labor market corresponds to entrance in adulthood and consequently a step closer to reproductive life (27, 36, 39).

Being an income provider can, on one side, increase pregnancy risk because woman is now projected in her adult role. On the other side, female employment decreases fertility because of incompatibility between job and having children. Early maternity is associated with leaving school in the short term, which let young women to access labor market, but in the long run it is a factor that inhibits female labor participation (36).

Women who are employed are less likely to be pregnant or bear child at early age and are more likely to use family planning (5, 47). In contrary, working woman are more likely to breastfeed for short period than those who have no job (33).

Women in the highest wealth quintile marry a year later than women in the lowest wealth quintile among women of aged 25-49 years. Current use of modern family planning method was 33.7% and 4.0% among women of reproductive age group belonging to the poorest and the richest wealth quintile respectively in Ethiopia (25).

Media exposure

Exposure to mass media has no direct influence on pregnancy, but it represents an important element, which acts through the spread of sexual and reproductive health information, programs and experiences. Furthermore Media effect is even stronger among adolescents (36).

In Brazil, mass media exposure, as measured through television-viewing habits, appears to effect adolescent fertility. Young women who watch television often are consistently less likely than those who do not to have had a first birth before age 20 years (28).

Further analysis of DHS form eight sub-Saharan African countries has shown that listening to radio tend to have a negative correlation with likelihood of early reproductive behavior. In most of the surveyed countries, higher proportions of young women who did not listen to the radio regularly reported having first birth, first sex, and first union before age 18 compared with women who listen regularly (48).

Religion and ethnicity

Differences in fertility levels according to race and religion have been observed throughout the world. In particular historical studies in North America suggested that Catholics have experienced relatively high fertility rates (28). In Latin America the fertility was found to be associated with religion and ethnicity (36).

In Ethiopia, variation in religion and ethnicity has been shown to be related with the use of family planning, age at marriage and fertility but the findings are mixed. For instance, in a study conducted in Butajira, ethnicity and religion has no effect on fertility(49). But in a study conducted in Awasa, ethnicity was associated with fertility among women of reproductive age group (50).

2.4 Pattern and determinants of utilization of maternal health care services by teenagers

For all women, use of health care services is a key proximate determinant of maternal and infant outcomes, including maternal and infant mortality. Moreover, the benefits of health care seeking and positive health behaviors are relatively strong in settings and subgroups where socioeconomic and public health resources are constrained. Timely and appropriate care can provide an opportunity to prevent or manage the direct causes of maternal mortality and to reduce fetal and neonatal deaths related to obstetric complications (7).

According to the recent WHO guideline, antenatal care should be started in the first trimester of pregnancy or early in the second trimester. If the pregnant woman has no serious health problem that needs special care, only four ANC visits are considered as enough for most women with routine ANC(17, 51).

Antenatal care can improve certain outcomes of pregnancy complications such as eclampsia, anemia and syphilis through the detection, management and referral for potential complications, although such care has not been shown to reduce rates of maternal mortality (51).

Nonetheless, there are potential benefits to be had from some of the elements of antenatal care, and these benefits may be most significant in developing countries where morbidity and mortality levels among reproductive-age women is high. The antenatal period clearly presents opportunities for reaching pregnant women with a number of interventions that may be vital to their health and well-being and that of their infants. For example, if the antenatal period is used to inform women and

families about danger signs and symptoms and about the risks of labor and delivery, it may provide the route for ensuring that pregnant women do, in practice, deliver with the assistance of a skilled health care provider. (51)

The antenatal period provides an opportunity to supply information on birth spacing, which is recognized as an important factor in improving infant survival and reduction of total fertility rate. Tetanus immunization during pregnancy can be life-saving for both mother and infant. The prevention and treatment of malaria among pregnant women, management of anemia during pregnancy and treatment of STIs can significantly improve fetal outcomes and improve maternal health. Adverse outcomes such as low birth weight can be reduced through a combination of interventions to improve women's nutritional status and prevent infections during pregnancy. More recently, the potential of the antenatal period as an entry point for HIV prevention and care, in particular for the prevention of HIV transmission from mother to child, has led to renewed interest in access to and use of antenatal care services (7, 51, 52).

Generally, care during pregnancy can provide an entry into the health system, and for adolescents in particular, such care may be one of the first comprehensive health assessments they receive. The provision of antenatal care also presents an opportunity to teach adolescents how to recognize and respond to the signs of obstetric complications (7, 51)

Delays in seeking care, in reaching adequate health facilities and in receiving appropriate care at facilities are well-known barriers to care for all women, and these factors may be especially pronounced for young women, who may have little knowledge and experience in seeking care (7). Use of ANC from health professionals has been shown to be associated with seeking delivery service at health facility at the time of birth (31).

Adolescents have increased risk for poor maternal and infant outcomes, and it is widely assumed that they are less likely than older women to use services. A multi country analysis of use of MCH service has shown, in Nicaragua and three Asian countries (Bangladesh, India and Indonesia), adolescents aged 18 or younger were significantly less likely than women aged 19–23 to use antenatal care with odds ratios of 0.6–0.9. However, for five of sub-Sahara African countries included in the analysis, there were no significant age differences in the use of skilled antenatal or delivery care for the same age group (7).

In Thailand, teenagers were less than four times to use antenatal care than women in the age group 20-25 years. It was found that only 13.4% of the teenagers have attended antenatal care while it was 25.9% for the age group 20-25 years of age. The difference was attributed to low level of education and unwanted pregnancy among the teenagers (13).

In a study conducted in Nigeria it was seen that 38.1% and 75.6% of woman aged 15-19 and 20-24 years respectively had received antenatal care during their most recent birth in five year preceding the survey. Education and place of residence was associated with the use of ANC. Adolescents in the urban locations and with more than primary schooling had received antenatal care more than those who are living in rural area or having no education (53).

In Ethiopia, the rate of use of ANC from health professionals is generally very low among woman of reproductive age group. In Gondor, 45.7% of women aged 15-49 years has attended ANC at least once for their most recent birth and those who had got ANC from health workers were more likely to seek health workers assisted delivery than those who didn't get ANC (31). Similarly, 26% of women had got ANC for their most recent birth within six years in southern Ethiopia (54). Nationally the rate of use of ANC for most recent birth in five years was 27.6% by the year 2005(25).

According to a study done in Ethiopia, considerable adolescents reported that reproductive health services are not accessible, affordable and acceptable to adolescents and they prefer to consult their peer or suffer in silence (55).

Adolescents avoid using existing RH services for a variety of reasons, including policy constraints, operational barriers, lack of information and feeling of discomfort. Operational barriers like inconvenient hours of operation lack of convenient transportation and high costs of services were considered the most important reasons adolescents avoid using existing health services even though policies allowed them to use. Moreover, feelings of discomfort, like belief that the services are not intended for them, concern that staff will be hostile or judgmental, fear that their parents learn of their visit are also considered important barriers. Current programs and health personnel in many developing countries are usually ill equipped to reach and assist such young people.(2)

Studies conducted in Ethiopia have also revealed similar finding. The reasons mentioned for not using existing reproductive health services by adolescents were unaware of services available, shy, fear of being seen by parents and others, embarrassment at needing RH services, long waiting time

and expensive services to be the major barriers. In addition, 70% of them preferred special hours for adolescents, 44.3% young provider of the same sex and 53% special discount on service fees for adolescents (2).

Factors associated with use of maternity service

In developing countries, the use of modern health care such as maternal health care services can be influenced by the socio-demographic characteristics of women, the cultural context, and the accessibility of these services. Additionally, factors related to place of residence and socioeconomic status may account for variations in use of maternal health care. These factors include women's age, ethnicity, education, religion, culture, clinical need for care and decision-making power of women. The costs, location, and quality of health services are also important. These factors interact in different ways to determine use of health care.(56)

The effects of mother's education, household economic status, and place of residence are strongly and significantly associated with prenatal care and attended delivery, where the adjusted odds of receiving prenatal care before birth of the child and attended delivery from health professionals are much higher among mothers with some education, better household economic status, and urban residence.(37)

Female education is a strong predictor of maternal health care services, but the extent and nature of the relationship between the two is not uniform across social settings. In Bangladesh, and Thailand women with primary education did not differ from women with no schooling in receiving delivery assistance. In Peru and Guatemala, women with primary level education were more likely to have received delivery assistance from health personnel (57, 58)

Variation in urban and rural area on use of antenatal care and assisted delivery has been observed in different part of the world (57). In north west Ethiopia the proportion of mothers living in urban areas and receiving adequate ANC was about three times greater than mothers living in rural areas (31). Similarly, another study has shown that Women living in rural areas were less likely to receive antenatal care than those women in urban areas. The percentages of women who received antenatal care were 21.4% and 73.1%, for rural and urban areas, respectively (54).

Many women in developing countries need a husband's permission to visit a health facility, or must be accompanied, particularly when the husbands are away from home. This tradition can severely limit women's ability to use even nearby health facilities. In many parts of the world women's power to make decision is limited even matters directly related to their own health. Moreover, in many parts of Africa, women's decision-making power is extremely limited, particularly in matters of reproduction and sexuality. In this regard, decisions about maternal care are often made by husbands or other family members (57-59).

Women living in households that fall within the poorest population quintile use antenatal services much less frequently than do those in the richest 20%. The data also show that whereas some degree of wealth differential exists everywhere, the gap between the richest 20% and the poorest 20% for use of antenatal care varies enormously. Particularly steep gradients are observed in Bangladesh, Chad, Egypt, India, Mali, Morocco and Pakistan (51).

Further analysis of EDHS 2000 has shown that, place of residence and women's education as the most important determinants of antenatal care utilization in Ethiopia. Marital status, parity and religion were also found to be predictor of use of ANC. Married women were 40% more likely to receive antenatal care from a health professional than unmarried women and Muslim women were 30% more likely to receive professional antenatal care services than Orthodox or catholic in urban area. Compared with women with no education, those with primary education were nearly two times more likely to use ANC services. The corresponding odds of using ANC services were about four times higher if these women attained at least secondary education. Married women residing in rural areas were 20% more likely to use antenatal care than their unmarried counterparts. Maternal education also has a positive effect on the utilization of antenatal care in rural Ethiopia. The odds of using this service are more than two and half times higher for women with primary education than for women with no education in rural area(60).

Community based study in Addis Ababa found that women who did not have ANC were often to be illiterate, had low income and were unmarried (61). Similar study conducted in Arsi Zone of central Ethiopia found maternal age, parity, lack of time, education, marital status, and women's economic status to be significant predictors of utilization of maternity care services (62). Another study conducted in Asayta has shown that women who have secondary or more education were two times

more likely to seek ANC than those who were illiterate. Higher income was also associated with the use of ANC from health professionals (58)

In Butajira, urban dwellers were more than three times to use antenatal care than rural pregnant women. Equity in utilization of preventive MCH services was also affected by socio-economic status of the households. The heads of households being non-farmer, and having higher annual household income were also found to be associated with the use of antenatal care (63).

In Jimma, the use of antenatal care varies substantially if the pregnancy was wanted and approved by husband for prenatal care. More than three quarters of those who wanted pregnancy were found to have used antenatal care compared to 62% of women who did not want the pregnancy. The impact of husband approval was highest for teenagers than adult women (59).

3 OBJECTIVES

3.1 General Objective:

To identify the determinants of teenage fertility and assess the pattern of use of antenatal care service utilization of women in the age group 15-19 years of age in Ethiopia

3.2 Specific objectives

1. To find out the level of teenage fertility in Ethiopia
2. To identify proximate determinants of teenage fertility
3. To investigate the utilization level of antenatal care services among teenage women
4. to identify factors associated with use of antenatal care among teenage women

4 METHOD

This research has mainly used the data collected for Ethiopia demographic and health survey (EDHS) 2005. The principal objective of the EDHS 2005 was to provide current and reliable data on fertility and family planning behavior, child mortality, adult and maternal mortality, nutritional status of children, the utilization of maternal and child health services, knowledge of HIV/AIDS and prevalence of HIV/AIDS and anemia. The main result to the DHS was published by the year 2006 (25). This paper will use the database of the survey through further analysis to identify the determinants of teenage fertility and their maternal health service utilization. DHS data have been shown to be reliable and powerful for the analysis of reproductive behavior in various publications (10, 36, 48, 64).

4.1 Study area

The EDHS 2005 was conducted to provide nationally representative sample from both urban and rural areas of all the nine regions and two city administrations of Ethiopia (Tigray; Affar; Amhara; Oromiya; Somali; Benishangul-Gumuz; Southern Nations, Nationalities and Peoples (SNNP); Gambela; Harari; Addis Ababa and Dire Dawa).

To supplement the EDHS 2005 data, qualitative data was collected from Addis Ababa, North Shoa Zone of Amhara region (in and around Debre Berhan town) and East Shoa zone of Oromia region (in and around Ziway town).

Ethiopia is situated in the Horn of Africa between 3 and 15 degrees north latitude and 33 and 48 degrees east longitude. It is a country with great geographical diversity; its topographic features range from the highest peak at Ras Dashen, which is 4,550 meters above sea level, down to the Affar depression at 110 meter below sea level. The climatic condition of the country varies with the topography, with temperatures as high as 47 degrees Celsius in the Affar depression and as low as 10 degrees Celsius in the highlands. The total area of the country is about 1.1 million square kilometers and Djibouti, Eritrea, Sudan, Kenya, and Somalia border it.(25)

The majority of the population lives in the highland areas of the country. The main occupation of the settled population is farming, while in the lowland areas, the mostly pastoral population moves from place to place with their livestock in search for grass and water. Among the nine regional states, Amhara, Oromiya and SNNP comprised about 80% of the total population of the country. Affar,

Somali, Benishangul-Gumuz and Gambela regions are relatively underdeveloped. Christianity and Islam are the main religions with 51% Orthodox Christians, 33% Muslims, and 10% Protestants. The rest follow a diversity of other faiths. The country is home to about 80 ethnic groups that vary in population size from more than 18 million people to less than 100. (25)

Based on the Ethiopian central statistic agency report, the country will have total population of 79.221 million by July 2008. Out of these, 83.3% live in rural areas and the remaining 16.7% are urban dwellers. Of the total population about 12.5%, 10.3% and 9.4% are in the age group of 10-14, 15-19 and 20-24 years, respectively. Most of the populations are economically dependent on traditional rain fed agriculture. The population is expected to be 108.7 million by the year 2025 with rate of natural increase of 2.5% per year (65)

The primary health service coverage (which includes health center, nuclear health center and health post) was 86.7 by mid 2007. When only health center and nuclear health center are considered, the potential health coverage was 30.5% by the year 2007. The crude birth rate, maternal mortality ration and total fertility rate were estimated to be 35.7 per 1000, 673 per 100,000 and 5.4 respectively by 2005 (65).

4.2 Study design

This study has composed of two methods. The first is review and further analysis of Ethiopia DHS 2005 which is quantitative community based cross sectional survey planned to be nationally representative. Secondly, qualitative data was collected from teenagers using in-depth interview from three regions (Amhara, Oomia and Addis Ababa) to supplement the EDHS finding.

4.3 Study period

EDHS data was collected from April 27 to August 30, 2005. The qualitative data was collected in February and March 2008.

4.4 Source population

There are two source populations for this study:

- a. All woman aged 15-19 years of age at the time of interview (to be used for teenage fertility assessment)

- b. All women who have given birth at least once in five year preceding the survey whose age was less than 20 years of age at the time of most recent child birth (to be used for assessment of maternal health service utilization).

4.5 Study population

Similarly two study population:

- a. All women aged 15-19 years of age at the time of interview who participated in the survey.
- b. All women who have given birth at least once in five year preceding the survey whose age was less than 20 years of age at the time of most recent child birth that participated in the survey

4.6 Inclusion criteria

From the EDHS 2005 database, all women within the age group of 15-19 years at the time of interview and those aged 15-24 years at the time of recent child birth in five year were included in this study. For the in-depth interview women whose age is in the range of 15-19 years, volunteer, is currently pregnant or already has given birth, were included in the survey.

4.7 Exclusion criteria

Women whose age is over 24 years of age at the time of birth as well as men and children are not be included for the quantitative analysis from EDHS data base.

For the qualitative component women who are sick (either physically or mentally), or having no history of pregnancy/delivery and age over 19 were excluded from the interview.

4.8 Sampling procedure

4.8.1 EDHS sampling procedure:

In the 2005 EDHS a representative sample of approximately 14,500 households from 535 clusters were selected. The sample was selected in two stages using stratified clustered sampling procedure.

In the 1994 census frame, each of the 11 administrative areas was subdivided into zones and each zone into Woredas. In addition to these administrative units, each Woreda was subdivided into

convenient areas called census enumeration areas (EAs). Each EA was either totally urban or rural. This list of EA from the 1994 Population and Housing Census sample frame was used as a sampling frame for selection of clusters. One EA is considered as one cluster. A cluster has size of around 100 households. For this survey there were over 60,000 clusters and based on international recommendation and available resource (financial, time, human resource), 540 clusters (145 urban and 395 rural) were selected from the list of enumeration areas. These 540 clusters were distributed into urban and rural area by their respective region. Since there is significant variation in population size across regions of the country, the allocation of clusters to regions was not based on their population size to minimize sampling error of regions with small population size. Then selection of cluster was conducted in all regions as part of the first stage. Fieldwork was successfully completed in 535 of the 540 clusters, with the 5 clusters not covered primarily due to inaccessibility (25).

In the second stage complete household listing was carried out in each of the selected cluster. The listing operation lasted for three months from October 2004 to January 2005. Then between 24 and 32 households from each cluster were selected systematically for participation in the survey. In the selected household, all women in the reproductive age group (15-49 years) were interviewed (25).

4.8.2 In-depth interview sampling procedure:

For the qualitative study, convenient sampling method was employed. The samples were selected both from the community and health facility fulfilling the inclusion and exclusion criteria. In all the three regions, 2-3 health facilities were selected. In the selected health facilities, adolescents who came for maternity or child health services (antenatal care, delivery or immunization) were interviewed. For the samples in the community, they were selected whenever the data collectors got information that the women has delivered recently, or is using contraceptive in the given age group. The procedure has continued to select samples of at least six women per region and as long as no new information is coming.

4.8.3 Data collection instruments and procedures

The DHS data was collected through standardized DHS core questionnaire with adjustment to Ethiopian condition prepared in three main Ethiopian languages: Amharic, Oromiffa and Tigrigna. Before the actual field implementation of the survey, the questionnaire was pre-tested in all the three languages and refined accordingly. Training of interviewers, editors and supervisors was given for

about a month, both in classroom and practically in field by senior staff members from Central Statistical Agency, Family Guidance Association of Ethiopia, UNFPA and center for disease control (CDC). After completing the interviewers' training, the field editors and supervisors were trained for an additional three days on how to supervise the fieldwork and edit questionnaires in the field to ensure data quality(25).

For the qualitative data in-depth interview was conducted among the selected teenage women at health facility and in the community. The data was collected by the principal investigator and other two health officers. One day training was given to the data collectors. The interview was facilitated through open-ended guiding questions. Each interview has lasted form 30-60 minutes. Before beginning the interview, the objective and procedure of the interview was clarified to the interviewees and the interview continued when they agree to proceed. All the interviews were tape-recorded and additional note was taken during the sessions. Finally, the principal investigator with the data collectors transcribed the tape recorded information after each session then it was translated and interpreted as part of the finding by the principal investigator.

4.9 Quality of the data

The DHS data was well monitored data both at the time of data collection and data entry level. The fieldwork was closely monitored for data quality through regular field visits by senior staff from Central Statistics Authority and other member organizations of the Steering Committee. Data quality was also monitored through field check tables generated from completed clusters simultaneously data entered and produced during the fieldwork. Continuous communication was maintained between the field staff and the headquarters through cell phones.(25)

During data entry, each of the questionnaires was keyed twice by two separate entry clerks. Consistency checks were made and entry errors were manually checked by going back to the questionnaires. A secondary editing program was then run on the data to indicate questions that showed inconsistency and these were also corrected by secondary editors.(25)

For the qualitative component, the quality was maintained through training of the data collectors on the data collection procedure and approach, rehearsal of the answer and recording of the interview.

4.10 Conceptual framework of teenage fertility

The conceptual framework of fertility is attached at annex 1. The framework considers two components –proximate and background variables which is adapted from Bongaarts model of fertility. The proximate determinant includes marital status, contraception, and breastfeeding. The framework also considers socioeconomic and environmental variables which have relationship to both the proximate determinants and the outcome of interest- adolescent fertility.

4.11 Variables

To achieve the objective there are two different types of dependant variables: fertility and use of antenatal care as a representative of maternal health service utilization.

- **Dependant variables:**
 1. Being fertile (have ever given birth) by the time of interview and not being fertile.
 2. Attending Antenatal care from health professionals at least once or not
- **Independent variables:** For the outcome of interest, the independent variables are, socio demographic and behavioral characteristics including: age, marital status, age at first marriage, educational level, ideal number of children, current residence, employment status, access to mass media, and use of family planning. Additional variables for use of maternal health service are sex of the head of the household, parity, history of death of child, and the child birth being planned or not, are included.

4.12 Data analysis

The analysis of this thesis has two main categories- teenage fertility and maternal health service utilization. The method of analysis for these two groups is as follow.

4.12.1 Common to Both types of dependent variables

For both types of analysis the data was extracted from women database of EDHS 2005 and analysis done using SPSS 13.0 Statistical Packages. Descriptive analysis was done for each variable in the study by running frequencies and cross tabulation. For testing strengths of associations and their statistical significance, chi-square, Odds Ratio (OR) and 95% confidence interval (CI) were

calculated for each independent variable against the dependent variables using cross tabulation and binary logistics regression. Finally, multivariate analysis was employed via multiple regression models for categorical variables using enter method in order to account potential confounding factors. P-values less than 5% were considered significant. For variables having three or more levels, the overall p-value has been displayed to check for the variable net effect.

In the descriptive part of the analysis, sampling weight was used to produce national estimate because the selected samples were not distributed by region proportionally to the population size which resulted in difference with the probability of selection. For logistics regression sampling weight was not applied.

The qualitative data collected through in-depth interview was transcribed, translated, coded and categorized by the principal investigator. This data is used together with the quantitative result to explain the finding.

4.12.2 Analysis of teenage fertility

Two types of models have been used for identifying teenage fertility determinants – Bongaarts model and multiple logistic regressions.

To fit into model of logistic regression models, for all independent variables except family planning, all women in the age group 15-19 were used by considering their fertility. In the case of family planning, only adolescents who are sexually active have been entered into the model. Those teenagers who had started to use family planning for the first time after getting birth are considered as never taken (only for the variable “ever use of family planning” in logistic regression model).

The second model applied for teenage fertility is Bongaarts model. The model to be used for this analysis is the direct extension of the one described in the literature review part of this thesis which is recommended by Bongaarts and Robert Potter (33). Equation 1 mentioned in the methodology part can be re-written for ASFR as

$$ASFR = C_m(15-19) \times C_c(15-19) \times C_a(15-19) \times C_i(15-19) \times C_p(15-19) \times AF \text{ ----- (2)}$$

Where

$C_m(15-19)$ = index of marriage for the age group 15-19 years

$C_{c(15-19)}$ = index of contraception for the age group 15-19 years

$C_{a(15-19)}$ = index of abortion for the age group 15-19 years

$C_{i(15-19)}$ = index of post-partum infecundability for the age group 15-19 years

$C_{p(15-19)}$ = index of primary sterility for the age group 15-19 years

AF = age specific fecundity rate (the maximum biologically possible fertility)

ASFR = Age specific fertility rate

The age specific fecundability (AF) of women aged 15-19 years is 511 per 1000 woman (as 511 per 1000 is for five year age group, so multiplying it with five gives 2.5 children per woman per year) (33). Age specific fecundability of 2.5 per woman means theoretically an adolescent who remained married continuously from age 15 to 19 and who doesn't breastfeed, and does not use family planning would have the maximum potential to give 2.5 births by the age of 19 years.

If the age specific fecundability (AF) is substituted with 2.5, equation 2 becomes

$$ASFR = C_{m(15-19)} \times C_{c(15-19)} \times C_{a(15-19)} \times C_{i(15-19)} \times C_{p(15-19)} \times 2.5 \text{ ----- (3)}$$

Each of the index described above are going to be calculated with the following formulas (33).

$$C_{m(15-19)} = m(20-24) * 0.75 \text{ ----- (4)}$$

Where

$m(20-24)$ is proportion married among women age 20-24 years

0.75 = this constant is used because in the age group 15-19 the incidence of premarital conception is not negligible. In addition, the married women in the 15-19 age groups are mostly 18 or 19 years old at the time of marriage, and they are, therefore, not representative of the entire age group. To avoid these problems the proportion of 15-19 who have married is set equal to 0.75 X $m(20-24)$ for all populations. (32, 33)

$$C_{c(15-19)} = 1 - c * u / f \text{ ----- (5)}$$

Where

C = average effectiveness of contraception (which is usually 0.61 for those aged less than 24 years). The value of contraceptive effectiveness is considered to be 0.61 because young women are more likely to use less effective methods of contraceptive than older women. (33)

U = proportion currently using contraceptive among married woman (in this case proportion of currently married teenagers who are currently using contraceptive)

F= proportion currently believed to be fecund (which is usually 0.98 for those aged less than 24 years of age) (66).

$C_{a(15-19)}$ = this index is usually under reported specially in countries where abortion is not legalized and even reported its impact on fertility is minimal in developing countries (33). In Ethiopia the abortion is not permitted unless for medical cases at time of this data collection. So for this analysis, as recommended by Bongaarts, the value has been taken as 1 (which means abortion has negligible influence on fertility)

$C_{p(15-19)}$ = index of primary sterility in this analysis has been considered as 1 because, the effect of primary sterility is very minimal in east African countries. Besides, as described in the literature review part above, its fertility inhibiting effect is very low in Ethiopia. So its value in this study has been considered as one.

$$C_{i(15-19)} = \frac{20}{18.5 + i(15-19)} \text{----- (6)}$$

Where

$i(15-19)$ = duration of postpartum or lactational infecundability (in months) which is calculated from average duration of breast feeding as in the next equation

$$i = 1.753e^{0.1396B - 0.00187B^* B} \text{----- (7)}$$

where B = mean duration of breastfeeding in months(33)

4.12.3 Use of maternal health service

For the analysis of use of maternal health service, age at birth was considered (rather than current age which was the case for fertility analysis). The unit of analysis is women who had at least one live

birth in the five years preceding the survey. If women had more than one live birth in the past five years, only care received for the most recent live birth is considered. Antenatal care service is used as a representative of maternal health services.

4.13 Operational definition

- **Adolescent:** adolescent is used interchangeably with teenage that refers the age group 15-19 years of age group
- **Age Specific Fertility Rate** – number of births per thousand women in a specified age group, calculated by dividing the number of live births to women in a specific age group by the number of woman-years lived in that age group
- **Age specific Marital Fertility Rate** - The number of children that a married woman expected to have at the end of her age group given that the current age specific marital fertility rate remains the same and no women dies between the age group.
- **Antenatal care:** indicates whether women had seen a skilled health care provider (defined as a doctor, person with midwifery training or health professional) at least once during pregnancy. Women who reported receiving no antenatal care, as well as those reporting a visit only with a traditional birth attendant (trained or untrained), a relative or another person, will be considered to have received no care from skilled personnel
- **Contraceptive knowledge:** Able to mention at least one of the family planning methods.
- **Currently sexually active:** Having at least one sexual exposure within four weeks prior to the time of survey.
- **Ever use of contraceptive:** History of using any method of family planning (modern or traditional) by the respondent or her partner, to avoid or delay pregnancy. (This definition is slightly changed in logistic regression model. For fertile women, if they start to use contraceptive for the first time after getting birth, then they are considered as never used. This happens only in logistic regression model).
- **Fertile** : women who have ever given live birth before the survey
- **Modern contraceptives:** methods include, oral contraceptive pills, injectable, implants, condom (male and female), diaphragm, contraceptive foam and jelly, intrauterine devices, and sterilization
- **Older teenager:** those aged 18-19 years, used interchangeably with older adolescents.
- **Older adolescent** – those aged 18-19 years, used interchangeably with older teenagers.

- **Older women** : women aged 20-24 years
- **Sexually active**: Had history of at least one sexual intercourse in her life time
- **Teenage**: for this analysis teenage is women age group 15-19 years. Teenage and adolescent are used interchangeably.
- **Total Fertility Rate** – The number of children that a woman expected to have at the end of her reproductive age given that the current age specific fertility rate remains the same and no women dies between the age of 15-49 years.
- **Traditional contraceptives**: includes withdrawal and rhythm methods
- **Union/married**: women who have been married or living with consensual union. The words married and union are used interchangeably
- **Unmet need for spacing**: includes pregnant women whose pregnancy was mistimed, or postpartum amenorrheic women whose last birth was mistimed. For fecund women who are neither pregnant nor postpartum amenorrheic and who are not using any method of family planning and say they want to wait two or more years for their next birth, are undecided about the timing of the next birth, or are undecided whether to have another child.
- **Unmet need for limiting**: includes pregnant women whose pregnancy was unwanted, or postpartum amenorrheic women whose last birth was unwanted. For fecund women who are neither pregnant nor postpartum amenorrheic and who are not using any method of family planning and who want no more children.
- **Young teenager**: those aged 15-17 years, used interchangeably with young adolescents
- **Young adolescents** – those aged 15-17 years, used interchangeably with young teenagers

4.14 Ethical consideration

To use the raw database of Ethiopian DHS, permission was obtained from ORC Macro through e-mail (see it at annex 6). The proposal was approved by the ethical review committee of the Faculty of Medicine of Addis Ababa University. Additional clearance from AA health bureau ethical committee and permission from respective regional health bureau and health facilities was obtained before starting the qualitative data collection.

Prior to asking consent to conduct interview, the purpose of the study and the right of the respondent not to participate and not to answer the question for which she did not want to, was carefully explained to respondents. Written informed consent was obtained from the participants of qualitative

survey. All interviews took place privately at place and time chosen by the respondent. Strict confidentiality was assured through anonymous recording and coding of questionnaire and placed them in safe place after they have been collected and was used for the purpose of the study only.

Dissemination of result: After presentation of the result to the school of public health, the findings will be published and disseminated as appropriate.

5 RESULTS

5.1 *Teenage fertility*

5.1.1 Sociodemographic characteristics of women aged 15-19

There were 3,266 women who have participated in the survey in the age group 15-19 years. Of these teenagers, 1953 (59.8%) were young adolescents (age 15-17 years) while 1313 (40.2%) were older adolescents (aged 18-19 years). The mean (SD) age of the teenagers was 16.9 (1.4) years. Table 1 shows the socioeconomic and demographic characteristics of woman aged 15-19 years at the time of interview.

As shown in the table, 1067 (32.7%) were Oromo followed by Amhara (32.1%), Tigre (7.3%) and Gurage (4.9%) by their ethnicity. About half (52.1%) of them were Orthodox Christian by their religion. Around three quarter (78.4%) were living in rural areas and almost similar proportion (73.3%) had never been married. Most of them (88.7%) were from four big regions of the country namely, Oromia, Amhara, SNNPR and Tigray regions. Three fourth (76.4%) of the teenagers were not working group at the time of interview. Two out of five adolescents (40.0%) had no any form of formal education whereas 47% and 16% had attended some primary and secondary level of education.

Table 1: Socioeconomic and demographic characteristics of women aged 15-19 years, Ethiopia, 2005

Variable	Frequency	%
Ethnicity		
Oromo	1067	32.7
Amhara	1049	32.1
Tigre	239	7.3
Gurage	159	4.9
Sidama	98	3.0
Others	653	20.0
Religion		
Orthodox	1703	52.1
Muslim	859	26.3
Protestant	606	18.6
Other	98	3.0
Current age		
15-17	1953	59.8
18-19	1313	40.2
Type of place of residence		
Urban	703	21.5
Rural	2562	78.4
Place of residence by region		
Oromia	1206	36.9
Amhara	811	24.8
SNNPR	652	20.0
Tigray	229	7.0
Addis Ababa	199	6.1
Other regions	169	5.2
Current marital status		
Never married	2394	73.3
Married	689	21.1
Living together	21	0.7
Widowed	8	0.2
Divorced	132	4.0
Not living together	20	0.6
Educational level		
No education	1308	40.0
Primary	1423	43.6
Secondary	519	15.9
Higher	16	0.5
Wealth index		
Lowest	448	13.7
Second	566	17.3
Middle	627	19.2
Fourth	603	18.5
Highest	1022	31.3
currently working Status		
Not working	2494	76.4
Working	770	23.6
Total	3266*	100.0

* Since the sample was weighed, sometimes the sum may deviate slightly from 3266

5.1.2 Adolescent sexuality

At the time of interview 904 (27.7%) of teenage women were sexually active. The mean and median age of first sexual intercourse was 14.8 (SD \pm 2.0) and 15 years respectively. As the age increase, the rate of sexually active teenagers increases linearly (X^2 for linear trend = 356.8 and $P < 0.001$). Only 59 (8.1%) of teenagers aged 15 years were sexually active but the proportion has risen to 234 (51.9%) among the teenagers aged 19 years of age. (See chart 1)

In other word, out of older teenagers aged 18-19 years 572 (43.6%) were sexually active while only 332 (17.0%) of those aged 15-17 had ever practiced sexual relationship. (See table 2)

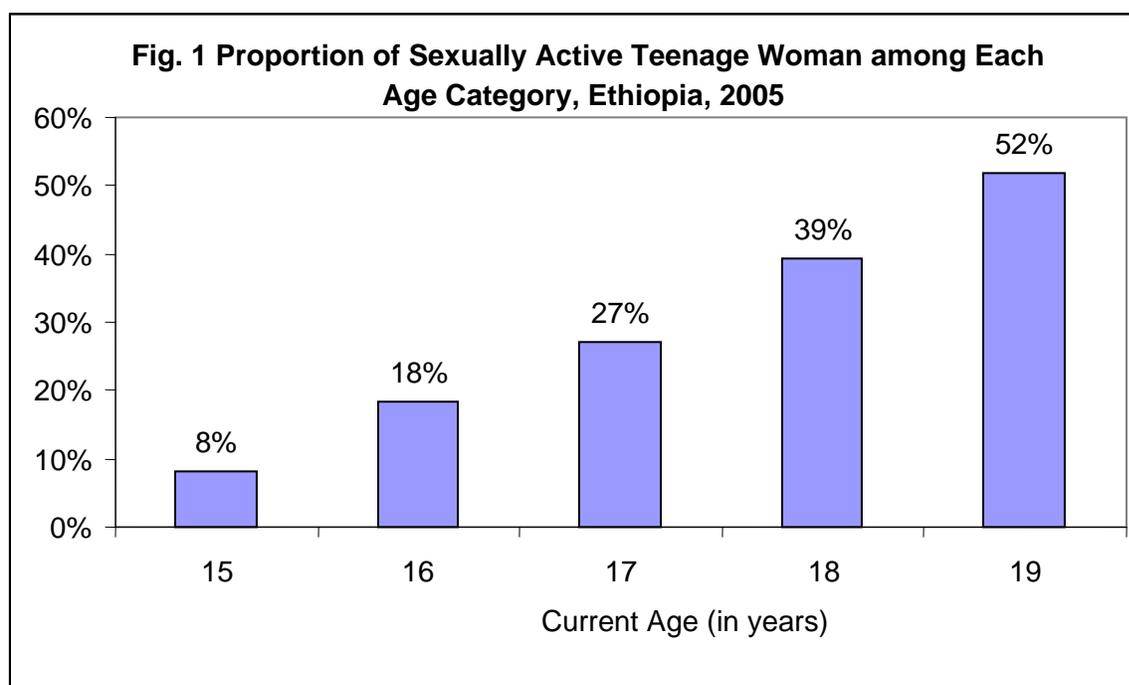
Out of the 904 sexually active teenagers 363 (40.9%) had their first sexual intercourse before the age of 15 while 443 (49.9%) had their first exposure at age of 15-17 years. Of the sexually active teenagers 287 (31.7%) were sexually active within the last four weeks preceding the survey.

Among the sexually active adolescents, 349 (38.9%) had their first sexual intercourse at their first union while the remaining 555 (61.1%) had engaged in premarital sexual relation.

Adolescent women living in rural area were more likely to be sexually active than those living in urban area. Only 106 (15.1%) of adolescents living in urban area were sexually active while it was 798 (31.1%) among those living in rural area and the difference was statistically significant ($X^2= 1.1$ and $p < 0.001$)

Table2: Characteristics of sexual practice of women aged 15-19 years of age, Ethiopia, 2005

Sexual activity Character	Frequency	%
Sexually active (n= 3266)		
No	2362	72.3
Yes	904	27.7
Age at first sex (n= 904)		
<15	363	40.1
15-17	443	49.0
18-19	98	10.8
Premarital sex (n=904)		
No	349	38.9
Yes	555	61.1



5.1.3 Teenage pregnancy, fertility and childbearing

Among teenage women aged 15-19 years of age 443 (13.6%) had given birth at least once in the past and 133 (4.1%) were pregnant at the time of interview. One hundred (3.1%) of the teenagers were pregnant for the first time during the time of interview. Of all the adolescents 543 (16.6%) have already started to bear child or had become pregnant. (See table 3).

The current age-specific fertility rate (ASFR) was estimated for the three year period preceding the survey date, which corresponds approximately from 2002 through 2005. The current age specific fertility rate of teenagers was 104 per thousand women aged 15-19 years of age.

Out of the 443 fertile teenagers 322 (72.7%) had only one child whereas 103 (23.2%) had given two live births. About one percent of the teenagers had given four live births. For the fertile adolescents, the mean number of child ever born was 1.33 (SD±0.6).

Of the fertile adolescents 57 (13%) and 288 (65%) had given their first birth before the age of 15 and 18 years respectively while the rest 98 (22%) had given their first birth after the age of 17 years. The earliest age reported at first birth among the teenagers was 12 years of age. The mean (SD) and median age at first birth was 16.2 (1.5) and 16 years, respectively.

Fertility and pregnancy for the first time were more common among older teenagers than younger once. It has increased from one percent among women aged 15 years to 32.8% among those aged 19 years, and those pregnant for the first time increasing from less than one percent among the youngest teen to 4.4% out of those aged 19 years. (See chart 2)

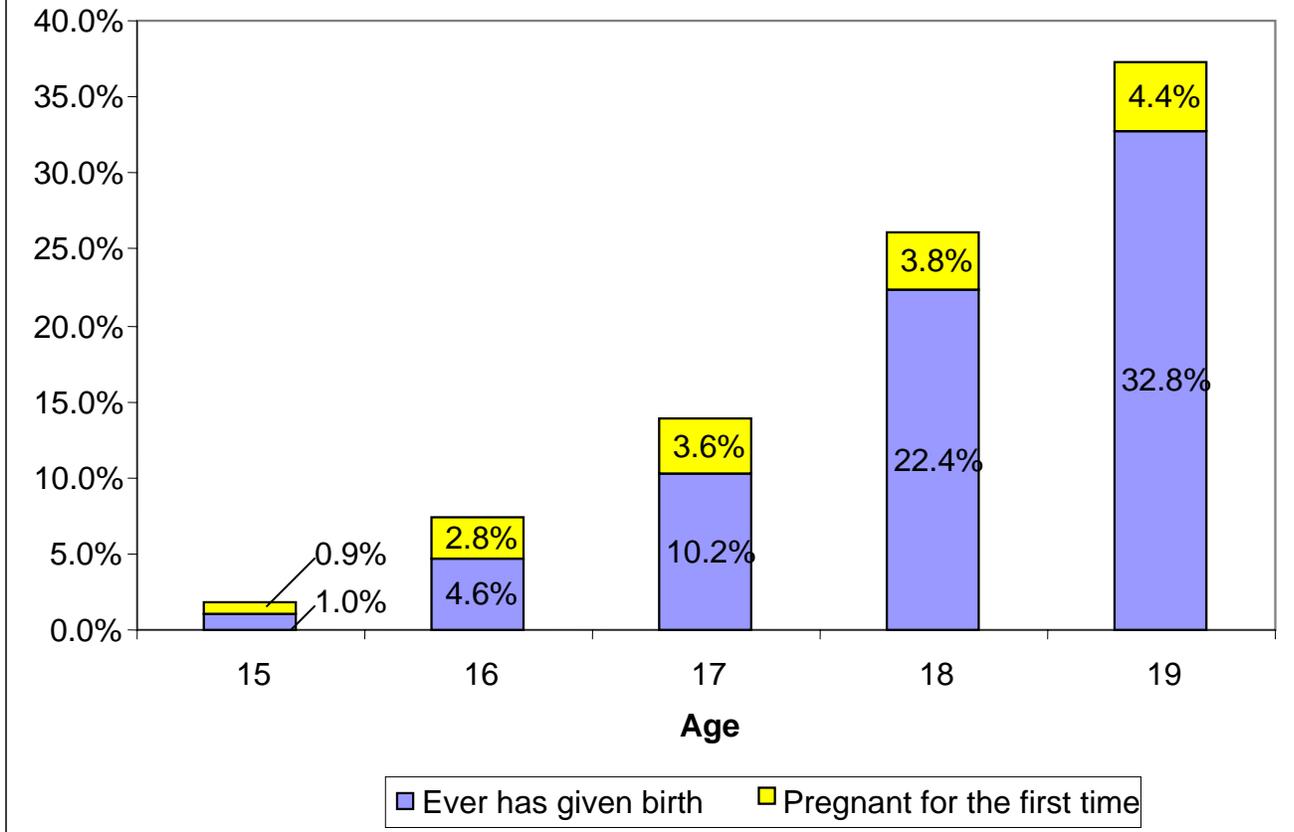
Among the 133 teenagers who were currently pregnant 100 (75.2%) were pregnant for the first time whereas 26 (19.5%) and 7 (5.3%) were pregnant for their second and third times respectively.

From the 443 teenage women who has ever given live birth 79 (17.8%) had lost their child because of death.

Table 3: Teenage fertility and pattern of childbearing in Ethiopia, 2005

Fertility characters	Frequency	%
Ever has given birth or Fertile (n= 3266)		
No	2823	86.4
Yes	443	13.6
Currently pregnant (n=3266)		
No	3133	95.9
Yes	133	4.1
Pregnant for the first time (n=3266)		
No	3166	96.9
Yes	100	3.1
Number of child ever born (n= 443)		
1	322	72.7
2	103	23.3
3	14	3.2
4	5	0.9
Age at first birth (n= 443)		
<15 years	57	12.9
15-17 years	288	65.0
18-19	98	22.1
Ever had experienced child death (n= 443)		
No	364	82.2
Yes	79	17.8

Fig. 2: Proportion of Teenagers who are Fertile or Pregnant for The First Time among each Age Category, Ethiopia, 2005



5.1.4 Child birth and pregnancy wanted or not

Among most recent 438 births in three year preceding the survey, 160 (36.6%) were unwanted. The rate of unwanted birth was higher in younger teenagers aged 15-17 years than those aged 18-19 years (55.7% and 30.6% respectively) and the difference was statistically significant ($\chi^2 = 26.7$ and $p < 0.001$). Of the unwanted births 97 (22.0%) were mistimed while 63(14.2%) was not needed at all.

Thirty five percent of current pregnancy was unintended. Of the unintended pregnancy 33 (24.5%) was needed later and 14 (10.3%) was not needed at all. The rate of unwanted current pregnancy for young teenager aged 15-17 and older teenagers aged 18-19 was 30.2% and 37.5% respectively and the difference was not statistically significant.

5.1.5 Ideal number of children

Information on ideal family size was collected in two ways: respondents who did not have any children were asked how many children they would like to have if they could choose the number of children to have. Respondents with children were asked how many children they would like to have if they could go back to the time when they did not have any children and choose exactly the number of children to have. The mean (SD) and median ideal number of children needed by the adolescents was 3.32 (2.3) and 3.0 children with the minimum and maximum number being zero and 30 respectively. The mean ideal number of children needed was relatively higher for adolescents living in rural (3.5 ± 2.4) than urban area (2.8 ± 1.5) and the difference was statistically significant ($t = 9.0$ and $p < 0.001$). There was no difference on the mean ideal number of children needed between younger and older teenagers (3.29 and 3.37 respectively)

5.1.6 Factors associated with teenage fertility

Table 4 shows the percentage of fertile teenagers aged 15-19 who were mothers according to some selected background characteristics.

As shown in the table, out of the 443 fertile adolescents, only 104 (5.3%) of young teenagers aged 15-17 were fertile while 339 (25.8%) older teenagers aged 18-19 years of age were fertile at the time of interview.

Overall teenage parenthood is higher among rural females than their urban counterparts. Only 7 (3.6%) of adolescents living in Addis Ababa had been fertile whereas 36 (7.1%) and 401 (15.6%) of those living in other urban areas outside Addis Ababa and rural area were fertile, respectively.

Education has a strong negative effect on childbearing. Only 12 (2.2%) of adolescents who have secondary or more education had become fertile while 105 (7.4%) and 326 (24.9%) of those who had primary and no education, respectively, has ever given birth.

Most of adolescent fertility has occurred after getting union. The rate of premarital fertility was found to be very low. Only 15 (3.4%) of the fertile adolescents had their first child before getting marriage. Among 872 ever married adolescents 433 (49.7%) had become fertile while only 10 (0.4%) of never married teenagers has ever given birth.

Early marriage was found to be associated with teenage fertility. Of women who had got marriage before the age of 15 years, 239 (57.6%) had become fertile while 180 (46.4%) of those who got married in the age of 15-17 had become fertile.

Teenagers who have started sexual intercourse before the age of 15 years were at a higher risk of getting fertility than who have started at latter age. Among those who have started first sexual intercourse before the age of 15 years, 60% has become fertile while the corresponding rate was 45.5% among those who have started at the age of 15-17 years ($X^2 = 52.5$ and $p < 0.001$).

As the wealth index increase, the probability of getting fertility decrease. Only 74 (7.2%) of those belonging to the highest wealth index had been fertile while 88 (19.7%) of those in the lowest wealth quintile were fertile.

Ever use of modern family planning method was low among the fertile adolescents. Only 21(4.7%) of the fertile adolescents had ever used modern contraceptive method before they give birth. Among those who had ever used modern contraceptive 21 (21.6%) were fertile whereas out of those who have never used it 413 (52.2%) had become fertile.

Table 4: Sociodemographic characteristics of fertile women aged 15-19 years, Ethiopia, 2005

	Ever has given Birth		Chi-square	p-value
	Yes N (%)	No N (%)		
Ethnicity			14.3	0.003
Amhara	169 (16.1)	881 (83.9)		
Oromo	152 (14.2)	915 (85.8)		
Tigre	27 (11.3)	212 (88.7)		
Others	96 (10.5)	815 (89.5)		
Religion			38.3	<0.001
Orthodox	221 (13.0)	1483 (87.0)		
Muslim	163 (19.0)	695 (81.0)		
Protestant	52 (8.6)	553 (91.4)		
Others	91 (7.1)	91 (92.9)		
Current age			281.1	<0.001
15-17	104 (5.3)	1848 (94.7)		
18-19	339 (25.8)	974 (74.2)		
Working status			11.8	0.001
Not working	367 (14.7)	2126 (85.3)		
Working	76 (9.9)	694 (90.1)		
Education			248.9	<0.001
None	326 (24.9)	982 (75.1)		
Primary	105 (7.4)	1318 (92.6)		
secondary and above	12 (2.2)	523 (97.8)		
Wealth index			59.1	<0.001
Poorest	88 (19.7)	359 (80.3)		
Poor	98(17.3)	468 (82.7)		
Medium	100 (15.9)	527 84.1)		
Rich	84 (13.9)	519 (86.1)		
Richest	74 (7.2)	949 (92.8)		
Place of residence			44.3	<0.001
Addis Ababa	7 (3.6)	190 (96.4)		
Other urban	36 (7.1)	471 (92.6)		
Rural	401 (15.6)	2162 (84.4)		
Ever married/union			1323	<0.001
No	10 (0.4)	2384 (99.6)		
Yes	433 (49.7)	438 (50.3)		
Age at first sex			52.5	<0.001
<15	218 (60.1)	145 (39.9)		
15-17	201 (45.5)	242 (54.5)		
18-19	14 (17.3)	67 (82.7)		
Age at first marriage			35.9	<0.001
<15	239 (57.6)	176 (42.4)		
15-17	180 (46.4)	208 (53.6)		
18-19	14 (20.3)	55 (79.7)		

5.2 Proximal determinants of fertility

5.2.1 Descriptive analysis of proximate determinants

5.2.1.1 Marital status and age at first marriage

Of the total 3266 woman aged 15-19 years 711(21.8%) were married (including both marriage and living with consensual union) at the time of interview while 871 (26.7%) of all adolescents have ever been in union and the majority (73.3%) had never been married. Among ever married adolescents, 118 (13.6%) had got marriage for two or more times. The age at first marriage ranges from 7 to 19 years. The mean (SD) and median age at first marriage was 14.3 (2.4) and 15 years, respectively.

About half (47.5%) of ever married adolescents has got first marriage before the age of 15 while 388 (44.5%) and 69 (8.0%) of them had been married at the age of 15-17 and 18-19 years of age respectively.

Older teenagers were more likely to marry than young once. Among teenagers aged 15-17 years, 266 (13.6%) and 65 (3.3%) were currently and formerly married respectively while 445 (33.9%) and 95 (7.2%) of older women aged 18-19 years were in union currently and formerly respectively.

Similarly teenagers in rural area were more likely to marry than their counterparts in urban area. In rural area 801 (31.3%) of teenagers were married at least once while 14 (6.9%) and 56 (11.1%) of those living in Addis Ababa and other urban areas outside Addis Ababa, respectively, has ever been married. Living in rural area is also risk factor to marry before the age of 15 years. Out of adolescents living in urban area only 34 (4.9%) had married before the age of 15 years while 380 (14.8%) of those in rural area had got first marriage before the age of 15 years.

5.2.1.2 Family planning

Four fifth (81.1%) of the teenagers know at least one type of modern contraceptive but the remaining 616 (18.9%) didn't know any type of family planning method.

Among the 904 sexually active teenagers, 140 (15.5%) were not able to identify or mention at least one method of contraceptive whereas 764 (84.5%) knows at least one modern method of contraception. Among the sexually active adolescents 752 (83.2%) had never used any form of

contraceptive while 144 (15.9%) and 8 (0.9%) had ever used modern and traditional methods respectively.

Only 80 (8.9%) of the sexually active teenagers were using modern family planning method at the time of interview while 3(0.4%) were using traditional method. Among the modern methods used by the sexually active group 59 (73.7%) were using injectable followed by condom 11(%13.8) and pills 10(12.5%). The traditional method being used was withdrawal.

Out of those who were sexually active within last four weeks and not in postpartum abstinence, 243 (84.6%) were not using any form of contraceptive while 42 (14.6%) and 2(0.8%) were using modern and traditional methods of contraceptive at the time of interview, respectively. The methods used were injectable, pills, condom and withdrawal by 28 (63.6%), 9 (20.5%), 5 (11.4%) and 2(4.5%) respectively.

Among the 711 currently married women, 596(82.7%) had never used any type of contraceptive whereas 111 (15.6%) and 4 (0.5%) had ever used modern and traditional methods, respectively. Current use of family planning was also found to be low among the currently married teenagers. Only 64 (8.9%) of currently married adolescent were using some form of contraceptive - 61(8.6%) modern and 2 (0.3%) traditional method. The methods being used were injectable 50 (79.4%), pills 9 (14.3%), condom 2 (3.2%) and withdrawal 2(3.2%).

Women living in rural area were more likely to use family planning than those living in urban area. Among those who are currently married teenagers and living in urban area 17 (39.5%) were using modern family planning method while the rate was (8.6%) for those living in rural area.

The use of family planning was found to be relatively higher among women who were sexually active within the last four weeks but not married at the time of interview. About half (53.8%) of currently unmarried and sexually active within past four weeks adolescents were using modern contraceptive at the time of interview.

Out of those who were fertile 372 (84.0%) had never used any form of contraceptives whereas 68 (15.3%) and 3 (0.7%) had ever used modern and traditional methods respectively. Of those who had ever used contraceptive 44 (62.9%) and 5 (6.8%) started to use after getting their first and second

child respectively. That means, only 21(4.7%) of the fertile adolescents had ever used modern contraceptive before getting their first birth and none of them had ever used traditional method.

Currently, 404 (91.2%) of the fertile adolescents were not using any form of contraceptive while 37 (8.4%) and 2 (0.5%) were using modern and traditional method respectively. The methods being used were injectable 34(91.9%), pills 3 (7.7%), and withdrawal 2(5.4%).

Teenagers have high unmet need for contraceptive. Among currently married adolescents 272 (38.2%) had unmet need for family planning. Of this unmet need 214 (30.1%) and 58 (8.1%) was for spacing and limiting respectively. The unmet need was higher among the young teenagers. Those aged 15-17 has 42.9% unmet need (35% for spacing and 7.9% for limiting) while it was 35.6% for those aged 18-19 years (27.3% for spacing and 8.3% for limiting). Married adolescents living in rural area had 38.8% unmet need (31.5% for spacing and 7.3% for limiting) while it was 28.9% in urban area (7.5% for spacing and 21.4% for limiting).

Table 5: Current use of family planning among different category of women aged 15-19 years, Ethiopia, 2005

Women category	Not using (%)	Using Traditional method (%)	Using Modern method (%)	Number of women
Sexually active	90.7	0.4	8.9	904
Currently sexually active	84.6	0.8	14.6	287
Fertile	91.2	0.5	8.4	443
Currently married	91.1	0.3	8.6	710
Currently married (urban)	60.5	0	39.5	43
Currently married (rural)	93.1	0.3	6.6	667

5.2.1.3 Duration of breastfeeding

To estimate the duration of postpartum infecundability, the mean duration of breastfeeding was calculated for adolescent who have given birth in three years preceding the survey. Among a total of 421 most recent births in five years the mean duration of total breastfeeding was found to be 30.1

months for births that has occurred among teenagers. Relatively, rural woman give breastfeeding for longer duration than urban woman. The mean duration of breastfeeding for rural and urban areas was 17.4 and 30.3 months respectively.

Based on the mean duration of breastfeeding, the average postpartum duration was calculated using the equation (7) given in the methodology part. So, the average duration of postpartum infecundability was 10.9, 19.2 and 18.5 months for urban, rural and total Ethiopian adolescents respectively.

5.2.2 Analysis of proximate determinates: Application of Bongaarts model

With the application of the Bongaarts model as mentioned in the methodology part (equation 3), the summary of the indices is presented in table 3.

Table 6: Indices for Proximate Determinants of teenage Fertility, Ethiopia, 2005

Index/measure	Urban	rural	Total (Ethiopia)
<i>C_m</i>	0.42	0.52	0.46
<i>C_c</i>	0.76	0.96	0.95
<i>C_i</i>	0.68	0.53	0.54
Predicted ASFR ¹	0.54	0.66	0.58
Observed ASFR ²	0.18	0.61	0.52

1. Predicted by Bongaarts formula

2. Estimated using births in the last five year

In these section indices for marriage, contraception, and postpartum infecundability of urban, rural and the nation are produced. These indices provided an empirical basis for assessing the relative contribution of the different proximate determinants to lowering fertility. The finding shows that all the three variables were determinants of adolescent fertility in Ethiopia but with different degree and there is urban rural difference.

The current observed ASFR of 0.52 children per woman indicates that about 1.98 births per woman were averted from maximum potential fertility of a teenager (which was 2.5 as given in equation 3 of the methodology part) due to non-marriage, delayed marriage, contraceptive use and postpartum infecundability. In urban areas, 2.32 births per woman were averted from its biological maximum of

2.5 births per woman while in rural area the number of prevented births was 1.89 because of these proximal determinants.

The index of marriage (C_m) for teenagers was 0.46, which means delayed marriage and non marriage reduces fertility by 54% below what it would otherwise be if marriage was universal among all women age 15-19. The index is lower for urban (0.42) than rural (0.52).

Postpartum infecundability is another important determinant of teenage fertility in which it has reduced 48% of natural marital fertility in the country among this age group. But its effect was stronger in rural than in urban area.

The use of contraceptive among adolescents in Ethiopia has reduced fertility only by five percent of total marital fertility. But there was visible difference between urban and rural area in the inhibitory effect of contraception. In urban area 24% of marital fertility was prevented because of use of family planning while the corresponding rate was only four percent for teenagers living in rural area.

5.3 Multivariate analysis of socio demographic deferential of teenage fertility

5.3.1 Socioeconomic and demographic deferential of fertility:

To assess the effect of other socio-demographic and sexual variables on fertility of adolescent's multivariate logistic regression was used. In the first model, women education, place of residence and current age were found to be strong deferential of teenage fertility followed by place of residence and working status after controlling for selected socio-demographic variables. (See table 7)

Women who had no any education were three and seven times more likely to be fertile than those who had primary (AOR = 2.8 and 95% CI = 1.7, 4.5) and secondary or more education (AOR = 6.7 and 95% CI = 4.1, 10.9) respectively.

Women living in rural areas were more likely to be fertile than their counterparts living in urban area. As compared to those living in Addis Ababa, teenagers living in rural (OR= 3.6 and 95%CI=1.9, 6.9) and other urban area (AOR= 2.1 and 95% CI=1.1, 3.9) were four and two times more likely to be fertile respectively.

Similarly, teenagers who were aged 18-19 years, (AOR= 7.7 and 95%CI= 6.0, 9.9) and currently not working (AOR =1.7 and 95%CI= 1.3, 2.2) were found to be at risk of being fertile than those who are aged 15-17 years and currently working respectively. (See table)

Ethnicity, religion, wealth index, and listening radio or watching television at least once in a week didn't show any association with adolescent fertility in the multivariate analysis although all, except religion, has shown significant association on crude OR.

Table 7: Sociodemographic deferential of teenage fertility in Ethiopia, 2005

Character	Level	Ever has given birth		Crude OR [95% CI]	AOR	
		Yes [®]	No		[95% CI]	Overall p-value
Ethnicity	Oromo	129	701	1.4 [1.1, 1.9]*	0.9 [0.5, 1.4]	0.058
	Amhara	122	849	1.6 [1.3, 2.1]*	1.1 [0.7, 1.8]	
	Tigre	37	304	1	1	
	Others	153	957	1.1 [0.7, 1.7]	0.7 [0.4, 1.1]	
Religion	Orthodox	176	1484	0.7 [0.4, 1.2]	0.8 [0.4, 1.7]	0.11
	Muslim	189	804	1.3 [0.7, 2.3]	1.3 [0.7, 2.4]	
	Protestant	62	446	0.8 [0.4, 1.4]	1.1 [0.5, 2.1]	
	Others	14	77	1	1	
Current age	15-17	96	1827	1	1	NA
	18-19	345	984	5.4 [4.4, 6.7]**	7.6 [6.0, 9.9]**	
Woman Education	None	297	913	9.1 [6.2, 13.2]**	6.7 [4.1, 10.9]**	<0.001
	Primary	119	1190	2.9 [2.0, 4.3]**	2.8 [1.7, 4.5]**	
	secondary and above	25	708	1	1	
place of residence	Addis Ababa	16	463	1	1	0.001
	Other urban	48	625	2.2 [1.2, 4.0]*	2.1 [1.1, 3.9]*	
	Rural	377	1723	6.3 [3.8, 10.5]**	3.6 [1.9, 6.9]**	
Currently working	No	364	2154	1.5 [1.2, 1.9]*	1.7 [1.3, 2.2]*	NA
	Yes	77	653	1	1	
Wealth index	Lowest	117	407	4.4 [3.1, 5.4]*	1.2 [0.8, 1.9]	0.445
	Second	81	359	3.2 [2.4, 4.2] *	1.1 [0.7, 1.7]	
	Middle	74	390	2.8 2.1, 3.8] *	0.9 [0.6, 1.5]	
	Fourth	74	364	3 [2.2, 4.1] *	1.2 [0.7, 1.9]	
	Highest	95	1291	1	1	
Listen radio/TV at least once a week	No	370	1826	2.8 [2.2, 3.7] *	1.04 [0.7, 1.5]	NA
	Yes	70	982	1	1	

[®] the frequencies given are based on un-weighted data

* p < 0.05 and ** p<0.001

NA = Not applicable

5.3.2 Sexual and reproductive health deferential of fertility

To assess the effect of family planning, age at marriage and fertility preference on teenage fertility another multivariate logistic regression was used. As can be seen in table 5, age at marriage and ever use of family planning before giving birth were found to associated with being fertile after controlling for knowledge of family planning and ideal number of children needed.(see table 8)

Teenagers who have married before the age of 15 years were seven times more likely to be fertile than those who had been married at the age of 18-19 years (AOR = 7.2 and 95% CI = 3.5, 14.8). Those who married in the age of 15-17 years of age were almost five times more likely to be fertile than those who got marriage in the age of 18-19 years. (AOR = 4.7 and 95%CI = 2.3, 9.6)

Similarly, teenagers who have never used or used family planning for the first time after getting first birth were three times more likely to be fertile than those who had used modern contraceptive (AOR = 3.0, and 95% CI = 1.7, 5.2)

In the bivariate analysis those adolescents who needs less than five children were 50% less likely to be fertile than those whose ideal number of children was five or more (OR = 0.5 and 95% CI =0.4, 0.6), but after controlling for other variables, its protective effect was not observed in the multivariate analysis. Knowledge of family planning didn't show any association with being fertile or not.

Table 8: Selected reproductive health deferential of teenage fertility in Ethiopia

Character	Level	Ever has given birth		Crude OR [95% CI]	AOR	
		Yes	No		[95% CI]	Overall p-value
Age at marriage	< 15 years	213	154	5.2 [2.8, 9.7] **	7.2 [3.5, 14.8]**	<0.001
	15-17	207	224	3.3 [1.8, 6.2] **	4.7 [2.3, 9.6] **	
	18-19	10	60	1	1	
Ever use of modern FP	No	419	405	3.9 [2.4, 6.5] **	3.0 [1.7, 5.2] **	NA
	Yes	21	95	1	1	
Knowledge of modern FP	No	98	567	0.8 [0.6, 1.01]	0.8 [0.6, 1.2]	NA
	Yes	343	2244	1	1	
Ideal number of children needed	<5	250	2108	0.5 [0.4, 0.6] **	1.09 [0.8, 1.5]	NA
	Five or more	142	566	1	1	

* p < 0.05 and ** p<0.001

5.4 Maternal health service utilization

There were 994 women aged less than 20 years by the time of delivery who have given birth at least once in the last five years, who would have been the target for antenatal and delivery care. The socioeconomic and demographic characteristic is given in table 9.

As can be seen in the table, most of them were Amhara (35%) and Oromo (33.7%) by their ethnicity. At the time of interview 895 (90%) were living in rural area and 885 (89%) were in marital union. Most of them (91.4%) were living in four major regions of the country (Oromia, Amhara, SNNPR and Tigray regions). About 772 (77.7%) had no job. Almost three out of four (72.4%) of those who had given birth has no any for of formal education while only 235 (23.6%) and 39 (3.9%) had some primary and secondary level of schooling, respectively.

Table 9: Socioeconomic and demographic character of women aged less than 20 years at the time of birth who had given live birth in five year preceding the survey, Ethiopia, 2005

Variable	Frequency	%
Ethnicity	334	33.7
Oromo	347	35.0
Amhara	67	6.8
Tigre	17	1.7
Gurage	25	2.5
Sidama	202	20.4
Others	334	33.7
Religion		
Orthodox	472	47.5
Muslim	344	34.6
Protestant	145	14.6
Other	33	3.3
Type of place of residence		
Urban	99	10.0
Rural	895	90.0
Place of residence by region		
Oromia	390	39.2
Amhara	286	28.8
SNNPR	161	16.2
Tigray	72	7.2
Addis Ababa	18	1.8
Other regions	67	6.8
Current marital status		
Never married	15	1.5
Married	20	2.0
Living together	8	0.8
Widowed	63	6.3
Divorced	23	2.3
Not living together	15	1.5
Educational level		
No education	720	72.4
Primary	235	23.6
Secondary	39	3.9
Higher	0	0
Wealth index		
Lowest	177	17.8
Second	234	23.5
Middle	237	23.8
Fourth	175	17.6
Highest	171	17.2
currently working Status		
Not working	772	77.7%
Working	222	22.3%
Total	994*	100.0

* Since the sample was weighed, sometimes the sum may deviate slightly from 994

5.4.1 Use of ANC among women aged 15-19 years at the time of birth for their most recent birth

Among the 994 women who has given birth before age of 20 years in last five years only 271 (27.3%) had got at least one ANC from health professionals. Very few (1.3%) of the teenagers had tried to get ‘ANC’ from other sources including trained and untrained traditional birth and community health agents. But 710 (71.4%) of the deliveries had happened without any consultation for ANC any source. (See table 10)

Out of those who got ANC from health workers, only 61 (21.8%) had sought first ANC visit in the first three months of their pregnancy where as the remaining 137(49.0%) and 81(29.2%) had started first prenatal visit during the second and third trimester of pregnancy. Among the ANC service users from health workers 150 (53.6%) had less than four antenatal contacts and the rest 130 (46.4%) reported to have four or more prenatal visits.

Table 10: Antenatal care seeking behavior of women less than 20 years of age at most recent birth in five year, Ethiopia, 2005

Character	Frequency	%
Source of ANC (n= 994)		
Health workers	271	27.3
Trained traditional birth attendants	6	0.6
Untrained traditional birth attendants	2	0.1
Community health workers and others	5	0.5
No none	710	71.5
Timing of first ANC (n= 271)		
1 st trimester	61	21.8
2 nd trimester	137	49.0
3 rd trimester	81	29.2
Number of ANC visits (n= 271)		
Less than four	150	53.6
Four or more	130	46.4

Factors associated with the use of antenatal care

The use of ANC from health professionals varies by various socioeconomic and demographic factors. Of the associated factors place of residence and education has strong influence. (See table 11)

Those adolescents who have higher level of education were more likely to use ANC. Among the teenagers who had secondary or more education 33 (84.6%) had got ANC while the rate was only 23.3% among those who have no any education.

Teenagers in the lowest wealth quintile were less likely to use ANC than any of the higher wealth index categories. Only 24 (13.6%) of those belonging to the poorest wealth quintile had got ANC while it was 24.9%, 28.7% and 51.8% for those in the middle, fourth and highest wealth quintile and the difference was statistically significant.

Out of teenagers living in urban area 59 (59.6%) had got ANC while only 212 (23.7%) of those in rural area had got the service for their most recent birth in five years.

Listening to radio or watching television at least once in a week was also associated with the use of ANC from health workers. Of those who listened radio or watch television at least once in a week 51 (38.6%) had sought ANC while it was 221 (25.7%) among those who doesn't listen radio or watch television at least weekly.

Among teenagers who were involved in the decision making to use health care 164 (29.7%) has got ANC from health workers while 74 (22.5%) of those who didn't involve in making decision to use health care service had got the service.

For the teenagers aged less than 20 year at the time of birth, there was no significant difference in the use of ANC by history of death of child, parity and the pregnancy being wanted or not (see table 6).

Table 11: Proportion of women aged less than 20 year at the time of birth that had got ANC from health workers for their most recent birth in last five years, Ethiopia, 2005

variable	Attended ANC		Number of women
	Frequency	%	
Ethnicity			
Oromo	75	22.5	334
Amhara	113	32.6	347
Tigre	25	37.3	67
Others	58	23.7	244
Religion			
Orthodox	159	33.7	472
Muslim	75	21.9	343
Protestant	32	22.1	145
Others	5	15.2	33
Woman Education			
None	167	23.3	720
Primary	72	30.6	235
secondary and above	33	84.6	39
place of residence			
urban	113	68.1	99
Rural	204	25.4	895
Currently married			
No	34	30.9	110
Yes	238	26.9	884
Currently working			
No	204	26.4	772
Yes	68	30.6	222
Wealth index			
Poorest	24	13.6	177
Poor	51	21.8	234
Medium	59	24.9	237
Rich	50	28.6	175
Richest	88	51.8	171
Involve in decision to use health service			
No	74	22.5	329
Yes	164	29.7	551
Parity			
1	188	28.7	655
2 or more	60	22.9	262
History of death of child			
No	220	27.2	810
Yes	52	28.1	185
Child birth planned			
No	97	27.9	348
Yes	175	27.1	645

5.4.2 Bivariate and Multivariate analysis (ANC)

In the bivariate analysis religion, women and partner education, listening to radio or watching television at least once in a week, wealth index and the sex of the household head were found to be associated statistically with the use of ANC from health workers.

Women who didn't listen radio or watch television at least once in a week were 70% less likely to seek ANC during pregnancy than those who had listened radio or watched television at least once in a week (Crude OR = 0.3 and 95% CI = 0.3, 0.5).

Women living in a household led by female were 40% less likely to seek ANC than those living in a male headed household (crude OR= 0.6 and 95%CI = 0.5, 0.9).

Similarly women having primary or secondary level of education, not belonging to the lowest wealth index and having educated partner (primary or secondary level of education) were more likely to seek ANC from health professionals. (See table 12)

Multivariate analysis

The result of multivariate analysis has shown that only four factors – woman education, wealth index, place of residence and partner education - were important predictor of use of ANC from health professionals among the teenagers after controlling for religion, working status, marital status, listening radio or watch television at least once in a week, involvement of women in decision making to use health service, history of death of child, parity, and child birth being planned or not. (See table 12).

Education continues to exert independent influence on utilization of ANC from health professional. Adolescents who had primary and secondary educational level were 1.5 (AOR = 1.5 and 95% CI = 1.04, 2.3) and four (AOR = 4.a and 95% CI =2.0, 8.8) times more likely to use ANC from health professionals than those who had no education, respectively.

Similarly, women's partner education level was also found to be predictor of use of ANC from health professionals. Those women who have partner whose having secondary or more education level were 2.5 times more likely seek ANC than those whose partner has no education.

Teenager belonging to the highest (AOR =3.5 and 95% CI = 1.9, 6.3), the fourth (AOR = 2.4 and 95% CI = 1.4, 4.0), middle (AOR = 1.8 and 95% CI =1.1, 3.0) and second (AOR = 1.9 and 95% CI =1.2, 3.3) wealth quintile were more likely to use ANC than those belonging to the lowest wealth quintile after controlling for potential confounders.

Likewise, those adolescent women living in urban area were two times more likely to seek ANC from health professionals than their counterparts living in rural area (AOR = 1.9 and 95% CI = 1.1, 3.4).

Religion, age at birth, current marital status, currently working, listening radio or watching television at least once in a week, parity, last pregnancy wanted or not, history of death of child, and the child birth being planned or not didn't show any association with adolescent fertility in the multivariate analysis.

Table 12: Logistic regression showing determinants of use of ANC from health professionals by women aged less than 20 years at the time of birth, Ethiopia, 2005

Character	Level	Received ANC		Crude OR [95% CI]	AOR	
		Yes	No		[95% CI]	Overall p-value
Religion	Orthodox	166	260	1	1	0.571
	Muslim	96	259	2.7 [1.1, 6.9]*	1.4 [0.6, 3.8]	
	Protestant	49	110	1.6 [0.6,4.0]	1.3 [0.5, 3.4]	
	Others	6	26	1.9 [0.8, 5.0]	1 [0.4, 2.8]	
Woman Education	None	148	496	1	1	<0.001
	Primary	103	144	2.4 [1.8, 3.3]**	1.5 [1.04, 2.3]*	
	secondary	66	15	14.7 [8.2, 26.5]**	4.1 [2.0, 8.8]**	
Partner Education	None	100	390	1	1	0.021
	Primary	94	188	2.0 [1.4, 2.7]**	1.4 [0.9, 2.0]	
	Secondary or more	110	63	6.8 [4.7, 10.0]**	2.5 [1.5, 4.1]*	
place of residence	Urban	113	53	6.3 [4.4, 9.0]**	1.9 [1.1, 3.4]*	NA
	Rural	204	602	1	1	
Currently married	No	49	76	1	1	NA
	Yes	268	579	0.7 [0.5, 1.1]	1.2 [0.7, 2.1]	
Currently working	No	246	523	1	1	NA
	Yes	71	132	1.1 [0.8, 1.6]	1.0 [0.7, 1.4]	
Head of household	Male	246	554	0.6 [0.5, 0.9]*	0.9 [0.6, 1.5]	NA
	Female	71	101	1	1	
Wealth index	Lowest	35	200	1	1	0.006
	Second	46	132	2 [1.2, 3.3]*	1.9 [1.2, 3.3]*	
	Middle	44	130	1.9 [1.2, 3.2]*	1.8 [1.1, 3.0]*	
	Fourth	50	104	2.3 [1.7, 4.5]*	2.4 [1.4, 4.0]*	
	Highest	142	89	9.2 [5.9, 14.4]**	3.5 [1.9, 6.3]**	
Listen radio/TV at least once a week	No	227	579	0.3 [0.3, 0.5]**	1.3 [0.8, 2.1]	NA
	Yes	89	76	1	1	
Ever had child death	No	274	547	1.3 [0.9, 1.8]	0.9 [0.6, 1.4]	NA
	Yes	43	108	1	1	
Child birth planned	No	103	196	1.2 [0.8,1.5]	0.8 [0.6, 1.2]	NA
	Yes	214	457	1	1	
Parity	1	232	423	1.5 [0.9, 1.8]	1.2 [0.8, 1.7]	NA
	2 or more	85	232	1	1	

* p < 0.05 and ** p<0.001

NA = not applicable

5.5 Qualitative analysis

General characters of the interview

A total of 30 in-depth interviews were conducted in all the three regions, ten per region. Twenty of the interviews were conducted with women who came for maternity service at health centers and the remaining ten were conducted with women within the community. The number of health facilities visited was three in Addis Ababa and two in Amhara and Oromia region. All the interviewees were conducted with women aged 15-19 years of age who have ever given birth or were pregnant at the time of interview.

The results of the in-depth interview are presented by different category as follow.

Teenage pregnancy- attitude and causes

All the participants of in-depth interview have mentioned that pregnancy and child birth at age less than 20 years as a “common” phenomenon in the community. Some of their pregnancy was unwanted.

The reasons mentioned for their unwanted pregnancy and child birth includes not using contraceptive, forget taking pills, use of ineffective method of contraception such as withdrawal, concern about side effect, partner opposition to use family planning. Marriage, rape, and misconceptions about sexuality were also mentioned as the cause for their unwanted pregnancy. To mention some of their wording

“I thought that I wouldn’t be pregnant in the first sex and had it without family planning but I become pregnant in my first sex” 15 years, Amhara region, rural

“After getting marriage, all his (her husband) and my family expect me to give birth soon, that is why I become pregnant” 18 years old, Oromia region

“I was using injectable contraceptive.... no menstruation for long time.... My friends advised me to stop taking injectable because it will make me infertile... then start to take

pills... forget to take it ... I become pregnant though I didn't need it to happen now" 19 years old, Addis Ababa

Most of the teenagers has strongly discussed that there is little or no discussion about sexuality with their parents, specially related to pregnancy and family planning which has been described as one of the cause for their pregnancy. Poor follow-up by parents about children's activity has also been ascribed as predisposing factor for unnecessary sexual experiences.

"I used to say to my mother 'I am going to school'. But after leaving home I am going to my boyfriend and some other places, not to school Now I am pregnant of seven months. If the school and my parents have close coordination, I wouldn't face such type of problem" 15 year old, Amhara region

"With my parent I didn't discuss any thing about menstruation. They (family) didn't tell me the precautions needed during sexual relationship, at what age to do what... Sometimes they raise the issue but it is warning not discussion... I had sex without adequate care and got unplanned pregnancy. If I had open discussion with my parent about the cares needed and the actions to be taken, I wouldn't be pregnant and stop my education because I was practicing it (sexual relation) by hiding from them" 17 years old, Addis Ababa

Attitude and Consequences of teenage pregnancy

Pregnancy during teenage period is acceptable if she is married. If the pregnancy occurred in an out-of-wedlock condition, then the woman is not acceptable by the community as well as her own family. She will experience stigmatization and social discrimination and its associated psychological stress.

Even if the family accepts her, they will not give adequate care both to the mother and the child during puerperal period. The consequence of unwanted pregnancy ranged from abortion, discharge from home, school and job to suicidal attempt. Some of the interviewee has said

“When I become pregnant, my boy friend left me. My parents forced me to leave home.... after delivery, they (her family) have said ‘drop your daughter to garbage’ and they have given me cartoon to kill my daughter. Now I am living on street with no job, no education and no adequate care for my child “17 years old, Addis Ababa

“One of my school friends become pregnant and has tried to terminate it but she has no money for payment to terminate the pregnancy now she is pregnant of eight month. She has discontinued her education” 18 years, Addis Ababa

“Because of the pregnancy I loose my temporary job now I am working as daily labors at low income” 19 year old, Oromia region

“last week one of my friend has got pregnant at age of 16 years and tried to abort it using herbal medicine called “*endod*” now she is admitted in hospital because she was at verge of death” 18 years, Amhara region

Factors for not using existing services

Some of the discussants didn’t get antenatal care for their pregnancy and delivery services from health professionals. The reason mentioned were fear of people in health facility, concern about other family member will see them, lack of adequate information about the existing service, ignorance, fear, shy, distance, culture, economic reason (for card and glove during delivery), and non friendly approach of health workers.

“God has given my pregnancy and let him take care of it not the hospital. So I didn’t go for checkup” 18 years old, Amhara region

“During delivery, the health workers do not accept us friendly. They treat us impolitely. I go there because I have problem that needs solution. If they (health workers) are going to mistreat me, why should I go? I prefer to deliver at home” 18 years old, Addis Ababa

“Culturally, first birth has to be attended by being with mother because they (parent) think that I am still child and not well experienced to handle any problem. When my pregnancy reaches nine months she (mother) came and takes me to her home. Then I give birth at her home with an assistance of traditional birth attendant” 17 years old, Amhara region.

Reasons for using existing service

Some of the interviewees had got ANC as well as delivery assistance from health workers. The motives given for attending ANC were complication during pregnancy (bleeding, nausea, vomiting), perceived benefits of attending ANC, and partner support to seek service. The perceived benefits of attending ANC were able to know the health of their unborn child, medical advice given from the health workers, and able to handle problem if happens

“I came to this health center because my husband informed me to go for checkup” 17 years, Oromia region

“First I go to health center for antenatal care because of bleeding that has occurred at 7th month of my pregnancy...” 18 years, Amhara

“When I go to my doctor, he will tell me about the health of my baby which makes me happy. That is why I go there regularly until I give birth...” 19 years, Addis Ababa

Suggestions given concerning use of maternal health service and teenage pregnancy

Making health facilities user friendly on handling of adolescents specially related with delivery service.

Radio program focused on youth experience, family planning, and unwanted pregnancy. One interviewee has said

“Currently there is lot of FM radio station that has ‘live’ discussion about sexuality, but their focus is mostly on HIV/AIDS. There is no much discussion about unwanted pregnancy, checkup for pregnant woman (antenatal care), and family planning.... The radio program should consider the time of students because most adolescents are in-school at the time of radio discussion.” 19 years old, Addis Ababa

Programs focused on initiating discussion between parent and children should be given due attention

Close follow up and coordination between school and parents about the situation of students in and out side of school

Strengthening existing school health program

Peer education program

“My mother used to give me some advice but I was looking the advice given from family as nagging because there was serious pressure from my friends to have boy friend.... The idea and practice of my friends is quite different from my family’s advice.... The ways we should have been taught should be collective by addressing the peer pressure, not individualistic because when I am out of home, they will influence me”
Oromia region, 18

6 DISCUSSION

6.1 *Teenage fertility*

In Ethiopia the rate of teenage fertility is 13.6%. Additionally, 3.1% of the adolescents are pregnant for the first time making the adolescent childbearing rate 16.7%. That means one out of six adolescents aged 15-19 years are either currently pregnant or has already given birth. The current age specific fertility rate is 104 per 1000 women of aged 15-19 years at the time of interview. Compared with other Eastern Africa countries, the teenage fertility rate in Ethiopia is relatively lower than the rate observed in Kenya, Uganda, Tanzania, and Malawi which was 18.5%, 19.2%, 19.6%, and 25.3% respectively but higher than Eritrea and Rwanda which was 11% and 3.3% respectively (67). This difference may be due to variation in socio-cultural conditions of the countries including age at marriage, age at first sexual intercourse and use of family planning.

Although the rate of adolescent fertility looks to be lower than some of the neighboring countries first birth as low as 12 years of age has been reported. Additionally, 1% of the fertile teenagers had given four live births, before their 20th birthday. Such closely spaced and early childbearing aggravates complications including fistula and other grave complications that lead to high maternal morbidity and mortality. On the other hand, in this study about 1% of the teenage women had given four live births whereas according to Bongaarts proposition the biological maximum for women aged 15-19 years is 2.5 children per women. This may be due to age reporting error as some of those who has reported to be age 19 may be over the age of 19 years at the time of interview.

Ethiopia has experienced decline in TFR of women in reproductive age group from 6.4 in 1990 to 5.9 and 5.4 in the year 2000 and 2005, respectively (25, 68). The ASFR of women aged 15-19 has also declined between the year 2000 and 2005. However, the share of adolescent fertility to the TFR has increased constantly over the last 15 years. In 1990 ASFR of women age 15-19 account 7.5% of the TFR. But in the year 2000 and 2005, the ASFR of women aged 15-19 was 9.3% and 9.6% of the TFR in the respective years. This shows that the rate of decline in adolescent fertility is lower than the rate observed in the general population.

Additionally the teenage fertility rate in Ethiopia has slightly increased from 12.8% by the year 2000 to 13.6% in 2005 (68). But many African countries has experienced declined in teenage fertility including Egypt, Kenya, Eritrea, Uganda, Ghana and Nigeria (4, 8, 37).

Both of these findings suggest that teenage fertility needs focused attention in order to reduce the teenage fertility and thereby the overall TFR of the country.

In this study 27.7% of the teenage women were sexually active. Of this, 61% was premarital sexual relationship. About a quarter (26.6 %) had ever been married and 21.7% are currently in union. This is consistent with other previous studies conducted in Ethiopia and other part of the world where teenagers are characterized by high level of sexual activity, premarital sexual relationship and marriage(20, 22-24). The in-depth interview had found that the predisposing factors for premarital sexual engagements were peer pressure, absence of open discussion with parents, loose follow up and guidance by school teachers, and rape. Premarital sexual intercourse predisposes women to risk of unwanted pregnancy, abortion and HIV/AIDS, and premature termination of schooling because of pregnancy as premarital sexual intercourse is usually unplanned and not using condom or other family planning methods (69, 70).

Adolescent have high level of knowledge of contraceptive but low rate of utilization. Among the sexually active adolescent women 84.5% were able to mention at least one method of modern contraceptive but only 17 % have ever used any form of contraceptive. Furthermore only 9% of currently married adolescents are using contraceptives. Such gap between knowledge and actual utilization was observed throughout Ethiopia both in teenagers and general population (24, 71-73). Similarly adolescents in Eritrea, and Uganda had low rate of use of contraceptive in spite of high level of knowledge (4, 37). The existing knowledge and practice gap predicts the need to institute strong behavioral change communication intervention for this age group.

About 33% of current pregnancy and 37% of most recent birth of adolescent were unplanned. The unmet need for contraception was 38%. Similar studies have revealed that significant proportion of adolescent pregnancy and births are unwanted. The reasons cited were low rate of utilization of contraceptive, rape, use of ineffective method and limited access to services (4, 17, 24, 37, 72). In the qualitative part of this study it was also revealed that adolescents face unwanted pregnancy because of these problems plus forget to take pills, concern about side effect of family planning, partner opposition to use contraceptives, marriage, misconceptions about sexuality and rape.

Generally, in Ethiopia significant numbers of adolescents are sexually active or married. The rate of premarital sexual intercourse is also high. In contrast there is very low rate of use of

contraceptive among married and unmarried sexually active teenagers. As well, the unmet need for contraception is not negligible. These factors have led to high rate of teenage fertility, unwanted pregnancy and birth. Addressing these issues could reduce exposure to reproductive health risks and open possibility for young women in education, employment and social participation. If we were able deal with the unmet need and unwanted child birth with an effective contraceptive alone, the teenage fertility could have been reduced significantly.

6.2 Proximate determinants of fertility

Based on the application of Bongaarts model, current ASFR of teenagers 104 per 1000 women (which is equal to 0.52 children per woman per year) has declined from its maximum potential of 511 per 1000 woman (which is equal to 2.5 children per woman per year) because of the three proximal determinants of fertility. That means 79.6% of the maximum fertility potential (fecundability rate) of woman aged 15-19 has been averted because of delayed marriage, non marriage, use of contraceptives and breastfeeding.

From this model it can be seen that 54% of teenage fertility reduction from its maximum capability (2.22 children/mother) is attained due to the inhibiting effect of index of marriage (because of delayed marriage and non marriage) while the index of duration of postpartum infecundability (because of breastfeeding and abstinence) has reduce the natural fertility by 44%. Family planning has contributed only 4.5% of the reduction of marital fertility among teenagers.

In this study postpartum infecundability has contributed to the reduction of the observed level of fertility among teenagers which is consistent with other previous studies conducted in Ethiopia (73, 74). This is because Ethiopian women have the culture of prolonged breastfeeding which has resulted in lowering the chance of fertility (73, 74).

In this study delayed marriage and non marriage were responsible for 54% reduction of the observed ASFR ($C_m = 0.46$) which is in contrary with other studies that were conducted among woman of reproductive age group in Ethiopia (73, 74). This happens because in this study most of the teenagers have never been married. Additionally other studies had applied the model for all women of reproductive age group while teenagers aged 15-19 years are the study subject for this thesis. Due to these facts non marriage and delayed marriage has brought index of marriage to be strong determinant of prevention of fertility among teenagers.

In this study the inhibitory effect of family planning was only 5% which is much lower than the studies conducted in Awasa, Oromia region and Addis Ababa which had C_c value of 0.63, 0.88 and 0.55 respectively among women of reproductive health group (35, 50, 74). This difference is because teenagers are less likely to use contraceptive than the general population. According EDHS 2005, the contraceptive prevalence rate for Ethiopia was 14.7% while only 8.9% of currently married woman aged 15-19 were using some form of contraceptive(25). Moreover, even if adolescents use contraceptive, they are less likely to use most effective family planning methods like sterility and long term methods than the older woman(33). In this study as well, most of the users of family planning were using injectable followed by pills and condom and even few were using withdrawal method.

Comparatively, the inhibitory effect of contraceptive use and marriage is higher in urban area ($C_c=0.76$ and $C_m=0.42$) than the rural ($C_c=0.96$ and $C_m=0.52$) while the protective effect of postpartum infecundity was stronger in rural area. This is consistent with other studies conducted in Ethiopia.(35, 50, 73, 74). The urban-rural difference is because women living in urban area are more likely to use family planning and experience delayed age at marriage than woman living in rural area. But woman living in urban area give breastfeeding for shorter duration of time than those living in urban area. (74)

Generally, the model shows that in urban area, all the three proximal determinants of fertility has strong impact for the reduction of potential biological fertility whereas in rural area the inhibitory effect of family planning is very low. As most of Ethiopians are living in rural area, the inhibitory effect of contraceptive use, therefore, is also very low.

The predicted ASFR for the rural population is relatively close to the ASFR estimated from information on births in the last five years (0.66 compared to 0.61). This result suggests that the proximate determinants included in the model are the principal mechanisms by which fertility is reduced below its biological maximum. However, the predicted TFR for the urban population is substantially above the observed TFR (0.54 compared to 0.18). Such type of variation between the predicted and observed level of fertility especially in urban areas has been observed in other studies conducted using the same methodology. This large difference between the model estimate and the observed value is consistent with the omission of important proximate determinant from the model.

The absence of abortion from the model, as well as underreporting of contraceptive use, is potential sources of the overestimate of fertility. (35, 50, 73, 74)

6.3 Sociodemographic differentials of fertility

In this study woman education and place of residence were found to be predictors of teenage fertility. Those living in Addis Ababa and other urban area were less likely to be fertile than those living in rural area. Similarly, those who have primary or secondary level of education have lower probability of being fertile during their adolescence period than those who have no education. This finding is similar to other studies conducted in Ethiopia as well as other countries. Repeatedly, researchers have identified the negative impact of education and living in urban area on teenage fertility (8, 28, 32, 50, 75, 76).

Living in an urban area and having a higher education level are expected to be associated with a lower level of adolescent childbearing mainly through the proximate determinants of fertility(33). Female adolescents living in urban areas and having a higher education level are more likely to have access and use contraceptives and abortion in order to avoid or postpone a pregnancy (28, 40, 41, 72). More educated female adolescents are also more likely to get married later because increased schooling tends to increase the opportunity cost of marriage for women and that of early childbearing (77). Indeed, urbanization and increased education open better economic alternatives (such as a higher education and a paid job) to getting married and bearing children to women, especially the younger ones (8).

In this study too, it was found that among women living in urban area 39.5% were using modern contraceptive method while it was only 6.9% among those living in rural area. Similarly, rural area 31.3% of teenagers living in rural area had ever been married while only 6.9% and 11.1% of those living in Addis Ababa and other urban areas outside Addis Ababa, respectively, has ever been in union.

In this study teenagers whose age was 18-19 years were about eight times more likely to be fertile than the younger once. This has been also observed in other countries where older teenagers are more likely to be fertile than the younger (8, 28). As the age increase, the risk of exposure to pregnancy and childbearing also increase, because of higher probability of getting sexual relation and marriage. In this study it was evidenced that more women belonging to the older age group (41%) were married while for the younger teenagers only 16% have ever been married. Similarly 17% of younger

teenagers and 44% of older teenagers were sexually active. So, as the age increases the probability of getting sexual intercourse and marriage increase which are the proximal determinants of fertility (32).

Another important differential of fertility in this study was age at marriage. Those who got married before the age of 15 and 16-17 years were seven and five times, respectively, more likely to be fertile than those who had got after age of 17 years. This finding is similar to other previous studies in which early marriage associated with being fertile (28, 77). This is because women who marry early will have, on average, a longer period of exposure to the risk of pregnancy, often leading to higher completed fertility. In some society the main purpose of marriage is to have children (78). In the qualitative part of this study has shown that if a woman is married, then she is expected to give birth soon and discouraged the use of contraceptives.

Age at marriage is of particular interest because it marks the transition to adulthood in many societies; the point at which certain options in education, employment, and participation in society are foreclosed; and the beginning of regular exposure to the risks of pregnancy and childbearing. Young mothers are more likely to experience pregnancy related complications and less able to deal with them, which often lead to maternal death. Children born to young mothers are usually subject to elevated risks of morbidity and mortality (8).

Delayed age at marriage directly affects total fertility by reducing the number of years available for childbearing. Later marriage permits women to complete their education, build labor force skills, and develop career interests that compete with childbearing within marriage. These career interests may, in turn, motivate women to limit family size and / or widen the spacing of their children (8). So efforts are needed to delay age at marriage which has benefit both at individual and societal level.

6.4 Antenatal care utilization

As in the case of general population, the rate of use ANC is low among teenage women in Ethiopia. Only 27.3% of teenagers have used ANC from health professionals for their most recent birth in five years. Such low rate of use of ANC has been documented in other previous researches in the country (31, 54, 60).

As compared to other neighboring countries the rate observed in Ethiopia is much lower. For instance the rate of use of ANC from health professionals among women aged less than 20 years at most recent birth was 72%, 84% , 87%, 92%, 93%, 94% and 95% in Eritrea, Kenya, Mozambique, Rwanda, Malawi, Tanzania and Uganda in their most recent DHS conducted between 2002 and 2006 (67).

Adolescents avoid use of existing reproductive health services because of various reasons including operational barriers like working hour, long waiting time and cost, lack of information and feeling of discomfort like belief that the services are not intended for them, concern that staff will be hostile or judgmental, and stigmatization (2, 17). In the in-depth interview some of the discussants didn't get antenatal care for their pregnancy. The reasons mentioned were fear of people in health facility, concern about other family member will see them, lack of adequate information about the existing service, ignorance, fear, shy, distance, culture, economic reason (for delivery service), and non friendly approach of health workers.

Pregnancy during adolescent period is associated with increased risk of experiencing complication during delivery and teenage mothers are twice more likely to face maternal death than woman aged 20-24 years. Yet, obstetric and neonatal outcomes for adolescents can be improved if comprehensive antenatal care emphasizing specific medical, nutritional, and social aspects of adolescence is available (17). Additionally, woman who attend antenatal care are more likely to seek professionally assisted delivery than those who had no any ANC (31, 64, 79). Further more, especially for adolescents, antenatal care may be the first comprehensive health assessments they receive, which gives opportunity for adolescents to discuss about prevention of transmission of HIV/AIDS from the mother to the child and birth spacing that may reduce fertility (7, 51).

Although ANC has all these advantages for the teenagers, about a quarter of them are currently getting the service. Even if they obtained ANC, most of them start late in the pregnancy which is against the guideline of WHO, which recommends to start in the first trimester of pregnancy to get more benefit of ANC (51). All these show that, adolescents are less privileged to get ANC. The current programs being implemented in Ethiopia needs special consideration for adolescents to increase the use of ANC, which may result in raise the coverage of professionally assisted delivery which ultimately contributes for the reduction of maternal and infant mortality.

6.5 Determinants of ANC

In this study woman education as well as partner education, place of residence and wealth index were found to be determinants of use of professionally assisted ANC among teenage women aged 15-19 years. Other similar studies has revealed similar finding, where the adjusted odds of receiving prenatal care before birth of the child are much higher among mothers with some education, better household economic status, and urban residence. The effect of mother's education, household economic status, and place of residence on use of ANC was also observed in other studies conducted in Ethiopia(37)

The finding of a strong effect of education is consistent with findings from elsewhere in the world and here in Ethiopia. (37, 58, 60-62) Education is likely to enhance female autonomy so that women develop greater confidence and capability to make decisions about their own health. It is also likely that educated women seek out higher quality services and have greater ability to use health care inputs that offer better care (60).

In this study teenagers living in households that fall within the poorest population quintile use antenatal services much less frequently than do those in the richest 20%. It also shows that whereas some degree of wealth differential exists everywhere, the gap between the richest 20% and the poorest 20% for use of antenatal care varies enormously. This finding is consistent with other studies that show the effect of economic status with the use of ANC from health professionals (37, 58, 61, 62). Studies conducted in Bangladesh Chad, India, Mali, Morocco and Pakistan has shown such gap in the use of ANC between the poorest and the richest 20% wealth indexes (51).

Similarly, adolescents living in urban area were two times more likely to use ANC than those living in rural after controlling for potential socioeconomic, demographic and obstetric variables. Other studies have also shown similar finding where living in urban area is determinant factor for using ANC (37, 60).

Woman in urban area tend to be benefited from increased knowledge and access to maternal health services compared with their rural counterparts. This is because, health facilities are more accessible in urban areas and various health promotion programs that use urban-focused mass media work to the advantage of urban residents and explain the close connection between urban residence and use of

maternal health services. Moreover, rural women are more readily influenced by traditional practices that are contrary to modern health care. (60)

7 Limitation and strength of the study

Strength of the study

- Nationally representative large sample size
- Meticulous data collection, which meant there were very few inconsistent or unknown values
- Supplementing the quantitative result with qualitative in-depth interview
- Use of previously proven fertility model
- Tries to cover two different adolescent behaviors –fertility and maternal health service utilization at the same time

Weakness of the study

- As any cross sectional study cause and effect relationship was not possible to establish for the factors dealt in the study because it is difficult to know which occurred first the exposure or out come variable.
- Abortion and primary sterility were not included in the model of determinants of fertility because of data limitation
- There may be error in the reported age especially those reported to be aged 19 years may be over 19 years which has significant effect for this age specific analysis.

8 Conclusion and recommendation

8.1 Conclusion

1. Adolescents in Ethiopia are characterized by high rate of premarital sexual relationship, early marriage and low rate of use of contraceptive which has led to the observed level of teenage fertility
2. Peer pressure, absence of discussion on sexuality with parents, loose follow up of school teachers and parents on the activity of students are factors predisposing adolescents to premarital sexual engagement.
3. The two most important proximate determinants of teenage fertility are delayed marriage or non marriage and postpartum infecundability because of breastfeeding.
4. The effect of family planning as a determinant of fertility was observed only in urban area and it has very limited role in rural areas of the country among teenagers
5. When adolescents get pregnancy, only a quarter of them sought ANC service from health workers. Even among those who got ANC, only few of them start their first visit in the first trimester of their pregnancy.
6. Adolescent women in rural area are less privileged in getting reproductive health service than urban counterparts. Teenagers living in rural area are characterized by high rate of fertility, unmet need for contraception and early marriage but low rate of use of family planning and seeking ANC from health workers when becoming pregnant.
7. Education is strongly and consistently associated with the use of existing maternal health service and protection from getting fertility during adolescent period. Woman who have primary or secondary level of education are more likely to seek ANC and less likely to be fertile before the age of 20 years.
8. Partner level of education is also key factor for teenage women to the use of ANC from health professionals

8.2 Recommendation

1. Currently Ethiopia is undergoing vast developmental activities which include expansion of school and health facility especially in rural areas. This has to be continued as it has direct impact on the reduction of fertility and promoting utilization of maternal health service.
2. In the recently revised family law of Ethiopia, the legal age for marriage is 18 years or above for both boys and girls. But significant proportions of them are getting marriage before the age of 18. So the prohibition of marriage before the legal age should be reinforced by the concerned body.
3. Besides the legal enforcement of age at marriage, programs focused on increasing the opportunities for education and empowerment in decision-making for the young women should be considered, which are likely to result in delayed marriage and if pregnant will use existing maternal health service.
4. To improve the utilization of family planning especially to the rural teenage woman appropriate behavioral change communication through all available media should be used. One of the possibilities could be building health extension workers capability to handle the family planning and other reproductive health needs of adolescents to provide user friendly service.
5. As the age increase the probability of adolescents being sexually active also increases. Starting program after they become sexually active or pregnant may not be as effective as that has started before engaging in it. So programs related to reproductive and sexual health of adolescents should be started early enough before the teenagers get sexual intercourse at primary education level.
6. The current programs being implemented by various NGOs and governmental bodies should include parents with the adolescents to create favorable environment for the teenagers to use existing reproductive health services and to have open discussion.
7. School health programs need to be strengthened through incorporating sexual and reproductive health issues including ANC and family planning in the existing curriculum and use of school mini-media for dissemination of information.

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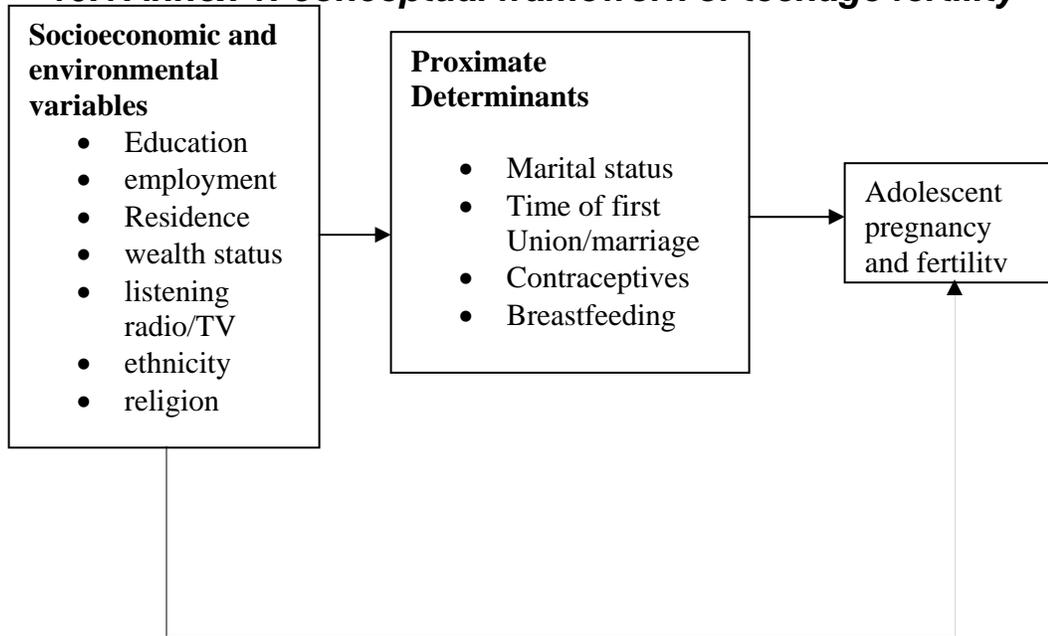
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10 ANNEX:

10.1 Annex 1: conceptual framework of teenage fertility



Source: Adapted from Bongaarts model of fertility

10.2 Annex 3: Written consent (English Version)

Written consent for determinants of teenage fertility and their health service utilization in Ethiopia

Thank you for coming to this session. My name is _____ from the District Health Office and the Addis Ababa University, faculty of medicine. The purpose of this interview is to identify the determinants of adolescent fertility and the maternal health service utilization of adolescent in Ethiopia. I am interested in all your ideas, comments and suggestions. There are no wrong or right answers. All comments, both positive and negative to the point of discussion are welcomed.

If you are willing, I will record with audiotape all your comments and opinions so that we could not miss any of your ideas while trying to take notes.

In this interview your name as well as address will not be written. I assure you that all your comments are confidential, and used for this research purpose only. At any moment if you decide not to discuss or escape any question, it is your right and I will respect your decision. Not participating in the survey, will not have any impact on you. Thank you in advance for participating in the survey.

Now please tell me if you agree to continue the discussion.

Yes _____ No _____

If yes, Signature _____ (If no thank you)

10.3 Annex 4: Written consent (Amharic version)

የፈቃደኝነት መግለጫ ቅጽ

ጤና ይስጥልኝ ስሜ _____ ይባላል። የመጣሁት ከወረዳው ጤና ጥበቃ ጽ/ቤት እና በአዲስ አበባ ዩንቨርሲቲ የህክምና ትምህርት ክፍል ለጥናት መረጃ ለማሰባሰብ ነው። የጥናቱ ዓላማ የወጣቶችን እርግዝና እና የስነ ተዋልዶ ጤና አገልግሎትን አጠቃቀም በተመለከተ ያለውን ሁኔታ፣ ተያያዥ ችግሮችና ትኩረት የሚሹ ጉዳዮችን ለመለየትና የማሻሻያ ሃሳቦችን ለማቅረብ ሲሆን እርስዎም የሚሰጡት ሃሳብ፣ አስተያየት ሙሉ በሙሉ ለጥናቱ አስፈላጊ ናቸው። ከጥናቱ አላማ ጋር በተያያዘ የሚሰጧቸው ጥሩም ይሁኑ መሻሻል ያለባቸው ሁኔታዎች በሙሉ ለጥናቱ ጠቃሚ ናቸው።

ፈቃደኛ ከሆኑ በውይይታችን ወቅት የተነጋገርነውን ሙሉ በሙሉ ለመያዝ እንዲያመችኝ ድምፅዎን በካሴት እቀርፀዋለሁ።

የሚሰጡት መረጃ በሙሉ ለዚህ ጥናት ብቻ የሚያገለግል ሲሆን በዚህ ቃለ መጠይቅ ላይ ስምዎትም ይሁን አድራሻዎት አይገለጽም። በዚህ ላይ ለመሳተፍ የእርስዎም ፈቃድ ፍፁም አስፈላጊ ነው። በተጨማሪም ለመመለስ የማይፈልጋቸው ጥያቄዎች ካሉ ጥያቄውን ለመመለስ አይገደዱም። እንዲሁም በጥናቱ ላለመሳተፍ ከፈለጉ በማንኛውም ሰዓት ማቋረጥ ይችላሉ። በጥናቱ አለመሳተፍዎ እርስዎ ላይ የሚያስከትለው ወይም የሚያመጣው ምንም አይነት ጉዳት የለም። ቃለ መጠይቁ የሚወስደው 20 ደቂቃዎች ያህል ነው። በዚህ ቃለመጠይቅ በመሳተፍዎ ምስጋናዬ የላቀ ነው።

- ጥያቄውን ልቀጥል? - አዎ ፈቃደኛ ነኝ
- ለመሳተፍ ፈቃደኛ አይደለሁም

ፈቃደኛ ከሆኑ ፊርማ _____ (ፈቃደኛ ካልሆኑ አመስግነህ ሂድ።)

10.4 Annex 5: in-depth interview guide questioner

Site of interview: Health facility_____

Community _____

Questions for adolescents in the community and health facility

1. How old are you?
2. Educational level
3. Marital status
4. living in rural/urban area
5. Are you pregnant or delivered at home or health facility recently? Did you get checkup/ANC? By whom? Why do you prefer to use health facility/home care?
6. Why do you become pregnant? Was that planned or not? Were you using family planning?
7. Do you get the service that you need in the nearby health facility (HF)?
8. What kinds of services are available at the nearby health facility for adolescents?
9. Do the adolescents go to HF for family planning, antenatal care or delivery? Is it common practice? If not why not?
10. What are the major factors that you think contribute to using or not using ANC, FP or delivery service at health facility by adolescents?
11. Could you tell me to what extent adolescent fertility is a problem in your area and its cause?
12. Could you tell me the general practices or beliefs towards adolescent fertility?
13. Could you tell me about maternal health service utilization (antenatal care, delivery, contraceptive use) difference by age or marital status in your area?
14. Could you describe the major factors that affect use of health service by adolescents?
15. Do the adolescents use family planning to prevent pregnancy? From where do they get? How is risk of unplanned/unwanted pregnancy among the adolescents?
16. What is your suggestion in order to improve the services utilization of adolescents in your locality?

Additional questions for adolescents at health facility

1. For what service do you come to this health facility?
2. Is it your first, second or more visits to this health facility?
3. How do you get the service in the health facility? Did you get the service that you need?
Satisfied or not? Why?

I have finished my questions. Thank you for your time and valuable information.

10.5 Copy of the permission to use the DHS raw data from ORC macro

10.6 Annex 7: DECLARATION

I, the undersigned, declared that this thesis is my original work in partial fulfillment of the requirements for the degree of master of public health. All the sources of the materials used for this thesis and all people and institutions who gave support for this work are fully acknowledged.

Name – Tewodros Alemayehu

Signature _____

Place of submission –School of public health, Addis Ababa University

Date of submission July 14, 2008

Approval of the Primary Advisor

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

Advisor's name – Dereje Habte (MD, MPH)

Signature _____