ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

LEVELS, TRENDS AND DIFFERENTIALS OF ADOLESCENT MOTHERHOOD IN ETHIOPIA

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Levels, Trends and Differentials of Adolescent Motherhood in Ethiopia

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TO

ALL SMALL PEOPLE STRUGGLING TO BE GREAT

AND

ALL GREAT PEOPLE WHO ARE ALWAYS AT THE SERVICES OF OTHERS

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ABSTRACT

Context: *Adolescent childbearing has undesirable consequences. In sub Saharan Africa, among other things, dropping out of school, high infant and maternal mortality and morbidity are the most noted consequences of adolescent childbearing. The ultimate goal of this study is to analyze the levels, trends and differentials of adolescent childbearing or motherhood in Ethiopia.*

Method: *This study is carried out using quantitative data obtained from the 2005 Ethiopian Demographic and Health Survey. A multilevel logistic regression is fit to analyze the determinants of adolescent childbearing using the MLwiN 2.02 software designed for this purpose. Qualitative data were also collected to facilitate the interpretation of results of the analysis of the quantitative data.*

Result*: Adolescent motherhood in Ethiopia has shown a generally declining trend over time. The decline, according to the results of this study, was more marked in the period following the adoption of the population policy. As was expected, the level of adolescent motherhood was lower in urban areas and women who have a secondary and above education. The effect of marital status and sexual experience on teenage motherhood was positive and significant. The levels of early marriage and early debut into sexual activity have declined over time. The decline in the percentage of early marriage and early sexual debut are mainly attributed, among other factors, to the increase in education of women. The risk of adolescent motherhood is higher among women who were not working and agricultural worker women.*

Conclusion*: In conclusion, modernization, especially as measured by a secondary and above level of educational attainment, reduces the chances of adolescent motherhood among women. Moreover, women not working, women working in agricultural sector and women residing in rural areas should be given priority in all actions designed to minimize the risk of adolescent motherhood.*

CHAPTER ONE

1. INTRODUCTION

1.1 STATEMENT OF THE PROBLEM

Adolescence is a prime period in an individual's life because during adolescence many key social, economic, biological, and demographic events occur that set the stage for adult life. The quality of their future lives depends largely on the extent to which adolescents take advantage of opportunities for personal growth and avoiding potentially problematic outcomes of sexual relations, such as early dropout from school, unplanned pregnancy, as well as its adverse health effects (Bongaarts and Cohen, 1998). Nonetheless, since adolescents are more mature physically than mentally or emotionally, they are more often ill prepared to make the serious decisions they face (Hughes & McCauley, 1998).

Zabin and Kiragu (1998) stated that in the developed world, the age at menarche decreased at a rate of approximately four months each decade over a period of a hundred years and this process is under way in sub-Saharan Africa, where the age at puberty dropped in most areas and in some it is still declining. This is commonly attributed to larger body size and earlier average attainment of sufficient body fat that is not typical to a given subgroups with less-than adequate nutrition (Zabin and Kiragu, 1998). And this decline in age at menarche has an effect on early debut in sexual activity and early childbearing (Crocket *et al.*, 1996).

According to the projection of Central Statistical Agency of Ethiopia (CSA Ethiopia, 2006), the total projected population of the country for July 2007 is 77,127,000. About 43% of the population is below age 15 and 53% are below age 20. On the other hand, according to the 2005 EDHS report, about 46% of Ethiopian women aged 20-24 years gave birth before reaching age 20. The median age at first birth is 19.2 years for women aged 25-29 (CSA and ORC Macro, 2006). From this it is evident to see that as in most developing countries (UN, 2004), the population of Ethiopia is young and also childbearing begins early.

In Ethiopia, according to the 2005 Demographic and Health Survey Report (CSA and ORC Macro, 2006), with the exception of women in the age group 15 to 19, fertility decline has been

observed in every age group in the period between 1990 and 2005. But the extent of adolescent childbearing, as measured by the age-specific fertility rate for women aged 15-19, has shown a slight increase over the period 1990 to 2005. Moreover, the relative contribution of adolescent childbearing to the TFR was 7.4%, 9.1% and 9.6% for the year 1990, 2000 and 2005, respectively. This portrays that the relative contribution of adolescent childbearing to TFR has shown an increase over the period 1990 to 2005.

As stated by different researchers (Wulf and Singh, 1991; Gupta and Mahy, 2003), early initiation into childbearing lengthens reproductive period and larger completed family size is one of the long-term demographic effects of adolescent fertility. Among women in the age 45-49 in Ethiopia, those who started childbearing before age 20 on average end up with two more births than were those who delayed childbearing to latter ages (see Table **A-1**, Appendix).

Pregnancy is a leading cause of death for young women aged 15 to 19 worldwide, with complications of childbirth and unsafe abortion being the major factors (UNICEF, 1998; Mayor, 2004). In non-contracepting societies, women who start childbearing early tend to have more children (Wulf and Singh, 1991; Gupta and Mahy, 2003), and this in turn increases their lifetime risk of maternal death (WHO, 2001). In Ethiopia, maternal mortality among adolescents under 16 years of age was found to be six times higher than for young women aged 20-24 (Zabin and Kiragu, 1998). A retrospective study done by Asheber (2000) in Jimma Hospital, Southwestern Ethiopia, showed that of all maternal deaths about 22% occurred to adolescent mothers. In addition, births to adolescent mothers are likely to be of low birth weights and low birth weight is one of the major causes of infant mortality (Alison *et al.*, 1995).

The strong association between adolescent childbearing and low levels of educational achievement (Klepinger *et al.*,1995; Lloyd and Mensch, 2006) for young women brings about a negative impact on their potential contribution to society. The potential economic and the non-economic contributions of these women to the society will be limited as young mothers are forced to drop out from school and devote themselves to child care and rearing (McDevitt *et al.*, 1996).

In short, evidences show that adolescent childbearing has undesirable consequences. In sub Saharan Africa, among other things, dropping out of school, high infant and maternal mortality and morbidity are the most noted consequences of adolescent childbearing. Since adolescent childbearing raises an issue of women's status, health, and population growth concerns, it is an important and timely issue to be researched. And an understanding of factors associated with adolescent childbearing is believed to assist program planners and policy makers to improve the reproductive health care for adolescents.

1.2 OBJECTIVES OF THE STUDY

1.2.1 GENERAL OBJECTIVE

The ultimate goal of this study is to analyze the levels, trends and differentials of adolescent childbearing or motherhood in Ethiopia.

1.2.2 SPECIFIC OBJECTIVES

This study attempted to:

i. Look at the levels and trends of adolescent motherhood,
ii. Assess the variation in adolescent motherhood by region and place of residence,
iii. Identify socioeconomic and demographic factors associated with adolescent motherhood, and
iv. Recommend appropriate policy measures to be taken in the sphere of minimizing the risk of adolescent motherhood.

1.3. LITERATURE REVIEW

1.3.1 THEORETICAL CONSIDERATIONS

There are a range of theories that guide researches on risk factors associated with adolescent pregnancy and childbearing. For instance, interactive or socialization theory posits socialization as an important influence on sexual behavior and childbearing of adolescents (Crockett *et al.*, 1996) and rational choice theory emphasizes socioeconomic factors, with adolescent childbearing being tied to socioeconomic factors (Florez and Nunez, 2001).

1.3.1.1 INTERACTIVE MODEL

Interactive theory states that adolescent reproductive behavior is a function of sexual behavior among older siblings and other family members that leads to early intercourse and childbearing

in a family (Crockett *et al.*,1996). East (1996) compared the perception of younger brothers and sisters of pregnant, teenage mothers and never-pregnant teenagers towards teenage pregnancy and childbearing. And the result of the study has shown that younger sisters of both pregnant and teenage mothers are more accepting of teenage childbearing and have more definite intention of having a child at young age. Other studies (Manlove *et al.*, 2000; Gigante *et al.*, 2004) also reported that being a daughter of a teenage mother is associated with an earlier intercourse and teenage pregnancy among girls. The general consensus in this regard is that experiences within the family members have significant effect on the timing of sexual intercourse and child bearing.

1.3.1.2 RATIONAL CHOICE MODEL

Under the rational choice model, individuals are considered as rational entities that take choices or actions which optimize their fixed preferences based on their belief about consequences of the chosen and other alternative actions (Friedkin, 1990 cited in Abell, 2003). In view of this theory, teenage childbearing is a response to the underlying socio-economic opportunities and constraints of teenagers (Florez and Nunez, 2001). Studies done in four Latin American countries: Chile, Barbados, Guatemala & Mexico (Buvinic, 1998) and five developed countries (Sing *et al.*, 2001) have shown that early childbearing is more likely among socially-disadvantaged adolescents than their better off peers. Negussie and Obare (2004) used the 2000 EDHS data to study the pregnancy and child health outcomes among adolescents in Ethiopia. The study reported that significantly larger proportion of the adolescent mothers were from rural areas, poorer, less educated, and have no history of marriage.

Existing theoretical models, in short, reveal that adolescents' decision whether to have children or not depends upon their family status, the environment in which they were raised, the economic and school opportunities they have, and personal characteristics to be developed in due course.

1.3.2 SOCIO-ECONOMIC DETERMINANTS OF ADOLESCENT MOTHERHOOD

This thesis uses the rational choice model to analyze the levels, trends and differentials of adolescent motherhood. Following are discussions on the effect that socio-economic and demographic factors exert on adolescent motherhood.

1.3.2.1 EDUCATION AND ADOLESCENT MOTHERHOOD

Female educational attainment is an important socioeconomic variable found in numerous studies to be associated with fertility. Adolescent childbearing is more likely among women with low levels of education than among their educated peers (Singh, 1998). Studies done in Brazil (Gupta and Leite, 1999) used data from three demographic and health survey to examine trends and determinants of fertility behavior among adolescents. The result of the study showed that high level of a young woman's education is strongly associated with delayed childbearing in the region. Gupta and Mahy (2003) conducted a study in eight sub-Sahara African countries based on data drawn from Demographic and Health Survey on adolescent reproductive behavior and the result of the study showed that education (Grade 8 and above) was found to have consistently and significantly reduced the risk of adolescent childbearing in all countries studied. However, in a study by Cesare and Rodriguez (2006) education has shown an ambiguous effect. In a model where only socioeconomic variables are incorporated, education had a significant effect whereas when all significant socioeconomic variables and proximate determinants are incorporated into a model to predict adolescent childbearing it lost its effect.

As indicated in the works of Ainsworth *et al.,* (1996) and McDevitt *et al., (*1996), education has the potential to directly affect desired family size and notions about acceptable styles of childrearing. It also has the power to influence fertility indirectly by delaying entry into marriage and by reducing barriers to the adoption of family planning (Bongaarts, 1978).

1.3.2.2 PLACE OF RESIDENCE AND ADOLESCENT MOTHERHOOD

A review of adolescent childbearing (Singh, 1998) done in 43 developing countries documented that the level of adolescent childbearing is lower in urban areas compared to rural areas. Another study (Gupta and Mahy, 2003) done on adolescent childbearing in eight sub-Sahara African countries showed that urban residence had a sizeable effect on the chance of adolescent childbearing only in three of the eight countries considered in the study. On the other hand, results from studies done in Brazil and Colombia tell that residence has insignificant effect or loses its effect when socioeconomic level is controlled (Gupta and Leite, 1999; Cesare and Rodriguez, 2006).

1.3.2.3 EXPOSURE TO MEDIA AND ADOLESCENT MOTHERHOOD

Exposure to media provides the opportunity to be acquainted with new ideas and knowledge that is useful in various aspects of everyday life (CSA Ethiopia and ORC Macro, 2006). A study done in Brazil (Gupta and Leite, 1999), however, indicates that exposure to media has no effect on early first birth. The survey conducted in eight sub-Sahara African Countries by Gupta and Mahy (2003) also reported that exposure to media has no significant effect on teenage childbearing in six of the eight countries considered in the survey.

1.3.2.4 BIRTH COHORT OF WOMEN AND ADOLESCENT MOTHERHOOD

Girls who entered adolescence at some time face different environment than those who entered at some other time (Manlove *et al.*, 2000). Singh (1998) reviewed the levels and trends in rate of adolescent childbearing, the timing of first birth and births to unmarried women in 43 developing countries. The review reports that a decline in adolescent childbearing is observed in many of the countries studied. Younger cohorts are more educated and live in urban areas. Besides, the decline observed is more common among the better educated and those who live in urban areas. However, small increase in adolescent childbearing is observed in five sub Saharan Africa and four Latin American countries even among the better educated women.

1.3.2.5 EMPLOYMENT AND ADOLESCENT MOTHERHOOD

There is a long history in the economic analysis of fertility that attempted to establish a link between income and fertility. An economic analysis of fertility tells that increases in family income are associated with a smaller number of children demanded if higher quality children are preferred (Davis *et al.*, 1993). The inverse relationship between female labor force participation and fertility has been demonstrated by different surveys. Studies done on adolescent childbearing support the claim that adolescent childbearing is associated with income and poor earning opportunities, occurring for poor and unemployed rather than to all women (Buvinic,1998; Singh *et al.*, 2001).

1.3.2.6 RELIGION AND ADOLESCENT MOTHERHODD

The role of religion as a fertility determinant has been a subject of considerable discussion in fertility literatures. Every social group has a distinguishing culture, complex of belief, attitudes, values and social controls (Melford, 1987). Throughout sub Saharan Africa, traditional

religious beliefs and practices are embedded in lineage and descent systems that structure society and sustain high fertility (Fred *et al.*, 1998).

1.3.3 PROXIMATE DETERMINANTS

The proximate determinants, characteristics having a direct influence on adolescent motherhood, considered in this study are sexuality, marital status, and contraceptive use. Following are discussions that these proximate determinants exert on adolescent motherhood.

1.3.3.1 SEXUALITY, MARITAL STATUS AND ADOLESCENT MOTHERHOOD

Initiating sexual activity is a natural transition made nearly by all humans. Nevertheless, it is not the occurrence of this transition but the timing and the circumstances under which it occurs that has significant implications (Elster & Kuznets, 1994; in Abdu, 2003). Different studies conducted in different parts of Ethiopia (Kora & Haile, 1999; Martjee *et al.*, 2002) showed that initiation of intercourse among adolescents is earlier. Haberland and colleagues (2004), on the other hand, accounted that in the vast majority of developing countries most sexual activity among teenage girls takes place in the context of marriage. According to them, if sexuality takes place in marital context, age at first marriage marks the beginning of regular exposure to the risks of pregnancy and childbearing. Singh (1998) also reported that much of the early childbearing that occurs in developing countries involves women who are in a union or marriage. Strengthening this argument, a study conducted in Brazil and Colombia (Cesare and Rodriguez, 2006) has indicated that very young women who had their first union are at higher risks of adolescent childbearing than those who had not.

1.3.3.2 CONTRACEPTIVE USE AND ADOLESCENT MOTHERHOOD

Review literatures on trends in adolescent fertility and contraceptive use in developing countries (McDevitt *et al.*, 1996) show that the use of family planning has little impact on adolescent fertility when compared to their age of entry into union. However, a survey (Cesare and Rodriguez, 2006) done on determinants of adolescent fertility suggest that those who have never used contraception are at higher risk of child bearing than those who ever used a modern contraceptive method. On the basis of this finding, use of contraceptive among adolescents may be considered as a function of interest in delaying, spacing or limiting childbearing and knowledge of family planning methods and sources.

Zemed (2002) has made an attempt to study the socioeconomic and demographic determinants of teenage pregnancy or motherhood in Ethiopia using the 2000 EDHS data for women in the 15-19 age group. He classified women in the 15 to 19 years old at the time of the survey into teenage pregnant/mother or not. The findings of this study showed that age, marital status, and knowledge about ovulatory cycle and contraceptive methods are found to have a significant effect on teenage pregnancy or motherhood while place of residence, current work status, and educational attainment have no significant effect on the likelihood of teenage pregnancy or motherhood. This type of selective analysis does not reveal the level and trend in teenage motherhood in Ethiopia as there would be changes overtime due to efforts being made by the Ethiopian government and the international community to improve the situation since early 1990s, the time when the Ethiopian Population Policy and related development programs were adopted. The purpose of this study is, therefore, to extend the work of Zemed by trying to look at the levels, trends and differentials of adolescent motherhood using data obtained from the 2005 EDHS on adult females, women aged 20 and above.

1.4 ANALYTICAL FRAMEWORK

While analyzing factors influencing fertility, Bongaarts (1978) made distinction between two groups of variables: the proximate determinants of fertility and background characteristics of respondents. According to this framework, it is the proximate determinants, proportion of women in reproductive age that are in union, frequency of sex, contraceptive use, lactational infecundability, sterility, spontaneous abortion, and induced abortion, that have direct influence on fertility. Socioeconomic and demographic variables such as social, cultural, economic, environmental, institutional and psychological variables, influence fertility outcomes through proximate determinants. The analytical framework for this study is, therefore, adopted from the aforementioned approach. All of the background variables are expected to have both direct and indirect effect on adolescent motherhood. Because lactational infecundability only applies to women who have a previous child, it is not appropriate to consider it for the analysis of first birth. Given the lack of consistency and reliability of data, proximate variables like, sterility, spontaneous and induced abortions are not considered, too.

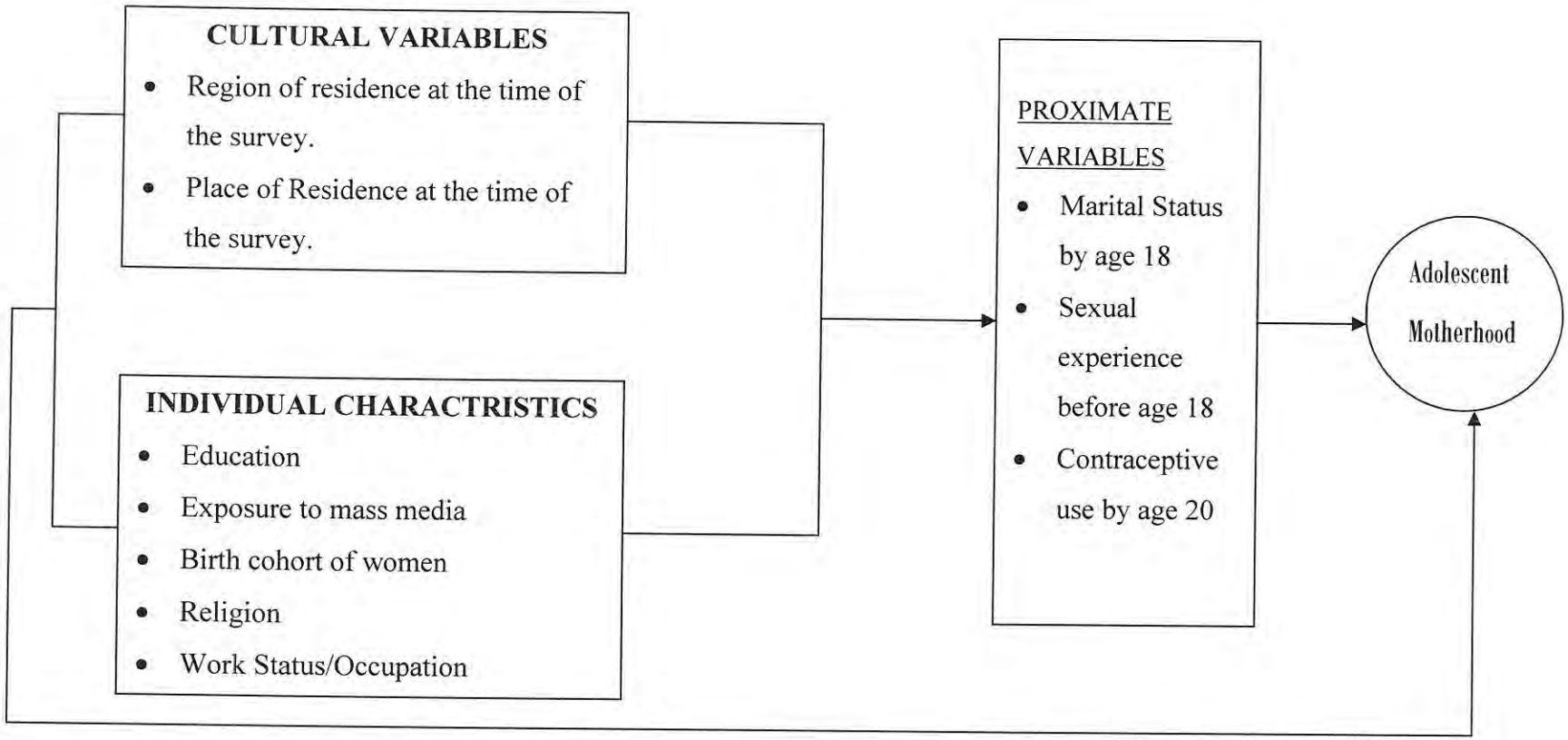


Figure 1: Analytical framework for the analysis of adolescent motherhood: Adopted from a framework for analyzing the proximate determinants of fertility (Bongaarts, 1978).

1.5 HYPOTHESES

The hypotheses to be tested in this study are:

1. Adolescent motherhood is higher in rural than urban areas.
2. There is an inverse relationship between adolescent motherhood and educational attainment of women.
3. Adolescent motherhood would be lower among younger cohort women.

CHAPTER TWO

2. RESEARCH METHODS

2.1 DATA SOURCE

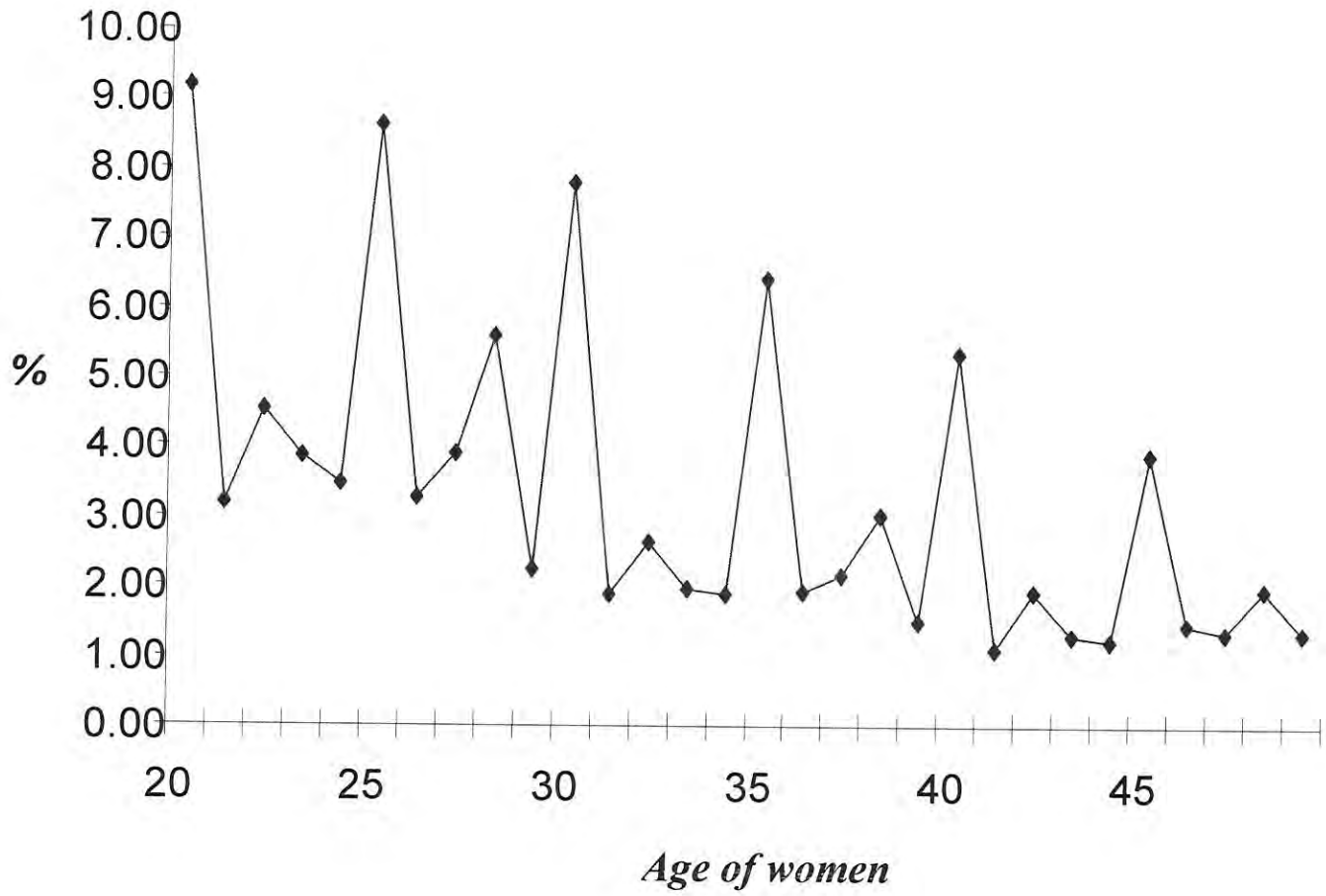
This study is carried out using quantitative data obtained from the 2005 Ethiopian Demographic and Health Surveys. The 2005 Ethiopian Demographic and Health Survey has been collected by the Central Statistical Agency with the prime objective of generating health and demographic information on family planning, fertility levels and determinants, fertility preferences; infant, child, adult and maternal mortality; maternal and child health; nutrition, malaria, women's empowerment, and knowledge of HIV/AIDS along other household characteristics (CSA and ORC Macro, 2006).

The statistical analysis included adult women in their reproductive age (i.e. 20-49 years) as fertility of women in the 15-19 age group provides an incomplete information on adolescent maternal situation since this cohort has not yet lived through the complete years of such age interval. The units of analysis to be considered in this study is, therefore, adult women who have celebrated their 20^{th} birthday anniversary and hence classified as those having had child before age 20 or later including those who never have had yet. A total of 10,818 women are included in the analysis from the 2005 EDHS. To facilitate the interpretation of results obtained from the quantitative data, qualitative information was collected from three different regions, i.e., Oromia, Amhara and SNNPs as well as Addis Ababa City Administration, from key informants. One FGD with six participants was also conducted in Amhara region where the prevalence of early marriage is very high.

2.2 DATA QUALITY

A glance at the single year of age data for the sampled female population aged 20-49 (Figure 2) reveals that there are clusterings at ages ending in "0" and "5." Less marked concentrations are also found on ages ending in "2" and "8." To look at the extent of concentration, an index is computed for the data using a Myers's Blended Method (Table **A-2**, Appendix). The overall summary index indicates that there are heapings of age among women in the sample. Moreover, the concentration is higher in digits ending in "0" and "5." Despite this fact, the use of grouped age could solve the problem of heaping to some extent (See Figure A-3, Appendix).

Figure 2: Percentage distribution of women by single age, EDHS 2005.



Source: Computed by the author using the 2005 EDHS.

2.3 DATA ANALYSIS

2.3.1 VARIABLE DESCRIPTION

DEPENDENT VARIABLE

Adolescent Motherhood: is a dichotomous variable that refers to the fertility experience of a woman before age 20. It assumes a value of '0' if a woman had not had any birth before age 20 and value of '1' if a woman had had birth before age 20. Adolescent motherhood, teenage motherhood, early birth, and adolescent childbearing are used interchangeably throughout this thesis.

INTERMEDIATE VARIABLES

Marital status: It takes a value of '1' if a woman had been married or started living together with her first partner before age 15 and value of '2' if a woman is married between ages 15 and 17 and value of '3' if a woman is not married before age 18.

Sexual experience: represents whether the respondents have had sexual relation before age 15, between ages 15 and 17 or has not started sexual relation before age 18.

Contraceptive use status: has two categories-'Ever using' if a woman has started to use a modern method before age 20 and 'Never used' if a woman was not using a modern method before age 20.

INDEPENDENT VARIABLES

Educational attainment: is categorized as "No education", "Primary (Grade 1- 8)", and "Secondary and above (Grade 9 and above)."

Place of residence: has two categories "Urban" and "Rural."

Birth cohort of women: five cohorts of women, that is, women born after 1980, between 1976 & 1980, between 1971 & 1975, between 1961 & 1970 and between 1956 and 1960 are considered. The first cohort women are women were below age 25, the second and the third cohort of women refer to women in the age between 25 and 35, and the last two cohorts refer to women beyond age 35 at the time of the survey.

Exposure to media: watching television, listening to radio and reading news paper are considered to measure exposure to media in the analysis. It is classified into three categories: 'Frequent' if a woman has an almost every day access to either of these media, 'Not at all' if

a woman has no access to any of these media and all other possible combinations are considered as 'Infrequent exposure.'

Occupation: refers to working status of women and/or the type of job a woman is engaged in at the time of the survey. It is classified as 'Not working', 'Agricultural women', and 'Non-agricultural worker.'

Region: refers to the 9 regional administrations and two city administrations of Ethiopia in which a woman was living at the time of the survey.

Religion: refers to the religious affiliation of a woman at the time of the survey. It is classified into Orthodox Christians, Protestant, Muslim and Others that include Catholics and Traditional among others.

2.3.2 MODEL

Both theoretical and empirical considerations of the distribution of a binary response variable suggest that the shape of the response function will be sigmoidal with respect to the parameters (Neter *et al.*, 1996) and for a two level random intercept model it takes the form (Goldstein, 2003):

$$\log\left(\frac{P_{ij}}{1-p_{ij}}\right) = \beta_{oij} + \beta_1 x_{1ij} + \beta_2 x_{2ij} + \ldots + \beta_p x_{pij} \quad ,$$

where $\beta_{0ij} = \beta_o + \mu_{oj} + \varepsilon_{oij}$

P_{ij} is probability of having a positive event for the ith individual in the jth cluster,

βs are parameters of the model,

Xs are regressors,

μ_j is the effect of cluster j on the log odd of a positive event or a level 2 residual and

ε_{oij} is a level 1 residual.

This model is referred as a multilevel binary logistic regression model with a random intercept. In this thesis, the proposed outcome variable, adolescent motherhood, is a dichotomous variable to be fitted to the model.

Members of same cluster are more alike to each other and therefore the assumption of independence of residuals of regression models will be invalid. This in turn will lead to the underestimation of standard errors, and therefore p-values that are too small. As a result,

multilevel modeling procedure is employed in this study to examine the extent of between cluster variation in the risk of teenage motherhood. Intra-cluster correlation, a useful measure that may be used to evaluate the extent of level 2 variation that is due to unobserved factors operating at cluster level, is computed as: $\rho = \frac{\text{var}(\mu_{oj})}{\text{var}(\mu_{oj}) + \frac{\pi^2}{3}}$ where $\frac{\pi^2}{3}$ is the variance for the standard logistic distribution (Goldstein, 2003).

MLwiN version 2.02 software is used to estimate the parameters of the models. Two approximate estimation procedures are available in MLwiN to fit multilevel models to discrete response data: marginal quasi-likelihood (MQL) and predictive quasi-likelihood (PQL). The MQL procedure will tend to underestimate the values of both the fixed and random parameters of the model, especially where the sample taken from each cluster is small. In addition, greater accuracy is obtainable if the second order Taylor series approximation, rather than the first order, is used (Goldstein, 2003). Therefore, PQL2 procedure is used to estimate the parameters of the models in this thesis.

The coefficients in the model can be described as the log odds for a given category of a variable over the odds for the base category of the same variable. To ease interpretation, results are expressed in terms of odds ratios, which are calculated by exponentiating the parameter estimates. A ratio greater than unity implies that an individual in a given category would be more likely to have a positive event compared with a counterpart in the base category. A ratio lower than unity signals that an individual in the given category is less likely to experience the event compared with a counterpart in the base category (Neter *et al.*, 1996).

2.4 LIMITATION OF THE STUDY

1. The study heavily depends on information pertaining to the timing of events such as age at first birth, age at first intercourse and age at first marriage. On the other hand, as with all observational studies, responses in the DHS surveys are not immune to errors such as recall errors due to memory lapses and event omission

(both deliberate and accidental). Therefore, readers are advised to cautiously interpret the results of this study.

2. Due to time constraint only one FGD was conducted for the purpose of interpreting the results of the quantitative data. Consequently, the results obtained from the qualitative data are analyzed with some reservation.

CHAPTER THREE

3.1 SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

The results displayed in Table 1 provide number and percentage of sampled women aged 20-49 by different socio-economic and demographic characteristics. As can be seen from Table 1, 64% of the sampled women in EDHS 2005 age 20-49 were maternal cohorts of 1970s and early 1980s. Sixty percent of these women were sexually active before age 18 of which more than half of them did start sexual exposure between age 15 and 17. Regarding their experience of early marriage, 57.7% of them had an experience of early marriage, marriage before age 18, and nearly half of these women were married between age 15 and 17.

More than two third (67%) of the sampled women age 20-49 were illiterate, where as the level of secondary and above schooling was less than 20%. On the other hand, the majority of the sampled women had no access to mass media (52%). Forty eight percent of these women are Orthodox Christians and 33% of them were Moslems. The majority (63%) of the sampled women were not working at the time of the survey. Among women who were working at the time of the survey the greater part (24%) were working in non-agricultural sectors (Table 1).

The sampled women were predominantly rural residents. Nearly 70% of these women were residing in rural areas at the time of the survey. Region-wise, more than half (57%) of the surveyed women age 20-49 were taken from Oromia, Amhara, SNNPs, and Addis Ababa.

Table 1: Distribution of women aged 20-49 by various socio-economic and demographic characteristics, EDHS 2005.

Variable		Number of women aged 20-49	Percent of women aged 20-40
Birth cohort of women			
	1981-1985	2617	24.2
	1976-1980	2557	23.6
	1971-1975	1754	16.2
	1961-1970	2810	26.0
	1956-1960	1080	10.0
Education			
	No education	7281	67.3
	Primary	2171	20.1
	Secondary +	1366	12.6
Exposure to media			
	Not at all	5566	51.6
	Infrequent	2544	23.6
	Frequent	2682	24.9
Religion			
	Orthodox	5149	47.6
	Protestant	1793	16.6
	Moslem	3529	32.6
	Others	343	3.2
Occupation			
	Not working	6744	62.5
	Agricultural worker	1487	13.8
	Non-agricultural worker	2566	23.8
Place of residence			
	Urban	3271	30.2
	Rural	7547	69.8
Region			
	Tigray	947	8.8
	Afar	629	5.8
	Amhara	1486	13.7

(Table 1, continued)

Oromia	1696	15.7
Somali	564	5.2
Benishangul Gumuz	660	6.1
SNNPs	1628	15.0
Gambela	594	5.5
Harari	618	5.7
Addis Ababa	1372	12.7
Dire Dawa	624	5.8
Marital Status		
Married before age 15	3087	28.5
Married between age 15-17	3160	29.2
Not married before 18	4571	42.3
Sexual experience		
Active before age 15	2878	26.6
Active between age 15-17	3632	33.6
Not active before 18	4297	39.8
Total[†]	10818	100.0

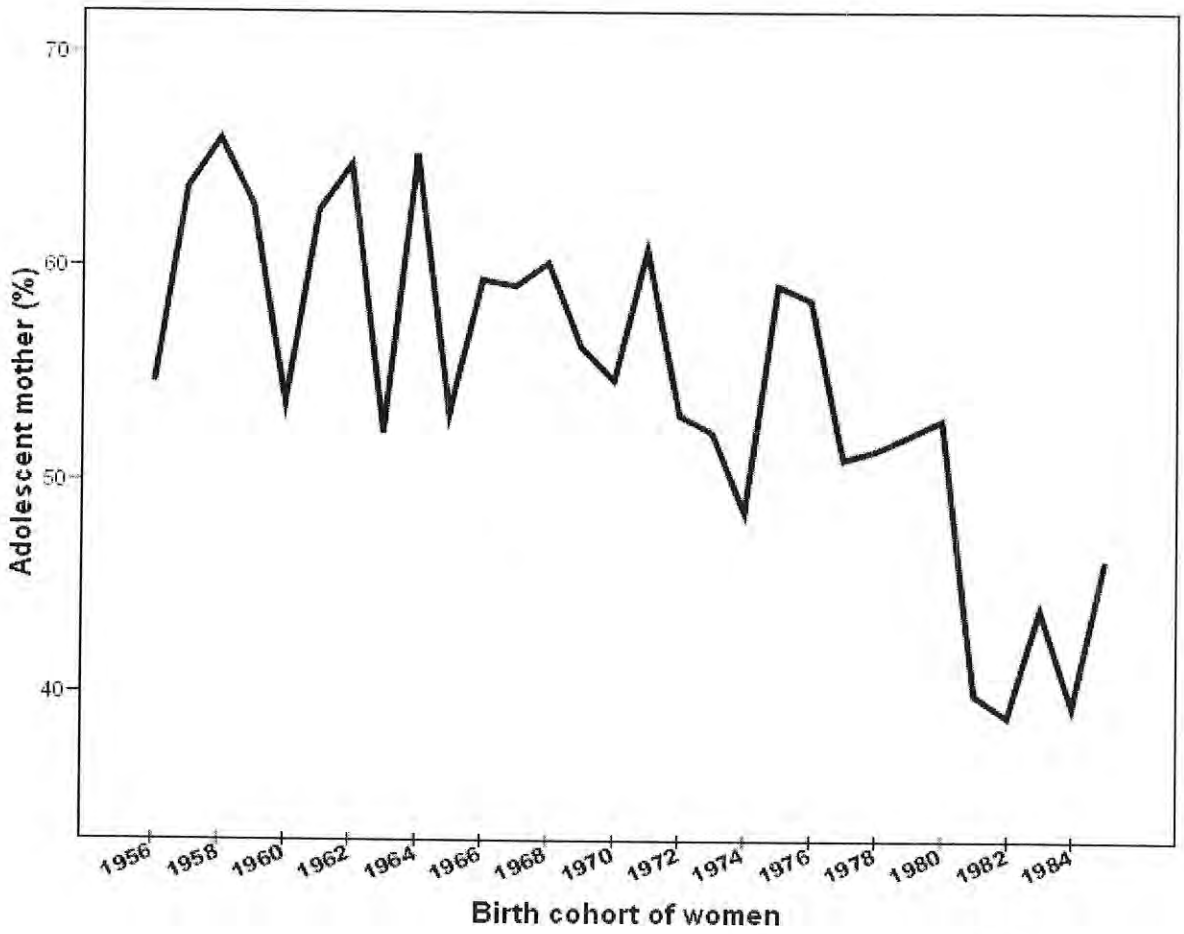
[†]*Exposure to media, religion, occupation, and sexual experience do not sum up to the total as there are missing observations for these characteristics.*

Source: Computed by the author using the 2005 EDHS.

3.2 LEVELS AND TRENDS IN ADOLESCENT MOTHERHOOD

Figure 3 presents the trend in the proportion of adolescent mothers according to birth cohorts of women. The level of teenage motherhood has shown a declining trend over the 30 years period preceding the survey time (2005). This decline could be attributed to the decline in the level of early marriage and early sexuality among these women (See Table 2, Panel IV & VI). As shown in figure 3, it can be seen that for cohorts between 1958 and 1975 there was a slight decline in the level of teenage motherhood where as the decline in the level of teenage motherhood was nearly continuous and sharp in the cohorts between 1975 and 1982. In the final segment of the graph, the level shows a steady trend and it is at a relatively lower level compared to the preceding cohorts.

Figure 3: Line graph showing percentage of adolescent mothers across different birth cohort of women, EDHS 2005.

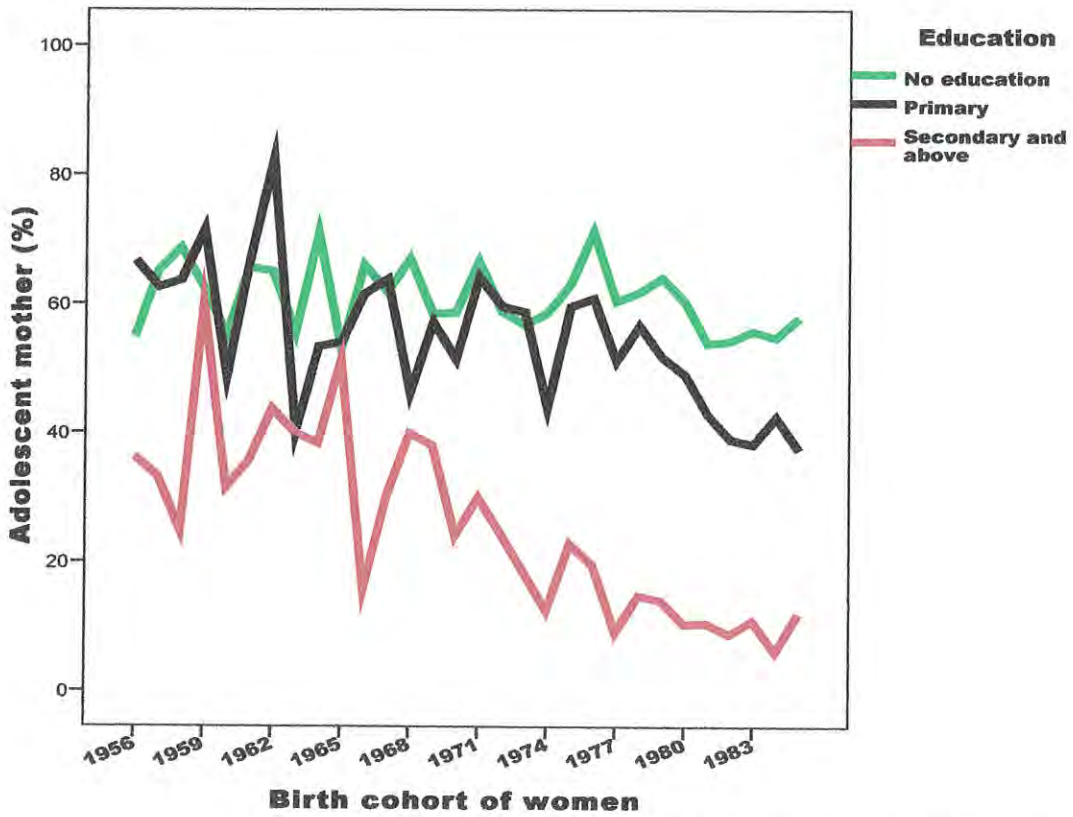


Source: Computed by the author using the 2005 EDHS.

3.2.1 TRENDS IN ADOLESCENT MOTHERHOOD BY EDUCATIONAL LEVEL OF WOMEN

Figure 4 presents the trend in the proportion of adolescent mothers according to birth cohorts of women by educational level of women. For older cohorts, the difference in the level of adolescent motherhood among women of different educational level was smaller. However, a declining trend in adolescent motherhood was observed for cohorts beyond 1976 having a primary education. Moreover, the trend in adolescent motherhood has shown a declining trend among women with a secondary and above education. The level of teenage motherhood is stable at about 60% for women with no education.

Figure 4: Line graph showing percentage of adolescent mothers for different birth cohort of women by educational level, EDHS 2005.

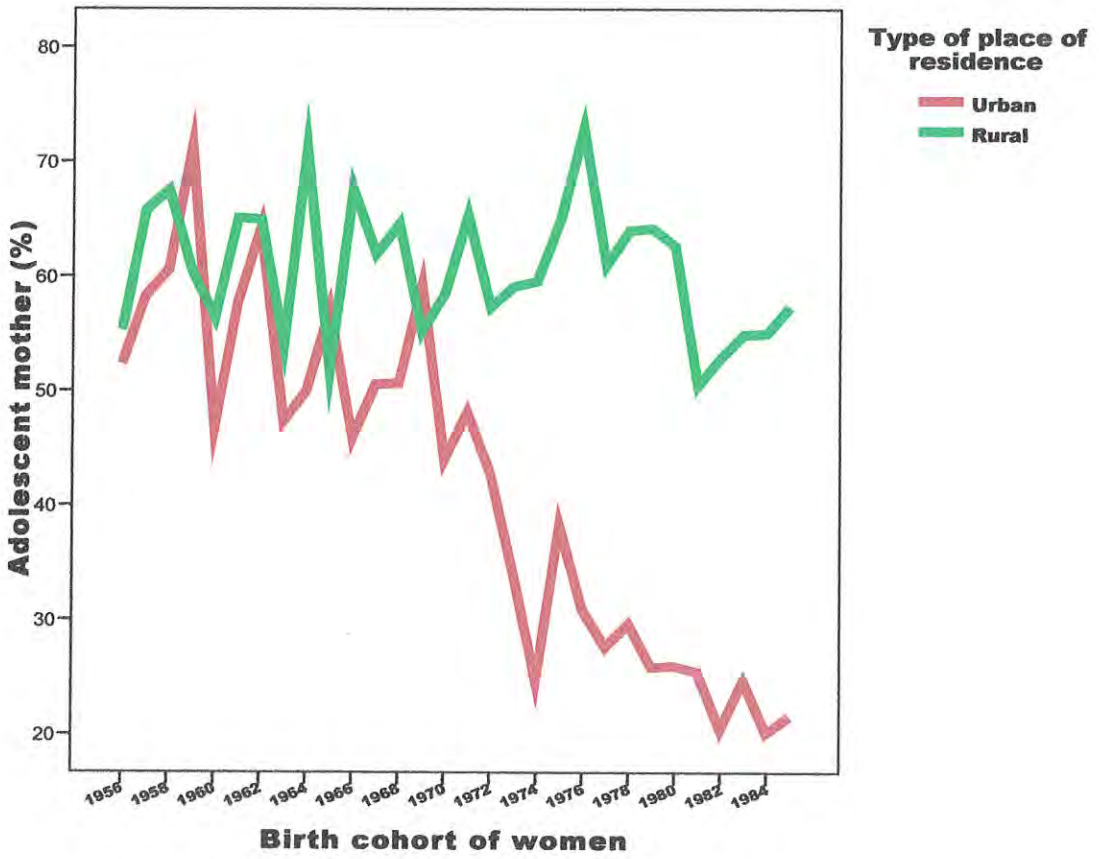


Source: Computed by the author using the 2005 EDHS.

3.2.2 TRENDS IN ADOLESCENT MOTHERHOOD BY PLACE OF RESIDENCE OF WOMEN

Figure 5 presents the proportion of adolescent mothers for different birth cohorts of women by type of place of residence of women. The graph shows a declining trend in adolescent motherhood for cohorts of women between 1958 and 1985 residing in urban areas. But the level was stable at about 60% for cohorts between 1956 and 1975. However, the final segment of the graph signals that the level of teenage motherhood is showing a declining trend though it is at higher level. Furthermore, the gap in the percentage difference of teenage motherhood between urban and rural place of residence was smaller for older cohorts. As clearly seen in the graph (Figure 5) it has got wider for cohorts after 1968.

Figure 5: Line graph showing percentage of adolescent mothers for different birth cohort of women by type of place of residence, EDHS 2005.



Source: Computed by the author using the 2005 EDHS.

3.3 REPRODUCTIVE BEHAVIOR OF WOMEN

The proportion of women in the 20 to 49 age group who have given birth before age 20 varies across different variables. In addition, the proportion of women in these ages who were married before age 18 and who had an experience of early sex also varies by different background variables (Table 2, Panels II through VI). These results indicate that apart from the direct influence background variables have on adolescent motherhood, they also operate through the proximate variables, marital status and sexuality of women, to influence adolescent motherhood.

3.3.1 EDUCATION

The percentage of teenage motherhood showed a variation across women with different educational level. The percentage of teenage mother women with secondary and above education was 18%. Nonetheless, the proportion was 60% among women with no education at all. The percentage of women with an experience of early marriage and early sex was higher among women with no education than women with a secondary and above education. The results, therefore, indicate that early marriage, early sexual experience and teenage motherhood are more common among women with no education than are among women with secondary and above education (Table 2).

3.3.2 EXPOSURE TO MEDIA

The percentage of adolescent mothers among women with no exposure to media was about 60%. And 52% of women with infrequent exposure to media were teenage mothers. Nearly 38% of women who had a frequent exposure to media were teenage mothers. On the other hand, the percentage of early marriage and experience of early sex were common among women with no exposure to media, 67% and 69%, respectively, than women with frequent exposure to media, 39% and 44%, respectively, among women with frequent exposure to media (Table 2). The result, thus, suggests that there is a variation in reproductive behavior of women, that is, early marriage, early sexual experience and teenage motherhood by their exposure to media.

3.3.3 PLACE OF RESIDENCE

The percentage of adolescent mothers residing in urban areas during the time of the survey was less than their rural counterpart. The level of teenage motherhood was about 35% in urban areas while it was 60% among women residing in rural areas during the time of the survey. Moreover, the proportion of early marriage and sexual experience before age 18 was lower among women residing in urban areas than rural women. More than two-third of rural women had an experience of early marriage and sex before age 18 (Table 2). Consequently, the result portrays that there is a differential in reproductive behavior of women by place of residence.

3.3.4 OCCUPATION

The percentage of teenage mothers was 62% among women employed in agricultural sector and 55.3% among women who were not working at the time of the survey. On the contrary, the percentage was smaller among women employed in non-agricultural sectors (40%). Similarly, the percentage of early married women and women with an early sexual experience was higher among women working in agricultural sector, over 70% in both cases. The percentage of early marriage and early sexual experience among women working in non-agricultural sectors were 43% and 47%, respectively (Table 2). As a whole, women working in non-agricultural sectors have exhibited a smaller rate of adolescent birth, early marriage and early sexual experience.

3.3.5 RELIGION

The proportion of adolescent mothers among women of Orthodox and Protestant religions was about 52% while it was nearly 54 % among Moslem women. The prevalence of early marriage and early sexual experience among women of Protestant religion were a little smaller than women of any other religion. But these percentages were nearly same for women of Orthodox and Moslem religions. Therefore, the percentage distribution of adolescent motherhood, early marriage and early sexual experience does not show a noteworthy variation across religions.

3.3.6 REGION OF RESIDENCE

Adolescent birth was less common in regions that are mainly urban and more common in regions that are predominantly rural (Figure A-1, Appendix). The figure displays the percentage of adolescent mother, early married women and women with an experience of early sex. For instance, the proportion of adolescent mothers was smaller among women residing in Addis Ababa and Dire Dawa, the two City Administrations. On the other hand, it is relatively bigger among women residing in Tigray, Amhara Gambela and Benishangul Gumuz. Similarly, the proportion of women married at early age and exposed to sexual activity before age 18 were smaller in regions that are urban domain but higher in regions that are predominantly rural.

Table 2: Number of women aged 20-49, percentage of adolescent mothers, percentage who had had sexual experience before age 18 and percentage who got married before age 18, EDHS 2005.

Variable	I	II	III	IV	V	VI
	Number of women aged 20-49	Percentage of women having birth before age 20	Percentage of women married before age 15	Percentage of women married before age 18	Percentage of women who started sex before age 15	Percentage of women who started sex before age 18
Birth cohort of women						
1981-1985	2617	42.9	21.1	45.1	19.4	47.2
1976-1980	2557	52.6	27.6	55.8	25.4	58.0
1971-1975	1754	56.2	31.3	61.5	28.6	63.7
1961-1970	2810	56.9	32.3	64.7	30.8	67.8
1956-1960	1080	58.7	34.3	68.6	33.1	71.7
Education						
No education	7281	59.9	34.2	67.5	32.2	69.5
Primary	2171	49.4	23.5	51.0	21.2	54.7
Secondary +	1366	18.2	6.3	16.3	5.6	19.5
Exposure to media						
Not at all	5566	59.9	33.8	67.1	31.8	69.0
Infrequent	2544	52.0	27.9	56.6	25.5	58.6
Frequent	2682	37.7	18.1	39.3	17.1	43.5
Religion						
Orthodox	5149	51.8	33.4	58.9	32.0	62.1
Protestant	1793	51.2	21.4	51.2	18.4	54.0

(Table 2, Continued)

	I	II	III	IV	V	VI
	Number of women aged 20-49	**Percentage of women having birth before age 20**	**Percentage of women married before age 15**	**Percentage of women married before age 18**	**Percentage of women who started sex before age 15**	**Percentage of women who started sex before age 18**
Moslem	3529	54.2	25.1	59.3	22.8	60.4
Others	343	53.6	28.0	58.9	28.3	62.7
Occupation						
Not working	6744	55.3	29.4	60.3	27.6	62.2
Agricultural worker	1487	61.7	39.5	71.9	37.2	73.8
Non-agricultural worker	2566	39.9	20.1	42.9	18.2	47.2
Place of residence						
Urban	3271	35.4	17.0	37.4	15.9	41.8
Rural	7547	60.0	33.5	66.6	31.3	68.2
Region						
Tigray	947	59.9	38.3	70.9	39.4	74.7
Afar	629	49.4	27.2	60.3	26.3	62.9
Amhara	1486	65.6	56.3	82.4	53.0	83.7
Oromia	1696	55.7	23.4	56.6	19.4	58.9
Somali	564	50.5	16.7	51.4	14.0	50.4
Benishangul Gumuz	660	69.4	45.0	78.3	42.4	78.2
SNNPs	1628	52.3	21.1	53.5	19.1	53.6
Gambela	594	63.8	35.5	67.0	30.7	75.5

(Table 2, Continued)

	I	II	III	IV	V	VI
	Number of women aged 20-49	**Percentage of women having birth before age 20**	**Percentage of women married before age 15**	**Percentage of women married before age 18**	**Percentage of women who started sex before age 15**	**Percentage of women who started sex before age 18**
Harari	618	40.5	13.8	42.9	12.5	43.9
Addis Ababa	1372	27.8	12.5	27.6	12.6	33.7
Dire Dawa	624	45.5	18.8	47.0	19.6	50.2
Marital Status						
Married before age 15	3087	85.5	-	-	-	-
Married between age 15-17	3160	77.2	-	-	-	-
Not married before 18	4571	13.3	-	-	-	-
Sexual experience						
Active before age 15	2878	83.9	-	-	-	-
Active between age 15-17	3632	73.4	-	-	-	-
Not active before 18	4297	13.9	-	-	-	-
Total[†]	10818	52.6	28.5	57.7	26.6	60.2

[†]Sexual experience, Occupation, Religion and Exposure to media do not add up to the total as there are missing values for these characteristics.

- not applicable

Source: Computed by the author using the 2005 EDHS.

3.3.7 SEXUAL EXPERIENCE AND ADOLESCENT MOTHERHOOD

Teenage motherhood varies by early sexual experience of women. The proportion of adolescent mothers among women who had their first sexual experience before age 18 was much higher than women who had no sexual experience before age 18. Eighty four percent of women who had sexual experience before age 15 were adolescent mothers while only 14 percent of women who had no sexual experience before age 18 had given birth before age 20.

3.3.8 MARITAL STATUS AND ADOLESCENT MOTHERHOOD

The proportion of adolescent mothers among women married before age 18 was 81.3% and 13.3% among women not married before age 18. This is an indication of the presence of a strong association between early marriage and early birth. Eighty six percent of women who were married before age 15 were adolescent mothers while only 13 percent of women who were not married before age 18 had given birth before age 20.

3.3.9 MARITAL STATUS AND SEXUAL EXPERIENCE BY BIRTH COHORT OF WOMEN

The percentage of early marriage and early sexual experience varies by birth cohort. Among older cohort women early marriage and early sexual experience were more common. The percentage of early married women among the oldest cohorts was about 69% and it was about 45% among the youngest cohort of women. On the other hand, the percentage of older cohort women who started sex before age 18 was nearly 72% and this percentage is about 47% for the youngest cohort. In summary, older cohorts of women are characterized by early married, having an experience of early sex and high proportion of teen mothers. But the levels of these characteristics are smaller for the younger cohorts as compared to the older cohorts.

CHAPTER FOUR

4. DETERMINANTS OF ADOLESCENT MOTHERHOOD

In this study, education, exposure to media, religion, place of residence, region, and occupation of women are considered as background variables which are believed to have both direct and indirect effect on adolescent motherhood and maternal age cohorts of women is considered as a control variable. The proximate variables included in the analysis of this study are: marital status, sexuality, and contraceptive use status during adolescence. Since EDHS data has not complete information on age at first use of contraception, contraceptive use is not considered in the analysis.

Before directly going to the modeling procedure, a check on multicollinearity between the explanatory variables is necessary. When multicollinearity exists, the common interpretation of a regression coefficient as measuring the change in the expected value of the response variable when a given predictor variable is increased by one unit while all other predictor variables are held constant is not fully applicable (Neter *et al.*, 1996). To address the problem of multicollinearity as a rule of thumb one can drop one of the collinear variables (Gujarati, 2004). From among the variables to be included in the analysis of this study, place of residence and region are moderately correlated, significant at 5% level (see Table **A-4**, Appendix), which is an indication of presence of multicollinearity between the two factors. For instance, 97.2% of women in Addis Ababa and about three-quarter of women in Dire Dawa were urban residents. On the other hand, more than 80% of women in Tigray, Afar, Amhara, Oromia, Somali, Benishangul Gumuz, SNNPs and Gambela were rural residents. Thus, the assumption that states each of the explanatory variables should be independent of each other is violated and creates a problem when the parameter estimates of regions are interpreted. According to the data from the EDHS, age at first marriage and age at first intercourse are also highly correlated and the correlation is noteworthy at 5% level of significance (see Table **A-3**, Appendix). Consequently, to avoid the problem collinearity, four different models were fit: region has been dropped in the modeling procedure where place of residence appears; and sexual experience has also been dropped when marital status is considered in the model. Along with this, to display the crude effect of a variable, a gross effect model, and a model that includes the background variables alone (Model V) are also provided.

Table 3: Estimates of unadjusted and adjusted odds ratio and standard errors of parameter estimates from multilevel logistic regression model for teenage motherhood for women age 20-49, EDHS 2005.

Variable	Gross Effect		Model I		Model II		Model III		Model IV		Model V	
	SE(β)	*Odds Ratio*	*SE(β)*	*Odds Ratio*	*SE(β)*	*Odds Ratio*	*SE(β)*	*Odds Ratio*	*SE(β)*	*Odds Ratio*	*SE(β)*	*Odds Ratio*
Sexual experience												
Active before 15	0.06	7.40***	0.06	6. 30***	-	-	0.06	6.23***	-	-	-	-
Not active before 15 **(r)**	-	1.00	-	1.00	-	-	-	1.00	-	-	-	-
Marital status												
Married before 15	0.06	9.21***	-	-	0.06	7.84***	-	-	0.06	7.77***	-	-
Not married before 15 **(r)**	-	1.00	-	-	-	1.00	-	-	-	1.00	-	-
Birth cohort of women												
1981-1985 **(r)**	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00
1976-1980	0.06	1.46***	0.06	1.36***	0.06	1.35***	0.06	1.38***	0.06	1.36***	0.06	1.45***
1971-1975	0.07	1.68***	0.07	1.46***	0.07	1.43***	0.07	1.48***	0.07	1.43***	0.07	1.62***
1961-1970	0.06	1.72***	0.06	1.42***	0.06	1.42***	0.06	1.42***	0.06	1.42***	0.06	1.58***
1956-1960	0.08	1.86***	0.08	1.39***	0.09	1.39***	0.08	1.39***	0.09	1.39***	0.08	1.55***
Education												
No education **(r)**	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00
Primary	0.05	0.69***	0.06	0.92	0.07	0.92	0.06	0.87*	0.06	0.87*	0.06	0.84**
Secondary+	0.08	0.17***	0.10	0.31***	0.10	0.32***	0.10	0.30***	0.10	0.30***	0.10	0.23***
Exposure to media												
Not at all **(r)**	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00
Infrequent	0.05	0.81***	0.06	1.02	0.06	1.01	0.06	1.00	0.06	0.98	0.06	1.01
Frequent	0.06	0.51***	0.07	1.02	0.08	1.03	0.07	0.99	0.07	0.99	0.01	0.98

(Table 3, continued)

Variable	Gross Effect		Model I		Model II		Model III		Model IV		Model V	
	SE(β)	*Odds Ratio*	*SE(β)*	*Odds Ratio*	*SE(β)*	*Odds Ratio*		*SE(β)*	*Odds Ratio*	*SE(β)*	*Odds Ratio*	*SE(β)*
Religion												
Orthodox **(r)**	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00
Protestant	0.07	0.90	0.07	1.00	0.07	1.01	0.08	0.94	0.08	0.95	0.12	0.79
Moslem	0.06	1.08	0.06	0.98	0.06	0.99	0.07	1.03	0.07	1.04	0.13	0.79
Others	0.13	0.90	0.13	0.82	0.13	0.88	0.14	0.76	0.14	0.81	0.14	0.72
Type of Occupation												
Not working **(r)**	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00
Agricultural worker	0.07	1.14	0.07	0.93	0.07	0.91	0.07	0.88	0.07	0.87*	0.07	0.98
Non-agricultural worker	0.05	0.64***	0.06	0.85**	0.06	0.84**	0.06	0.82***	0.06	0.80***	0.06	0.80**
Place of residence												
Rural **(r)**	-	1.00	-	1.00	-	1.00	-	-	-		-	1.00
Urban	0.06	0.36***	0.08	0.67***	0.08	0.69***	-	-	-		0.08	0.63***
Region												
Tigray	0.11	1.19	-	-	-	-	0.11	0.87	0.11	0.93	-	-
Afar	0.13	0.76*	-	-	-	-	0.12	0.57***	0.13	0.59***	-	-
Amhara	0.10	1.54***	-	-	-	-	0.10	0.85	0.10	0.80*	-	-
Oromia **(r)**	-	1.00	-	-	-	-	-	1.00	-	1.00	-	-
Somali	0.13	0.81	-	-	-	-	0.12	0.74*	0.13	0.76*	-	-
Benishangul-Gumuz	0.14	1.82***	-	-	-	-	0.12	1.35*	0.13	1.35*	-	-
SNNPs	0.10	0.86	-	-	-	-	0.09	0.88	0.10	0.90	-	-
Gambela	0.14	1.42*	-	-	-	-	0.13	1.30*	0.13	1.25	-	-

(Table 3, continued)

Variable	Gross Effect		Model I		Model II		Model III		Model IV		Model V	
	SE(β)	*Odds Ratio*	*SE(β)*	*Odds Ratio*	*SE(β)*	*Odds Ratio*		*SE(β)*	*Odds Ratio*	*SE(β)*	*Odds Ratio*	*SE(β)*
Harari	0.13	0.53***	-	-	-	-	0.12	0.76*	0.13	0.79	-	-
Addis Ababa	0.11	0.30***	-	-	-	-	0.11	0.52***	0.11	0.55***	-	-
Dire Dawa	0.13	0.66**	-	-	-	-	0.12	0.77*	0.13	0.84	-	-
Random Parameter	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate
Constant	-	-	0.07	-0.26***	0.07	-0.34***	0.09	-0.15	0.09	-0.24**	0.07	0.30***
Intra-cluster variance	-	-	0.02	0.11**	0.02	0. 12***	0.02	0.07***	0.02	0.09***	0.03	0.19***
Intra-cluster correlation	-	-	-	0.03	-	0.04	-	0.02	-	0.03	-	0.06
Number of cases	10818‡		10757		10768		10757		10768		10768	
Joint Chi-square	-		1509.09***		1690.20***		1581.43***		1741.55***		653.95***	
df	-		16		16		25		25		15	

- not applicable **(r)** reference category *** P<0.1% ** P<1% *P<5% † P<10%

‡ Sexual experience, Occupation, Religion and Exposure to media do not add up to the total as there are missing values.

Source: Computed by the author using the 2005 EDHS.

A model fit that incorporated the two categories of age at first marriage (married before age 18 or not) and age at first intercourse (started sex before age 18 or not) reveals that the estimated odds ratios for these categories were extremely larger (see Table **A-8**, Appendix). This casts doubt on the soundness of the estimated odds ratios. These extreme odds ratios had occurred due to the uneven distribution of adolescent motherhood over the values of these predictor variables, i.e., the percentage of teenage motherhood is very much smaller among women not married before age 18 (see Table 2). To avoid this problem two categories of these variables were considered in the analysis: whether a woman is married before age 15 or not for marital status and whether a woman had started sexual intercourse before age 15 or not for sexual experience.

Table 3 presents unadjusted and adjusted odds ratios and standard errors of the parameter estimates for teenage motherhood from multilevel logistic regression model for women age 20-49. The number of cases included in the analysis for Model I & III are 10, 757. And for Model II, IV & V, there were 10768 cases included in the analysis. The intra-cluster variance, which represents the variance due to unobserved factors operating at cluster level, is significant in all the models. The intra-cluster correlation is 0.02 for Model III & 0.03 for Models I & IV and 0.04 for model II. These indicate that 2%, 3% and 4% of the variation in adolescent motherhood is the result of unobserved cluster level factors for Model III, Model I & IV and Model II, respectively. The individual test of parameters is useful to determine if an individual variable provides additional information in the presence of all other variables. Nonetheless, a simultaneous test is helpful to ascertain if there is a regression relation between the dependent and all independent variables (Neter *et al.*, 1996). The joint chi-square statistic displayed at the bottom of Table 3 can be used to evaluate the relationship between teenage motherhood and all the independent variables included in the model. As can be seen from the model, the significant joint chi-square statistic suggests that there is a significant regression relation between the independent variables included in the model and the dependent variable.

SEXUAL EXPERIENCE

The result in Table 3 shows that sexual experience of women is strongly associated with the risk of early birth. The odds of teenage motherhood among women who initiated sexual

intercourse before age 15 is at least 6 times the odd of teenage motherhood among women who delayed sexual debut to latter ages. Thus, the risk of teenage motherhood among women who started sexual practice before age 15 is much higher than those women who delayed sexual practice to latter ages (Model I & III).

MARITAL STATUS

Regarding marital status, the results support the claim that marriage of women before age 15 is firmly & directly associated with the risk of teenage motherhood. The risk of teenage motherhood among early married women is more than seven fold times the risk among women who did not marry before age 15 (Model II & IV). The adjusted odds ratios, estimated odds ratio obtained from the logistic regression model, for sexual experience and marital status have shown a slight decline from the unadjusted one.

BIRTH COHORTS OF WOMEN

As shown in Table 3 of the gross effect model, the odds ratio estimates for birth cohorts of women indicate that the risk of teenage motherhood progressively declined among younger cohorts and the results are statistically significant for all categories of the variable indicating that teenage motherhood has been consistently declining. Similarly, when other variables are controlled, the contribution of maternal age cohort in explaining the variation in teenage motherhood was noteworthy and the estimates of odds ratios are stable (Table 3, Model I through V).

EDUCATION

As shown in Table 3, the educational level of women is inversely related to the risk of teenage motherhood. But in the presence of all other factors, it is only secondary and above education that has an inverse relationship with the chance of teenage motherhood. The odds of having first birth before age 20 among women with secondary and above education is at least 68% lower than women who have no education, if all else is same. The inverse relationship between primary education and the risk of teenage motherhood has become insignificant when all other factors are controlled (Table 3, Model I & II). But the effect of primary education was significant in Models II and IV.

EXPOSURE TO MEDIA

In the gross effect model showed in Table 3, exposure to media has a significant association with the risk of adolescent motherhood. But this association vanished when the proximate and socioeconomic factors are controlled.

RELIGION

Religion is another predictor variable introduced into the model. In the gross effect model, religion had no association with the risk of teenage motherhood. The risk of teenage pregnancy was almost similar across different religions. In addition, the result obtained for religion of women after controlling the proximate and background variables was similar to the gross effect model.

PLACE OF RESIDENCE

Place of residence was considered to have a sizeable effect on the likelihood of teenage motherhood and it was introduced to the model to explain the variation in adolescent motherhood. Urban place of residence was negatively and significantly associated with the risk of teenage motherhood. The odds of having an adolescent birth among women residing in urban areas at the time of the survey is at least 30% smaller than women residing in rural place of residence, if all other factors are kept constant (Table 3, Model I, II & V).

OCCUPATION

Employment condition/type of occupation of women was another factor associated with adolescent motherhood. In the gross effect model, it is seen that adolescent motherhood was less likely among women working in non-agricultural sectors. Nevertheless, the likelihood of teenage motherhood was same for agriculture worker women as women not working at the time of the survey. The odds of adolescent motherhood among women working in non-agricultural sectors was smaller by about 15% than were among women not working at the time of the survey, if all else is same (Table 3, Model I through V).

REGION

Region, like place of residence, is a cluster level predictor variable. It, therefore, is a variable that operates at cluster level to influence the likelihood of teenage motherhood. The results displayed in Table 3 suggest that there is a variation in the risk of adolescent motherhood by region. The odds of teenage motherhood were lower in Afar, Somali, and Addis Ababa than was in Oromia region both in the gross effect model and a model that controls the proximate and background variables. Nevertheless, the direction of the influence of region for Tigray and Amhara was reversed in the models that controlled the background and proximate variables (Models III & IV).

CHAPTER FIVE

5. DISCUSSION

In this thesis it is found that early marriage and early sexuality of women has a direct and significant association with adolescent motherhood. On the other hand, having a secondary and above education, urban place of residence, type of occupation (women working in non-agricultural sectors) had an inverse but a noteworthy association with early birth. More over, these characteristics have an indirect influence on adolescent motherhood as they had an inverse and noteworthy association with early sexuality and early marriage of women. Studies made in different parts of the world indicate that early childbearing is more likely among socially-disadvantaged adolescents than their better of peers (Buvinic, 1998; Sing *et al.*, 2001). Following are discussions of results outlined in the previous chapters.

EARLY MARRIAGE AND EARLY DEBUT INTO SEXUAL ACTIVITY LEAD TO ADOLESCENT MOTHERHOOD

The results of this study indicate that the level of teenage motherhood, early marriage and early sexual initiation has been declining over time. The decline in the percentage of early marriage and early sexual debut are mainly attributed, among other factors, to the increase in education of women (see Figure **A-2,** Appendix). Moreover, the results from the logistic regression also indicate that education of women reduces the risk of early marriage and early sexual activity (Table A-6 & A-7, Appendix).

The findings of this study show that early married women and women with an early sexual experience are more likely to have had an early birth than women in their counterpart. This is so because early marriage may result in increased periods of exposure to the risk of sexual intercourse during adolescence. In the absence of contraceptive use this could cause a teenage pregnancy/motherhood. The discussants of the FGD reached at consensus that they were married earlier to conform to the tradition and started childbearing at their early age. One of the discussants who started childbearing in her teenage said '***I was married earlier to conform to the tradition and had my first birth during my teenage. However, after having three births I planned to use contraceptive...***' This clearly shows the direct impact of early marriage on teenage motherhood. The response of a key informant from Addis Ababa who was born in

rural Amhara region also strengthens the argument ***"My mother was married at the age of 6 and she was 14 when she gave her first birth, that is I, ..."***

Results of the current study agree with findings reported in studies done on adolescent childbearing. Singh (1998), for instance, reported that much of the early childbearing that occurs in developing countries involves women who are in a union or marriage. A study done in Brazil and Colombia (Cesare and Rodriguez, 2006) also indicated that women who had had their first union before age 18 are at higher risk of adolescent childbearing than their counterpart.

EDUCATION DELAYS THE TIMING OF FIRST BIRTH

The main purpose of education is to produce a literate and numerate population that can deal with problems encountered at home and at places of work. The influence of schools on adoption of modern attitudes and practices is greater than that of other factors such as home environment and factory experience. A social consequence of education is, therefore, the adoption of more modern attitudes (Lockheed & Verspoor, 1991). Research and experience demonstrate that fertility levels are determined most immediately by age at marriage, contraceptive use, and other proximate variables, which are influenced in turn by the socioeconomic circumstance of the individual (Bongaarts, 1978). One of these circumstances is the education of women and educating women ultimately reduces fertility, that is, education of a woman is inversely related to her fertility (Akmam, 2002; Lindstrom *et al.*, 2007).

The level of teenage motherhood among women with some education has been declining for over 15 year period preceding the 2005 EDHS survey. It is no surprise that the likelihood of adolescent birth is lower among women with a secondary and above education. Education may influence fertility and the mores about acceptable styles of childbearing directly. At the same time, education may affect fertility by delaying entry into marriage (Ainsworth *et al.*, 1996; McDevitt *et al.*, 1996). One of a striking response obtained from a woman in an FGD in Amhara region, ***"I was married and started childbearing in my early age and I am now a widow. I have two daughters... I do not want my daughters pass through the hardship of life I underwent and I want to send them to school"*** indicates that education is playing a role for the decline in the level of early marriage, and hence early pregnancy and motherhood.

The result of this study agrees with the findings of studies done in Brazil (Gupta & Leite, 1999) and in other eight sub-Saharan African countries (Gupta & Mahy, 2003). These studies reported that education has been strongly associated with delayed childbearing among adolescents. But the result is at variance with the finding reported by Zemed (2002).After making the analysis using the EDHS 2000 data, he concluded that education had no influence on adolescent pregnancy or motherhood. The difference observed between this study and Zemed's work could be due to methodological differences applied in data analysis. Zemed did the analysis using the sampled women in EDHS 2000 of age group 15 to 19 classified as currently pregnant/ mother or not. This study, however, used women aged 20 and above from EDHS 2005 classified as teenage mother or not and focused on their experiences.

THE EFFECT OF MEDIA IS SUBSUMED BY OTHER FACTORS

Lazes (1979) after reviewing a literature on using the relationship between media and health education concluded that successful programs are the ones that consistently use media in a philosophical and programmatic context. Media in the context of Ethiopia are concentrated in urban areas where as they are scarce in rural areas where the majority of whom is illiterate. Exposure to media had a significant effect on the likelihood of early birth but its effect is not visible when other socioeconomic variables are controlled. Therefore, exposure to media operates through other variables (education, occupation and place of residence) to influence teenage motherhood. To put it in another term, this could be interpreted as: by virtue of her literacy a woman is highly likely to be exposed to media and as a result she will have lower chance of being a teenage mother. Consequently, the problem of teenage motherhood could be addressed through the other socioeconomic characteristics.

WORKING WOMEN HAVE A TENDENCY TO DELAY FIRST BIRTH

Type of occupation of women was also seen as a significant predictor variable associated with early birth. The difference in the likelihood of early birth between women not working and women employed in agricultural sector was statistically insignificant. However, women employed in agricultural sectors had lower likelihood of having adolescent motherhood experience. Thus, adolescent motherhood is common among women not working and agriculture worker women nonetheless women employed in non-agricultural sectors have

lower likelihood of teenage motherhood. This could be attributed to the fact that women working in non-agricultural sectors were more likely to adopt modern attitudes and practices from their working environment than not-working women and women working in agricultural sector.

URBAN RESIDENT WOMEN HAVE LOWER LIKELIHOOD OF TEENAGE BIRTH

Place of residence is another socio-economic characteristic found being associated with adolescent motherhood. Result of this study shows that urban place of residence, as expected (Singh, 1998), was inversely associated with adolescent motherhood. This can be for the reason that urban places are characterized by better access to health services than rural places (World Bank, 2004). As a result urban residents could have better access to information about contraceptive methods which is one of the causes for contraceptive use. This in turn could operate to reduce the likelihood of adolescent motherhood in urban places.

BIRTH COHORT OF WOMEN AND ADOLESCENT MOTHERHOOD

The different cohorts of women included in this study lived their adolescence in different time periods. Girls who entered adolescence at some time face different environment than those who did at some other time (Manlove *et al.*, 2000). For instance, cohorts of women preceding the 1974 cohorts lived their adolescence before the adoption of the population policy of Ethiopia, while the rest of them lived their adolescence in after the policy period. Consequently, these two cohorts will have different experiences as they lived their adolescence in different time periods.

Results of this study have shown that adolescent motherhood had declined over time. The decline in teenage motherhood for cohorts between 1958 and 1975 was slight while in the cohorts between 1975 and 1982 a sharp and continuous decline in the level of teenage motherhood is observed. The decline observed in the level of adolescent motherhood has started in the periods prior to the adoption of the population policy. However, the sharp and continuous decline observed in the period following the adoption of the population policy could be due to the strong efforts made by the Ethiopian government and the international community to improve the situation since then (FHI, 2004). The decline is more common

among the better educated (Grade 9 and above) and those who live in urban areas. The results from the logistic regression show that the risk of teenage motherhood was higher among older cohorts of women than was in the recent cohorts.

REGION

The level of teenage motherhood was higher in Tigray, Amhara, Benishangul-Gumuz, and Gambela regions than was in Oromia region. This could be due to the higher prevalence of early marriage in these regions than Oromia region. However, the results from the logistic regression, where socio-economic and proximate variables are controlled, indicate that the risk of teenage motherhood is lower in Tigray and Amhara regions than Oromia region. This could be due to the higher prevalence rate of divorce possibly in the regions shortly after marriage (International Women's Health Coalition, 2004) that the risk of early childbearing is lower in the two regions than Oromia region. However, the results indicate that there is a variation in the level and risk of adolescent childbearing by region of residence of women.

CHAPTER SIX

6. CONCLUSION AND RECOMMENDATION

6.1 COCLUSION

This study investigated the levels, trends, differentials and determinants of adolescent motherhood in Ethiopia drawing on data from the 2005 EDHS. The questions set out to be answered were: what are the levels and trend of adolescent motherhood in Ethiopia and what characteristics are associated with adolescent motherhood.

Youth reproductive health has been historically absent as a policy priority in Ethiopia, developments in the past decade show an increasing commitment to youth reproductive health, starting with the incorporation of youth in the National Population Policy of 1993. Since then, the Ministry of Health and the Ministry of Youth, Sports, and Culture have served as platforms to voice the reproductive health needs of youth and government programs and policies are prioritizing youth reproductive health needs (FHI, 2004). The data presented in chapter 3 suggest that there was a decline in the levels of adolescent motherhood in Ethiopia. The decline, according to the results of this study, was more marked in the period following the adoption of the population policy.

There was a differential declining trend of teenage motherhood by different characteristics. The decline in the level of teenage motherhood was more pronounced among urban resident women and women who have a secondary and above level of education. It was also seen that there were variations in adolescent motherhood by socioeconomic and demographic characteristics of women. There is also a decline in the level of early marriage and early sexual initiation. The decline in the percentage of early marriage and early sexual debut are mainly attributed, among other factors, to the increase in education of women.

Multilevel logistic regression models were used to determine the impact of these variables on adolescent motherhood. Among the characteristics included in the model, marital status and sexual experience had a firm and direct influence on teenage motherhood. However, both marital status and sexual experience vary by background variables. Background variables are associated with the risk of early sex and early marriage. Education and urban place of

residence are inversely associated with both of these proximate variables. This signifies that education and urban place of residence, besides their direct impact on teenage motherhood, also operate through sexual experience & marital status to reduce the risk of teenage motherhood.

From among the socioeconomic and demographic characteristics considered in the model, education of women and place of residence have a stronger and negative influence on adolescent motherhood. Exposure of women to media does not provide additional information that could explain the variation in teenage motherhood in the presence of education of women and other background variables. The results also suggest that the risk of teenage motherhood is lower among women employed in non-agricultural sectors than women who were not working at the time of the survey. However, the risk among agricultural worker women is nearly equal to the risk among women who were not working at the time of the survey. The risk of teenage motherhood is lower among the young adult women than were among older women.

There is a variation in the level of teenage motherhood among different regions. The risk of teenage motherhood is smaller in Addis Ababa, Afar, Amhara, Dire Dawa, Somali regions than Oromia region. And the risk is larger in Benishangul-Gumuz and Gambela regions than Oromia region. The significant intra-cluster variance, though the intra-cluster correlation is smaller, suggests that there are latent cluster level variables that operate at cluster level.

6.2 RECOMMENDATION

- The risk of early birth can be averted if we educate women. Therefore, working in the sphere of female education, particularly secondary and tertiary level of education, is believed to minimize the risk of early birth.

- Adolescent birth was generally higher among women not-working and agricultural worker women and women residing in rural areas are also at higher risk of adolescent birth. As a result, rural women need to be given priority in all actions done to minimize the risk of early birth.

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APPENDIX

Table **A-1**: Mean difference in children ever born among women age 45-49 with adolescent motherhood experience to women without the experience of adolescent motherhood, EDHS2005.

	EDHS 2005		
	Mean	SE	N
Adolescent mother	7.52	0.11	634
Not adolescent mother	5.71	0.14	446
Mean Difference		***1.81***	
Test statistic (t)		***9.96***	
Degrees of freedom		***905.7***	
P-value		***0.000***	

Source: Computed by the author using the 2005 EDHS.

Table **A-2**: Preference indexes for terminal digits by Myers' Blended Method, EDHS 2005.

Terminal digit, a	starting at age 20+a	starting at age 30+a	Weights for-		Blended population		Deviation of percentage from 10[1]
			Column 1	Column 2	Number	Percent	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
0	2415	1424	1	9	15231	18.47	8.47
1	670	327	2	8	3956	4.80	5.20
2	985	494	3	7	6413	7.78	2.22
3	774	355	4	6	5226	6.34	3.66
4	708	335	5	5	5215	6.32	3.68
5	2048	1115	6	4	16748	20.31	10.31
6	722	367	7	3	6155	7.46	2.54
7	802	380	8	2	7176	8.70	1.30
8	1146	542	9	1	10856	13.17	3.17
9	548	305	10	0	5480	6.65	3.35
Total	10818	-	-	-	82456	100	43.90
Summary index of age preference= Total/2	-	-	-	-	-	-	21.95

- Not applicable

Source: Computed by the author using the 2005 EDHS

[1] Signs disregarded

Table **A-3**: Correlation between age at first marriage and age at first intercourse, EDHS 2005.

	Age at first intercourse	**Age at first marriage**
Age at first intercourse	1.00	0.866***
Age at first marriage	0.866***	1.00
Number	10807	

*** P<0.01 Source: Computed by the author using the 2005 EDHS.

Table **A-4**: Correlation between type of place of residence and administrative region by age of women and relative date of the survey, 2005.

		Type of place of residence		**Total**
		Urban	**Rural**	
Region	Tigray	14.0%	86.0%	*100%*
	Afar	15.4%	84.6%	*100%*
	Amhara	10.8%	89.2%	*100%*
	Oromia	12.9%	87.1%	*100%*
	Somali	19.0%	81.0%	*100%*
	Ben-Gumuz	11.7%	88.3%	*100%*
	SNNPs	10.9%	89.1%	*100%*
	Gambela	18.4%	81.6%	*100%*
	Harari	62.5%	37.5%	*100%*
	Addis Ababa	97.2%	2.8%	*100%*
	Dire Dawa	75.5%	24.5%	*100%*
Total		*30.2%*	*69.8%*	*100%*
Coefficient of correlation			0.6***	

*** P<0.0001 Source: Computed by the author using the 2005 EDHS.

Table **A-5**: Percentage distribution of women age 20-49 by access to media and education, EDHS 2005.

		Exposure to media				Coefficient of correlation	Pearson Chi-square (df=4)
		Not at all	Infrequently	Frequently	Total		
Education	Illiterate	69.5%	21.3%	9.2%	100.0%	0.5***	4447.4***
	Primary	30.3%	36.3%	33.4%	100.0%		
	Secondary+	2.4%	21.0%	76.6%	100.0%		
Total		51.6%	23.6%	24.9%	100.0%		

*** P<0.0001 Source: Computed by the author using the 2005 EDHS.

Table **A-6**: Estimates of adjusted odds ratio and standard errors of parameter estimates from multilevel logistic regression model for early marriage, marriage before age 18, for women age 20-49, EDHS 2005.

Variable	Estimate	SE	Odds Ratio
Birth cohort of women			
1981-1985 **(r)**	0.00	-	1.00
1976-1980	0.43	0.06	1.54***
1971-1975	0.65	0.07	1.92***
1961-1970	0.71	0.06	2.04***
1956-1960	0.76	0.09	2.14***
Education			
No education **(r)**	0.00	-	1.00
Primary	-0.34	0.07	0.71**
Secondary+	-1.86	0.10	0.16***
Exposure to media			
Not at all **(r)**	0.00	-	1.00
Infrequent	-0.01	0.06	0.99
Frequent	-0.05	0.08	0.95
Religion			
Orthodox **(r)**	0.00	-	1.00
Protestant	-0.53	0.08	0.59***
Moslem	-0.41	0.07	0.66***
Others	-0.52	0.15	0.59***
Type of Occupation			
Not working **(r)**	0.00	-	1.00
Agricultural worker	0.12	0.08	1.13
Non-agricultural worker	-0.23	0.06	0.79***
Place of residence			
Rural **(r)**	0.00	-	1.00
Urban	-0.57	0.10	0.57***
Constant	0.66***	0.08	-
Random Parameter			
Intra-cluster variance	0.45***	0.04	-
Intra-cluster correlation	0.12	-	-
Number of cases		10768	
Joint Chi-square		980.63***	
Df		15	

- not applicable **(r)** reference category *** P<0.1% ** P<1%

Source: Computed by the author using the 2005 EDHS.

Table A-7: Estimates of adjusted odds ratio and standard errors of parameter estimates from multilevel logistic regression model for early sexual experience of women, sexuality before age 18, age 20-49, EDHS 2005.

Variable	Estimate	SE	Odds Ratio
Birth cohort of women			
1981-1985 **(r)**	0.00	-	1.00
1976-1980	0.44	0.06	1.55***
1971-1975	0.68	0.07	1.97***
1961-1970	0.78	0.06	2.18***
1956-1960	0.82	0.09	2.27***
Education			
No education **(r)**	0.00	-	1.00
Primary	-0.35	0.07	0.70***
Secondary+	-1.92	0.10	0.15***
Exposure to media			
Not at all **(r)**	0.00	-	1.00
Infrequent	-0.04	0.06	0.96
Frequent	-0.01	0.08	0.99
Religion			
Orthodox **(r)**	0.00	-	1.00
Protestant	-0.47	0.08	0.62***
Moslem	-0.46	0.07	0.63***
Others	-0.45	0.15	0.64***
Type of Occupation			
Not working **(r)**	0.00	-	1.00
Agricultural worker	0.11	0.08	1.11
Non-agricultural worker	-0.15	0.06	0.86*
Place of residence			
Rural **(r)**	0.00	-	1.00
Urban	-0.47	0.10	0.62***
Constant	0.74***	0.08	-
Random Parameter			
Intra-cluster variance	0.51***	0.05	-
Intra-cluster correlation	0.13	-	-
Number of cases		10757	
Joint Chi-square		1048.28***	
Df		15	

- not applicable **(r)** reference category *** P<0.1% ** P<1%

Source: Computed by the author using the 2005 EDHS.

Table **A-8**: Estimates of unadjusted and adjusted odds ratio and standard errors of parameter estimates from multilevel logistic regression model for teenage motherhood for women age 20-49, EDHS 2005.

Variable	Gross Effect		Model I		Model II		Model III		Model IV	
	SE(β)	*Odds Ratio*	*SE(β)*	*Odds Ratio*	*SE(β)*	*Odds Ratio*	*SE(β)*	*Odds Ratio*	*SE(β)*	*Odds Ratio*
Sexual experience										
Started before 18	0.06	22.90***	0.06	19.89***	-	-	0.06	20.70***	-	-
Otherwise **(r)**	-	1.00	-	1.00	-	-	-	1.00	-	-
Marital status										
Married before 18	0.06	30.30***	-	-	0.06	26.05***	-	-	0.06	27.11***
Otherwise **(r)**	-	1.00	-	-	-	1.00	-	-	-	1.00
Birth cohort of women										
1981-1985 **(r)**	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00
1976-1980	0.06	1.46***	0.07	1.21**	0.08	1.20*	0.07	1.21**	0.08	1.20*
1971-1975	0.07	1.68***	0.08	1.17*	0.09	1.16	0.08	1.17*	0.09	1.17
1961-1970	0.06	1.72***	0.07	1.06	0.08	1.06	0.07	1.05	0.08	1.06
1956-1960	0.08	1.86***	0.10	1.01	0.10	1.00	0.10	0.99	0.10	0.99
Education										
No education **(r)**	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00
Primary	0.06	0.79**	0.08	1.12	0.08	1.13	0.08	1.05	0.08	1.06
Secondary+	0.07	0.23***	0.10	0.70***	0.11	0.74**	0.10	0.65***	0.10	0.69***
Exposure to media										
Not at all **(r)**	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00
Infrequent	0.05	0.81***	0.07	1.08	0.07	1.05	0.07	1.03	0.07	1.01
Frequent	0.06	0.51***	0.08	1.01	0.09	1.04	0.08	0.95	0.09	0.99

*(Table **A-8** , continued)*

Religion										
Orthodox **(r)**	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00
Protestant	0.07	0.90	0.08	1.14	0.08	1.23**	0.09	0.97	0.10	1.03
Moslem	0.06	1.08	0.06	1.07	0.07	1.04	0.08	1.00	0.08	0.98
Others	0.13	0.90	0.15	0.91	0.16	1.00	0.16	0.76	0.16	0.82
Type of Occupation										
Not working **(r)**	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00
Agricultural worker	0.07	1.14	0.08	0.87	0.08	0.85*	0.08	0.87	0.08	0.85*
Non-agricultural worker	0.05	0.64***	0.07	0.82**	0.07	0.88†	0.07	0.78***	0.07	0.84*
Place of residence										
Rural **(r)**	-	1.00	-	1.00	-	1.00	-	-	-	
Urban	0.06	0.36***	0.08	0.72***	0.09	0.80*	-	-	-	
Region										
Tigray	0.11	1.19	-	-	-	-	0.12	0.69**	0.17	0.69*
Afar	0.13	0.76*	-	-	-	-	0.13	0.53***	0.14	0.51***
Amhara	0.10	1.54***	-	-	-	-	0.10	0.67***	0.11	0.59***
Oromia **(r)**	-	1.00	-	-	-	-	-	1.00	-	1.00
Somali	0.13	0.81	-	-	-	-	0.14	0.92	0.15	0.82
Benishangul-Gumuz	0.14	1.82***	-	-	-	-	0.13	1.12	0.14	0.94
SNNPs	0.10	0.86	-	-	-	-	0.10	1.00	0.11	0.88
Gambela	0.14	1.42*	-	-	-	-	0.14	0.88	0.15	1.07
Harari	0.13	0.53***	-	-	-	-	0.14	0.80	0.15	0.72*
Addis Ababa	0.11	0.30***	-	-	-	-	0.12	0.55***	0.13	0.63***
Dire Dawa	0.13	0.66**	-	-	-	-	0.13	0.84	0.14	0.84

*(Table **A-8** , continued)*

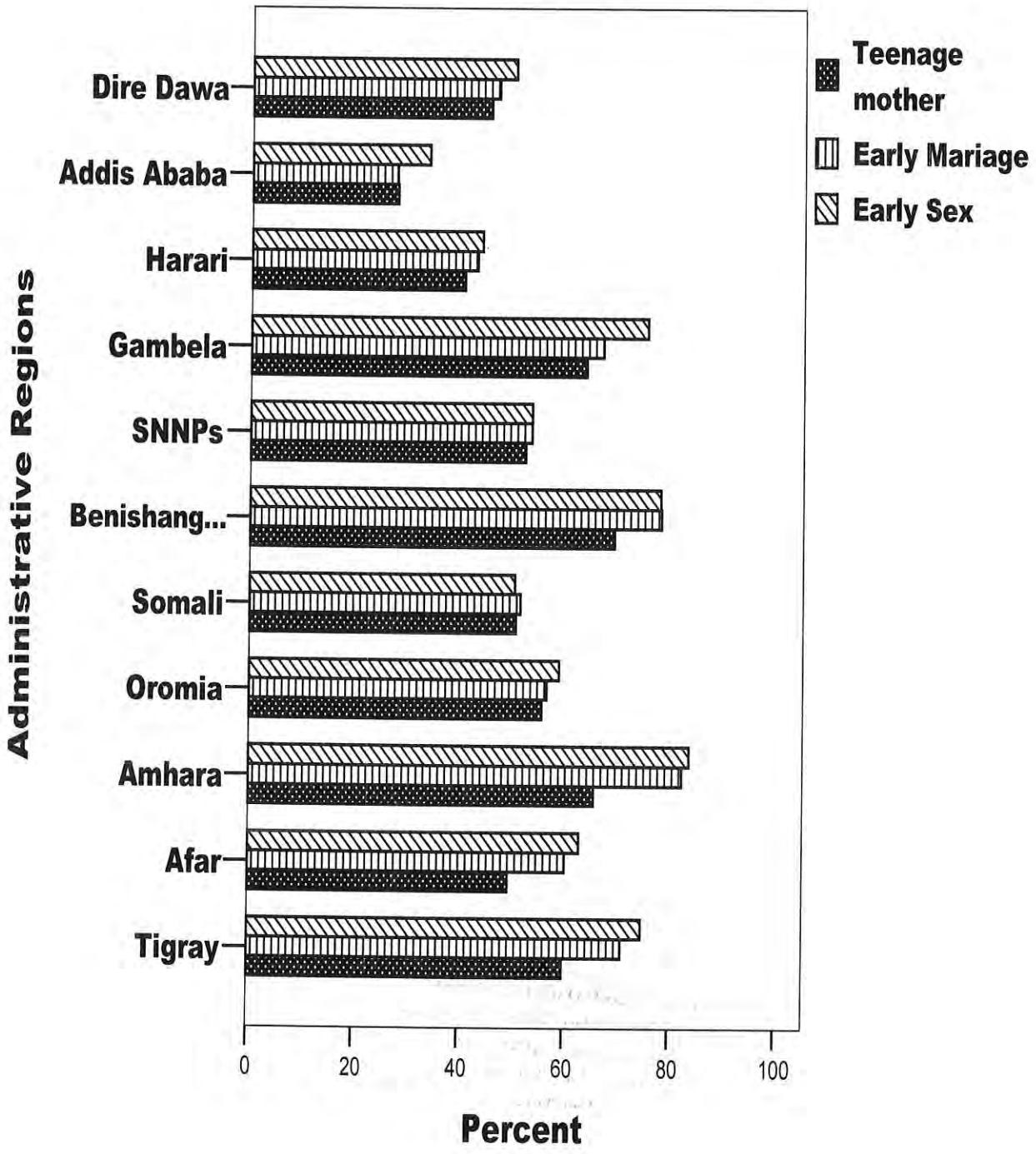
Constant	-	-	0.08	0.18***	0.09	0.16***	0.11	0.23***	0.11	0.21***
Random Parameter	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intra-cluster variance	-	-	0.06**	0.02	0.08**	0.03	0.03	0.02	0.05	0.03
Intra-cluster correlation	-	-	0.02	-	0.02	-	0.01	-	0.02	-
Number of cases	10818‡		10757		10768		10757		10768	
Joint Chi-square	-		3323.12***		3684.20***		3364.85***		3718.87***	
Df	-		16		16		25		25	

- not applicable **(r)** reference category *** P<0.1% ** P<1% *P<5% † P<10%

‡ Sexual experience, Occupation, Religion and Exposure to media do not add up to the total as there are missing values.

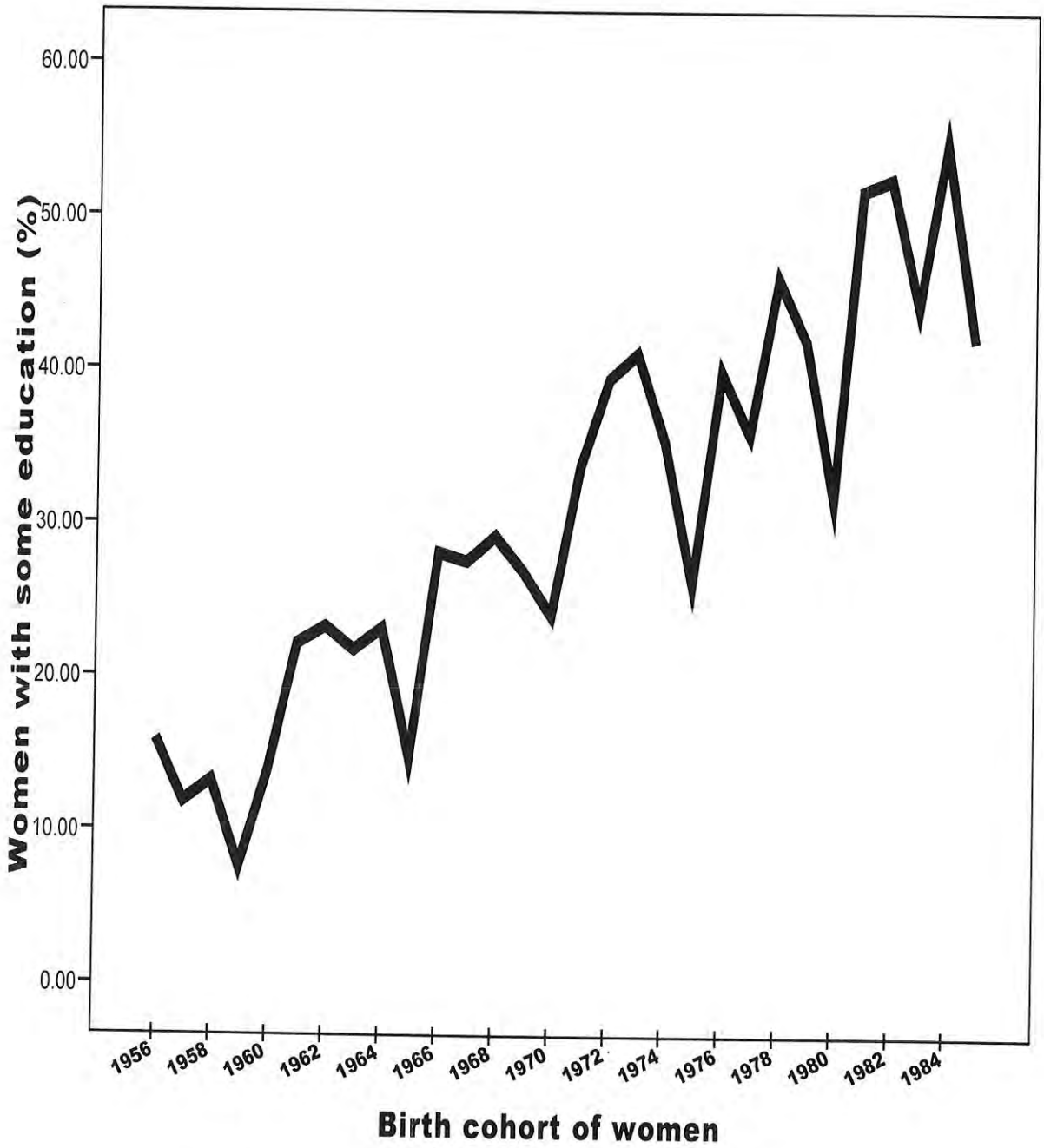
Source: Computed by the author using the 2005 EDHS.

Figure A-1: Percentage of teenage mothers, early married women and women with early sex experience by administrative regions, EDHS 2005.



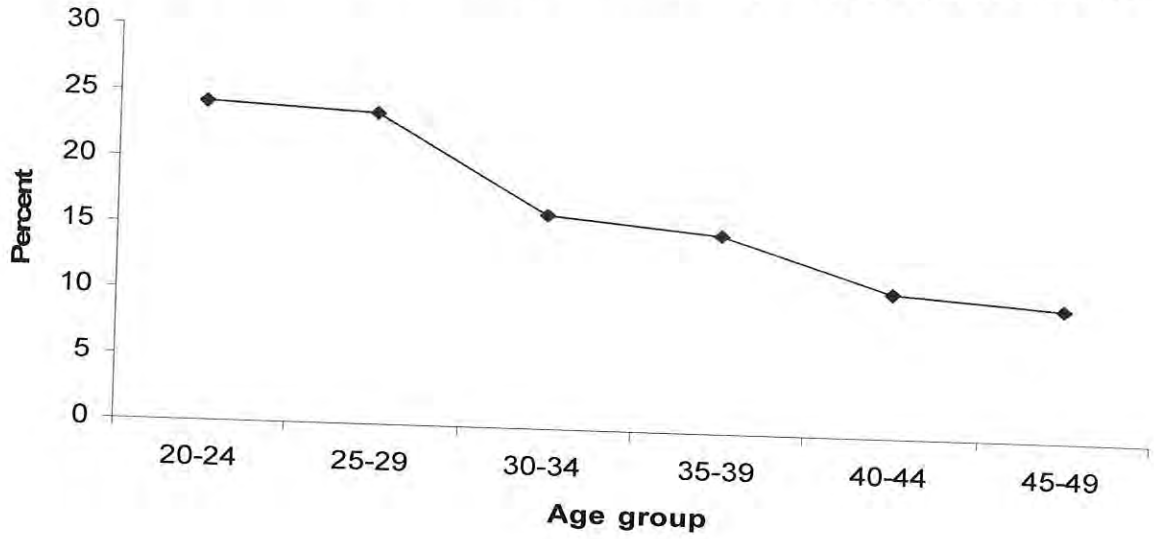
Source: Computed by the author using the 2005 EDHS.

Figure **A-2**: Percentage of women with some education by birth cohort of women, EDHS 2005



Source: Computed by the author using the 2005 EDHS.

Figure **A-3**: Percentage distribution of women by five year age groups, EDHS 2005.



Declaration

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

TARIKU DEJENE
Student

Signature

11-07-2008
Date

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

Dr. Eshetu Gurmu
Advisor

Signature

11/07/08
Date