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ABSTRACT

This study measured the levels and characteristics of early teenage pregnancy (that is, pregnancy before age 17) among women age 17-24 in Ethiopia, based on analysis of the Ethiopia Demographic and Health Surveys (EDHS) conducted in 2000 and 2005. The 2005 EDHS showed that, despite a minimum legal marriage of 18 years in Ethiopia, early marriage remains common, with a median age at first marriage among women age 25-49 of 16.1 years. Almost all pregnancies in Ethiopia occur within marriage, and the median age at first birth is about 17 years. Levels of contraceptive use are low, at 15% among married women of reproductive age.

The study measured the percentage of early teenage pregnancy by background characteristics of women age 17-24 in 2000 and 2005. The association of different background characteristics with early teenage pregnancy in 2000 and 2005 was ascertained using odds ratios with their confidence intervals in logistic regression analysis.

Despite efforts to curb early marriage in Ethiopia and improve adolescent reproductive health services, early teenage pregnancy among young women age 17-24 increased between 2000 and 2005. The analysis found a statistically significant increase in early teenage pregnancy between the two survey years among women who were uneducated, in minority Christianity denominations, belonging to minority ethnic groups, and members of households in the poor and rich wealth terciles. In both surveys, the odds of early teenage pregnancy were significantly lower among women age 17-24 with more education.

To address the problem of early teenage pregnancy, stronger measures should be taken to implement of the official minimum age at first marriage, and more effort should be exerted to change the cultural tradition of early marriage, which is a root cause of the problem. In addition to increasing girls' enrollment in secondary schools, the government of Ethiopia should scale up adult education programs for out-of-school young women, with more emphasis on reproductive health issues in the curriculum.

INTRODUCTION

Statement of the Problem

The unprecedented population growth in Ethiopia, if not checked with appropriate interventions, would result in a huge disharmony between population size and demand for resources (TGE 1993). Women of reproductive age have been the main agents of change in the size and structure of the population in sub-Saharan Africa. In 2007, women in the reproductive age group accounted for 23% of the Ethiopian population and about a quarter of those women were teenagers (CSA 2008). The World Health Organization (WHO) has defined adolescents as the population group age 10-19 (WHO 1999), while teenage fertility refers to women age 15-19. The term "teenage parenthood" is not clear at the outset. Parenthood for a 19-year old is a completely different experience than parenthood for a 14-year old, since the younger women are not yet at a stage of physiological development and maturity to become mothers (Coleman and Dennison 1998).

The fact that the great majority of women of reproductive age in Ethiopia are young suggests the potential of sustained high fertility, as levels of contraceptive use are low, at 15% among married women of reproductive age, according to the 2005 Ethiopian Demographic and Health Survey (EDHS) (CSA and ORC Macro 2006). The survey also showed that early marriage is common in Ethiopia, with a median age at first marriage among women age 25-49 of 16.1 years. Abortion and pregnancy complications are widespread. For instance, in 2008 an estimated 382,000 induced abortions were performed in Ethiopia, and an estimated 52,600 women were treated for complications of such abortions (Singh et al. 2010). Most of these complications occurred among teenage women (Haile 1992).

The two rounds of EDHS (CSA and ORC Macro 2006, CAS ORC Macro 2001) give us an opportunity to study maternal health issues in Ethiopia, including teenage pregnancy. One of the main aims of the Ethiopian Health Extension Programs (HEP), which started in 2003, has been provision of maternal and child health services at the household level to address the problems outlined above (Argaw 2007). Some of the impediments related to early marriage were also addressed by revising the legal age at first marriage to 18 years (FDRE 2000a). The 2005

EDHS, however, reported that most women married earlier than the minimum legal age at first marriage documented in the revised family law (FDRE 2000b).

Rationale of the Study

Even though the family code was revised and a reproductive strategy that gives due emphasis to teenage and adolescent reproductive health has been put in place (MOH 2006), its successful implementation is not yet visible. Early teenage marriage and pregnancy keep girls out of school and thus deny them basic knowledge and skills concerning family planning. Pregnancy before age 20 deters the growth of the mother into full adulthood. Pregnancy among those who themselves are children can also result in pregnancy complications. Early pregnancy before girls' physiological maturity can damage their reproductive and excretal organs and can lead to increased prenatal and maternal mortality in communities where there is low coverage of maternal and child health services (Muleta et al. 2008).

Studies in Ethiopia have indicated that teenagers had lower antenatal care attendance; higher proportions with weight less than 50 kg and height less than 150 cms; and higher rates of cephalo-pelvic-disproportion, prolonged labour, delayed second stage, preterm delivery, assisted delivery, low birth weight, and obstetric fistula (Taffa and Obare 2004, Kumbi and Isehak 1999, Thomson 2007). Early teenage pregnancy may have contributed to the highest maternal and child mortality rates in the country. Girl children who were exposed to early marriage to an older husband may suffer from vesco-vaginal fistula due to prolonged labor and physiological immaturity (Kumbi and Isehak 1999).

Rampant disability due to vesico-vaginal fistula required establishment of a hospital in Addis Ababa solely devoted to its care (Kelly 1995, Browning and Menber 2008). An effort has been made to establish more fistula hospitals in major regions of the country where the problem is more pronounced (Muleta et al. 2007). Also, health sciences colleges revised their curriculum on personnel trainings to incorporate fistula diagnosis and treatment. Training of health personnel on fistula diagnosis and management helps to provide appropriate care once women are suffering from the problem but has little role in the prevention of this health problem because early marriage is virtually universal in Ethiopia (Muleta et al. 2008).

In a country where marriage is universal and occurs at young ages, early teenage pregnancy is of prime public health importance. Accordingly, in Ethiopia it is useful to assess the levels and characteristics of early pregnancy using two nationally representative datasets available in the 2000 and 2005 EDHS. Such a study can inform policy related to maternal health issues, with special emphasis on teenage women.

LITERATURE REVIEW

Early Teenage Pregnancy and Associated Factors

Women becoming mothers before their 20th birthday are usually considered at greater risk of health and social problems by both health practitioners and researchers (Melhuish and Phoenix, 1987). The dominant ideology related to motherhood is that only adults should be parents. Teenagers are neither children nor adults, but are in transition to adulthood. The magnitude of teenage pregnancy differs across countries of the developing world. As mentioned, the majority of Ethiopian girls marry in their teens, and the percentage of teenagers who have begun childbearing has been extremely large. Figure 1 shows that in 2000 and 2005 about 40% of women had begun childbearing by age 19, and many as early as age 15 or 16.

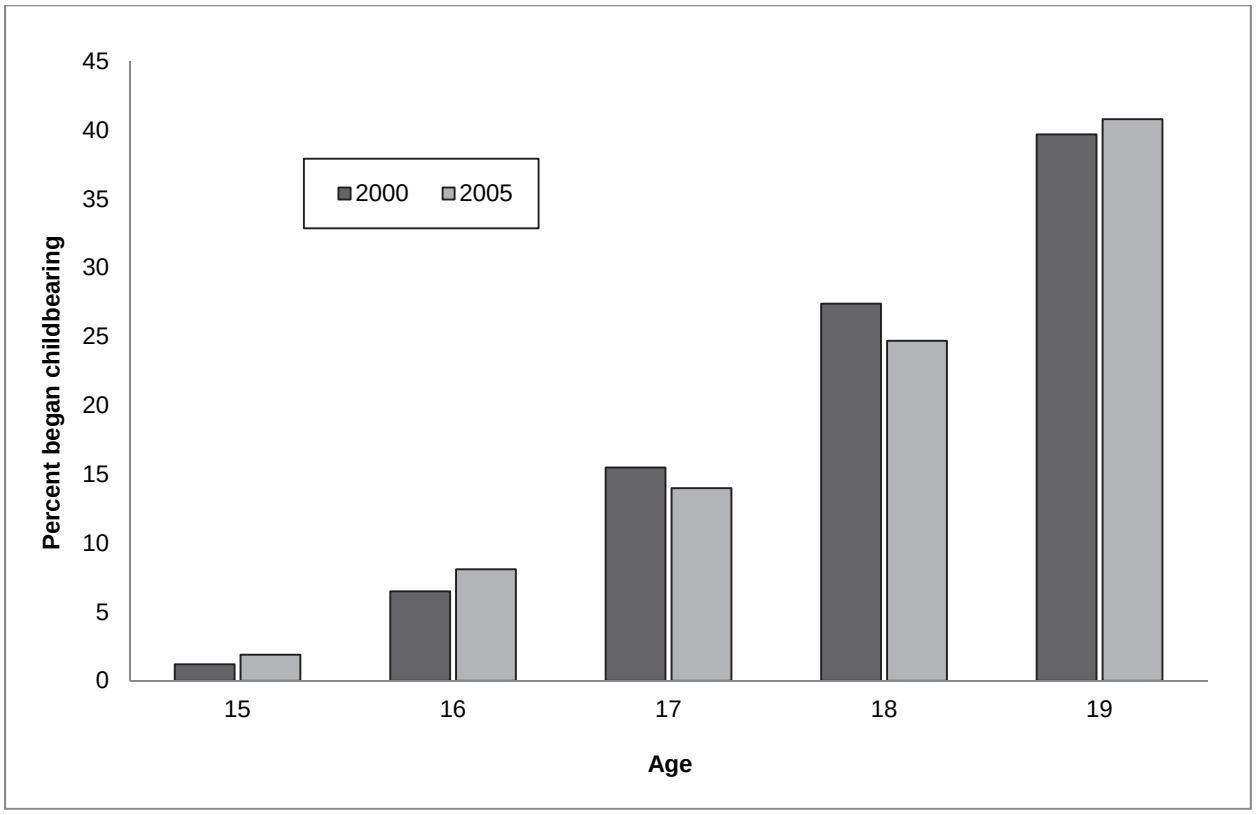
Individual, familial, and social characteristics have influenced levels of teenage sexual health, including reproductive health outcomes (Haldre et al. 2009). Differentials in the levels of teenage pregnancy were observed across residence type and region in Ethiopia, as evidenced in the two rounds of EDHS, in 2000 and 2005. In the most recent survey the highest teenage pregnancy rate of 3.7% was observed in rural areas compared with 0.6% in urban areas. Higher teenage current pregnancy was also observed in Beneshangul Gumz region, with a level of 6.4% compared with 0.9% in Addis Ababa. An earlier study in Ethiopia showed significantly larger proportions of teenage mothers from rural areas and among the poor, less educated, and unmarried (Taffa and Obare 2004). Also, teenagers had lower contraceptive prevalence and used family planning methods sporadically compared with young adults age 20-24 (Glei 1999).

Female teenagers often have sexual affairs with much older men. For instance, the study by Glei (1999) indicated that women under age 18 whose current partners were older by three or more years were significantly less likely to practice contraception than those whose partners were closer to them in age. Reasons cited for low levels of contraceptive use included that sexual relationships were less stable, intercourse was less frequent and less voluntary, and first-time intercourse was often unplanned.

A study in Nigeria revealed higher teenage pregnancy among women who had lower levels of education and income, and lower birth weight, and who delivered outside of health facilities, even after they registered for antenatal health care services, compared with older

mothers (Mutihir and Maduka 2006). In India teenage mothers had higher proportions of preterm deliveries and stillbirths, developed more perinatal complications, and delivered lower birth-weight babies compared with adult mothers (Mukhopadhyay et al. 2010). Another study in Eritrea showed that marriage type, educational status, and residence type were significant predictors of teenage pregnancy (Woldemicael 2005). It also revealed that mothers under age 18 had the worst prenatal medical care, increased incidence of low birth weight, and higher child mortality. In the Ethiopian context, factors affecting teenage pregnancy estimated in 2000 were teenagers' age at first sex, knowledge and use of family planning methods, residence type, education and employment status, and exposure to mass media (Govindasamy et al. 2002).

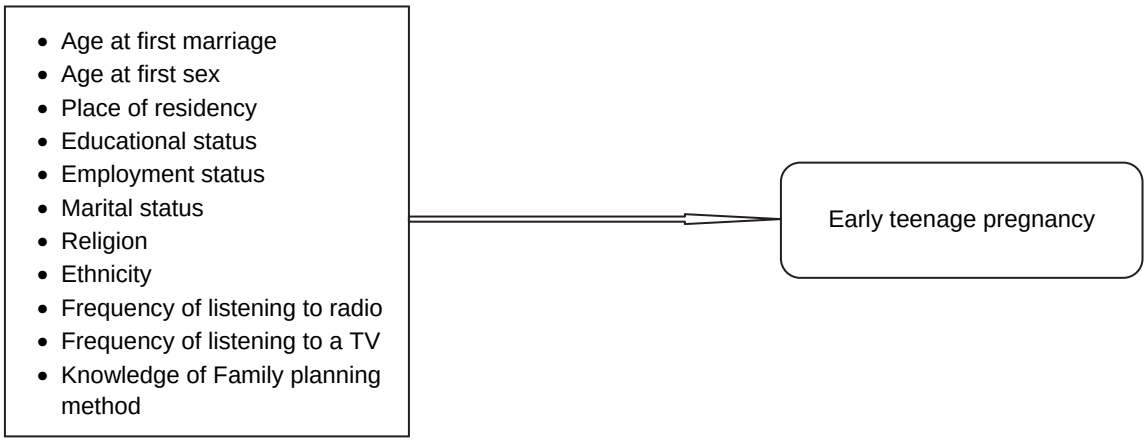
Figure 1. Percent of women age 15-19 who have had a live birth or who are pregnant with their first child, EDHS 2000 and 2005



Conceptual Framework

Cross-sectional surveys such as the EDHS cannot ascertain a cause-and-effect relationship between attributed background factors and the outcome variable of early teenage pregnancy but can only show associations. Having this in mind as a limitation of the study, the following schematic presentation presents the association of background factors with early teenage pregnancy among women age 17-24. Although teenage pregnancy usually refers to pregnancy before age 20, this study defines early teenage pregnancy as pregnancy before Ethiopia's median age at first pregnancy of 17 years. The association of various background characteristics with early teenage pregnancy is presented in Figure 2.

Figure 2. Conceptual framework showing the relationship between background characteristics of women age 17-24 and early teenage pregnancy (1st pregnancy before age 17)



OBJECTIVES

The general aims of this study are to measure the levels and characteristics of pregnancy before age 17 among women age 17-24 in 2000 and 2005 in Ethiopia. The study has the following specific objectives:

- Describe women age 17-24 in 2000 and 2005 by their main background characteristics,
- Measure changes in the levels of pregnancy before age 17 among women age 17-24 between 2000 and 2005, and
- Identify factors associated with pregnancy before age 17 among women age 17-24 in 2000 and 2005.

METHODS

Population and Data Source

This study uses the EDHS datasets for 2000 and 2005. Young women age 17-24 are the study population because they are fully exposed to the risk of early teenage pregnancy (pregnancy before age 17) and have recent experience that could be less likely to suffer from memory lapse compared with older women. Moreover, the recent experiences of younger women could be most relevant for making valid recommendations in the current context of the country.

Data Analysis

A composite binary outcome variable on early teenage pregnancy is generated by considering women age 17-24 who experienced pregnancy. Young women age 17-24 have passed through all exposure years of teenage pregnancy, so that data censoring is not a problem. Women who experienced pregnancy include those who in the survey reported any number of children ever born, those pregnant at the time of the survey, and those who experienced termination of pregnancy. However, it was not possible to study women whose pregnancies were terminated, because a reasonable majority of them did not report the gestational duration at which the pregnancy terminated, which is an important variable to calculate age at pregnancy. The composite variable on early teenage pregnancy is dichotomized in such a way that 0=no pregnancy before age 17 (which includes those who had their first pregnancy at age 17 or later, or never had a pregnancy) and 1= pregnancy before the 17th birthday.

The conceptual framework (Figure 2) lists a number of variables as associated with early teenage pregnancy. However, the timing of certain background variables and the outcome variable of early pregnancy could not be exactly known in a retrospective cross-sectional study. For instance, we do not know whether or not a woman age 24 at the time of the survey was employed when she had her pregnancy five years earlier.

Background characteristics included in this study are age, educational status, religion, ethnicity, and wealth tercile, all of which are less likely to suffer from the above problem. Age of younger women is categorized as 17-19 and 20-24. Educational status is categorized as no

education, primary (1-6 years), or secondary plus (7 and above years). Place of residence is coded as urban or rural. Religion is grouped into three categories including (1) Ethiopian Orthodox, which includes small proportions of women who reported traditional, other, or missing; (2) other Christianity (Protestants and Catholics); and (3) Muslims. Ethiopia is home to various ethnic groups with different values and cultures. In the study ethnicity is categorized as Oromo, Amhara, Tigraway, Guraghe, or other. In an economically underdeveloped country like Ethiopia, it can be difficult to interpret data on wealth quintile since there may be little difference in economic status between households in successive quintiles. Particularly, the health impacts of successive wealth quintiles might not show significant differences. Thus in this study household wealth is measured using terciles instead of quintiles.

Parental characteristics cannot be used since they are not collected in the DHS. Moreover, in a country like Ethiopia where marriage has been universal and happens early in life among girls, including marriage-related variables in the analysis would mask the effects of other variables, and thus they are excluded this analysis, in order to see the effects of other policy-relevant variables.

The study shows the distribution of study participants by background characteristics in 2000 and 2005. Percentage of early teenage pregnancy (pregnancy before age 17) by background characteristics of women age 17-24 in 2000 and 2005 is also shown. Ninety-five percent confidence intervals of the percentage of early teenage pregnancy by various background characteristics of women in current age 17-24 for each survey year are computed. Then, statistical significant difference in early teenage pregnancy is ascertained. Moreover, the association of different background characteristics with teenage pregnancy in 2000 and 2005 is ascertained using odds ratio along with their confidence intervals in logistic regression.

RESULTS

Description of the Study Population

Table 1. Distribution of women age 17-24 by background characteristics in Ethiopia, 2000 and 2005

	Women age 17-24 in 2000		Women age 17-24 in 2005	
Background characteristics	**Percent**	**Number**	**Percent**	**Number**
Age				
17-19	41.4	2,020	42.3	1,869
20-24	58.6	2,860	57.7	2,547
Educational status				
No education	69.2	3,374	55.1	2,433
Primary	17.3	844	27.4	1,208
Secondary plus	13.6	661	17.5	775
Place of residence				
Urban	20.4	997	21.8	964
Rural	79.6	3,883	78.2	3,451
Religion				
Orthodox	52.7	2,571	52.5	2,317
Other Christian	17.1	836	19.7	868
Muslim	30.2	1,472	27.9	1,231
Ethnicity				
Oromo	37.5	1,828	33.8	1,492
Amhara	30.2	1,473	31.1	1,373
Tigraway	6.4	312	6.9	305
Guragie	5.8	284	5.3	233
Others	20.1	983	23.0	1,014
Wealth tercile				
Poor	28.6	1,397	29.8	1,316
Medium	34.2	1,670	32.5	1,433
Rich	37.1	1,812	37.8	1,667
Early teenage pregnancy				
Yes	18.9	920	21.8	963
No	81.1	3,959	78.2	3,453
Total	100.0	4,879	100.0	4,416

Table 1 shows the distribution of women age 17-24 by background characteristics in 2000 and 2005. A total of 4,879 and 4,416 women age 17-24 were interviewed in the 2000 and 2005 survey rounds, respectively. The size of study group is large enough to make the required analysis. A slight increase in educational status of women age 17-24 is observed between the two survey years, as the percentage of illiterates declined from 69% in 2000 to 55% in 2005. In 2000,

80% of younger women resided in rural areas, falling slightly to 78% in 2005. Nearly 68% and 65% of study participants in 2000 and 2005, respectively, belonged to the two majority ethnic groups. In both survey rounds, over 50% of the study group were in the Ethiopian Orthodox Christian religion.

Levels and Changes of Early Teenage Pregnancy among Women Age 17-24 in 2000 and 2005

As Table 2 shows, the overall level of early teenage pregnancy among women age 17-24 increased from 19% in 2000 to 22% in 2005 in Ethiopia. In each survey round the percentage of early teenage pregnancy decreased as women's educational status increased, although the decline was statistically significant only in 2005. The percentage of early teenage pregnancy was also significantly lower among young women who completed a secondary plus level of education compared with those with only a primary education in 2000.

The percentage of early teenage pregnancy changed hardly at all among urban residents age 17-24 between 2000 and 2005, remaining about 11%. Among rural women age 17-24, early teenage pregnancy increased from 21% to 25% between 2000 and 2005.

Disaggregation of early teenage pregnancy by religious groups showed a slight decline from 22% to 21% among Orthodox Christians, an increase from 11% to 16% among other Christian denominations, and a significant increase from 18% to 28% among Muslims between 2000 and 2005. The percentage change in early teenage pregnancy between 2000 and 2005 also differed among ethnic groups (see Table 2).

Table 2. Percentage of early teenage pregnancy by background characteristics of women age 17-24 in Ethiopia, 2000 and 2005

Background characteristics	% who became pregnant before age 17 among women age 17-24			
	2000		2005	
	Percentage (CI)	Number	Percentage (CI)	Number
Age				
17-19	14.7 (12.4, 17.2)	2,020	15.9 (13.3, 18.8)	1,869
20-24	21.8 (19.6, 24.3)	2,860	26.2 (23.7, 28.9)	2,547
Educational status				
No education	21.2 (19.0, 23.6)	3,374	30.5 (27.6, 33.5)	2,433
Primary	17.9 (14.3, 22.3)	844	15.3 (12.5, 18.5)	1,208
Secondary plus	8.0 (5.2, 12.0)	661	4.8 (3.4, 6.7)	775
Place of residence				
Urban	11.2 (8.6, 14.3)	997	11.0 (8.1, 14.7)	964
Rural	20.8 (18.7, 23.1)	3,883	24.9 (22.4, 27.4)	3,451
Religion				
Orthodox	21.8 (19.1, 24.6)	2,571	20.7 (18.5, 23.1)	2,317
Other Christian	11.0 (7.9, 15.3)	836	16.0 (12.1, 20.8)	868
Muslim	18.2 (15.1, 21.8)	1,472	28.1 (23.6, 33.1)	1,231
Ethnicity				
Oromo	15.6 (12.8, 18.7)	1,828	22.4 (18.3, 27.2)	1,492
Amhara	26.4 (22.7, 30.6)	1,473	23.5 (20.5, 26.8)	1,373
Tigraway	22.7 (18.3, 27.8)	312	21.8 (17.4, 27.0)	305
Guragie	14.7 (9.0, 23.3)	284	9.9 (6.3, 15.3)	233
Others	13.6 (10.7, 17.3)	983	21.4 (17.8, 25.5)	1,014
Wealth tercile				
Poor	20.4 (17.5, 23.8)	1,397	28.0 (24.7, 31.6)	1,316
Medium	22.1 (18.9, 25.7)	1,670	24.7 (21.3, 28.5)	1,433
Rich	14.7 (12.4, 17.3)	1,812	21.8 (19.8, 24.0)	1,667
Total	18.9 (17.0, 20.9)	4,879	21.8 (19.8, 24.0)	4,416

The percentage of early teenage pregnancy declined as wealth tercile increased, in both survey rounds. There was a significant increase in the percentage of early teenage pregnancy among young women in households in the low wealth tercile, from 20% to 28%. Among young women in households in the rich wealth tercile, early teenage pregnancy also increased significantly, from 15% to 22% between 2000 and 2005.

Association of Background Characteristics of Women Age 17-24 with Early Teenage Pregnancy in 2000 and 2005 in Ethiopia

Table 3 shows the association of background characteristics of younger women age 17-24 with early teenage pregnancy (pregnancy before age 17). In both 2000 and 2005, the odds of early teenage pregnancy among women age 17-24 significantly decreased as educational status increased. The crude odds of early teenage pregnancy were 3.12 and 8.76 times higher, in 2000 and 2005 respectively, among young women who had no education compared with those who had a secondary plus level of education. When age, residence type, religion, ethnicity, and wealth tercile were included in the model, the odds of early teenage pregnancy were 2.47 and 7.6 times higher, in 2000 and 2005 respectively, among women who had no education compared with those who had a secondary plus level of education. Similarly, in both surveys the crude odds of early teenage pregnancy were higher among women age 17-24 who completed a primary education compared with those who had a secondary plus level of education. When age, residence type, religion, ethnicity, and wealth tercile were included, the odds of early teenage pregnancy were 2.37 and 3.72 times higher, in 2000 and 2005 respectively, among young women who completed a primary education level compared with those attained a secondary plus level.

The crude odds of early teenage pregnancy were 2.1 and 2.69 times higher, in 2000 and 2005 respectively, among rural residents compared with urban residents, while the adjusted odds of early teenage pregnancy by urban-rural residence were not statistically significant in the latest survey round.

Analysis of the association of religion with early teenage pregnancy showed that the odds were 1.24 times higher among Orthodox Christians compared with Muslims in 2000, but were 0.67 times significantly lower in 2005. When age, educational status, ethnicity and wealth tercile were included in the model, the odds of early teenage pregnancy were 1.25 times higher among Orthodox Christians compared with Muslims in 2000 but were 0.68 times significantly lower in 2005. Young women in minority Christian denominations (Protestants and Catholics) had significantly lower odds of early teenage pregnancy compared with Muslims in both 2000 and 2005. When the other variables used in this analysis were included in the model, the adjusted odds of early teenage pregnancy were 0.66 times lower among minority Christian groups in 2000, and 0.52 times significantly lower in 2005 compared with Muslims.

Analysis of the association between ethnicity and early teenage pregnancy showed that, compared with Guraghies, crude odds among Oromos were 1.07 and 2.63 times higher in 2000 and 2005 respectively; among Amharas, 2.08 and 2.8 times significantly higher; and among Tigraways, 1.7 and 2.54 times higher. The adjusted odds of early teenage pregnancy, compared with Guraghies, were 0.94 times lower and 2.21 times significantly higher among Oromos, in 2000 and 2005 respectively; 2.08 and 2.86 times significantly higher among Amharas; 1.64 and 3.74 times higher among Tigraways; and 0.9 times lower and 2.36 times significantly higher among minority groups.

Analysis of the association of wealth tercile with early teenage pregnancy showed the crude odds of early teenage pregnancy were 1.49 and 2.32 times higher among women age 17-24 in households in the medium wealth tercile compared with the low wealth tercile, in 2000 and 2005 respectively. The adjusted odds were 1.02 and 0.95 times higher, in 2000 and 2005 respectively.

The crude odds of early teenage pregnancy were 1.65 and 1.95 times higher among young women in households in the rich wealth tercile compared with the low wealth tercile, in 2000 and 2005 respectively, while the adjusted odds ratio were 1.18 times higher and 0.99 times lower, respectively.

Table 3. Association of women's background characteristics with early teenage pregnancy (pregnancy before age 17) in Ethiopia, 2000 and 2005

	2000		2005	
Background characteristics	**Crude Odds Ratio (CI)**	**Adjusted Odds Ratio (CI)**	**Crude Odds Ratio (CI)**	**Adjusted Odds Ratio (CI)**
Age				
17-19	1.00	1.00	1.00	1.00
20-24	1.62 (1.32, 1.99)*	1.66 (1.35, 2.03)*	1.88 (1.52, 2.34)*	1.75 (1.39, 2.20)*
Educational status				
No education	1.00	1.00	1.00	1.00
Primary	3.12 (1.97, 4.93)*	2.47 (1.45, 4.23)*	8.76 (5.93, 12.94)*	7.60 (4.88, 11.82)*
Secondary plus	2.53 (1.47, 4.33)*	2.37 (1.35, 4.14)*	3.61 (2.37, 5.50)*	3.72 (2.38, 5.79)*
Place of residence				
Urban	1.00	1.00	1.00	1.00
Rural	2.10 (1.53, 2.87)*	1.58 (1.08, 2.32)*	2.69 (1.87, 3.87)*	1.19 (0.78, 1.82)
Religion				
Orthodox	1.00	1.00	1.00	1.00
Other Christian	1.24 (0.95, 1.64)	1.25 (0.95, 1.64)	0.67 (0.51, 0.87)*	0.68 (0.51, 0.92)*
Muslim	0.56 (0.36, 0.86)*	0.66 (0.40, 1.08)	0.49 (0.33, 0.72)*	0.52 (0.35, 0.76)*
Ethnicity				
Oromo	1.00	1.00	1.00	1.00
Amhara	1.07 (0.58, 1.95)	0.94 (0.50, 1.79)	2.63 (1.51, 4.58)*	2.21 (1.28, 3.83)*
Tigraway	2.08 (1.15, 3.76)*	2.08 (1.15, 3.75)*	2.80 (1.66, 4.74)*	2.86 (1.61, 5.07)*
Guragie	1.70 (0.90, 3.20)	1.64 (0.84, 3.20)	2.54 (1.44, 4.58)*	3.74 (1.95, 7.19)*
Others	0.91 (0.49, 1.71)	0.90 (0.45, 1.78)	2.47 (1.43, 4.27)*	2.36 (1.35, 4.16)*
Wealth tercile				
Poor	1.00	1.00	1.00	1.00
Medium	1.49 (1.15, 1.94)*	1.02 (0.76, 1.35)	2.32 (1.78, 3.01)*	0.95 (0.69, 1.30)
Rich	1.65 (1.27, 2.14)*	1.18 (0.87, 1.59)	1.95 (1.47, 2.59)*	0.99 (0.72, 1.36)

* 95% confidence interval

DISCUSSION

In 2005 compared with 2000, women age 17-24 had more education but were almost similar in other background characteristics. There was a statistically significant increase in the percentage of early teenage pregnancy between the two survey years among women who were uneducated, in minority Christianity denominations, belonging to minority ethnic groups, and members of households in poor or rich wealth terciles. Even though the increase in early teenage pregnancy among women age 17-24 was not statistically significant across all other categories of age, educational status, residence type, religion, ethnicity and wealth terciles, an expected decline in early teenage pregnancy in the context of implementation of a revised family law and new reproductive health strategy in Ethiopia has not yet been achieved (FDRE 2000b, MOH 2006).

Most communities in the country have yet to accept the revised legal age at first marriage, probably because of the age-old traditions of arranged marriage by parents for their children at young ages (Tilson and Larsen 2000, Pathfinder International 2006). Ethiopians comply with the traditions of arranged early marriage to maintain family status in the community. In some communities in Ethiopia, if a girl becomes too old for marriage, it will be considered a failure on the part of her parents.

Another main reason for early marriage is to create a bond with the bridegroom's family, as well as to ensure that a girl marries while she is a virgin. In 2006 it was reported that enforcement of the legal age of marriage by authorities was inadequate (Pathfinder International 2006). One of the consequences of arranged early marriage is continued high fertility, as early marriage exposes women to more years of childbearing (Population Council 2004, CSA and ICF Macro 2011). Also, in countries such as Ethiopia, where there is little facility-based delivery and skilled attendance (Pathfinder International 2006, CSA and ICF Macro 2011), early teenage pregnancy can have negative impacts on the health of both young mothers and their infants. Young women face unfavorable and risky conditions for their reproductive health in the context of low facility-based delivery coverage. Studies have observed that teenage mothers who become pregnant before they reach the age of 15 have more adverse birth outcomes compared with those whose pregnancy occurs closer to age 20 (Cunnington 2001, Gupta and Leite 1999).

In both survey rounds the odds of early teenage pregnancy significantly decreased as the level of education of women age 17-24 increased. Uneducated women are less empowered than women with more education to negotiate when to have sex with their partners and are more likely to encounter gender-based violence and to marry early (Swann et al. 2003). In contrast, when girls stay longer in school, they are less likely to marry early, more empowered to negotiate when to have sex, and better able to make decisions for themselves, factors that tend to reduce early pregnancy.

The Ethiopian government decided to have universal coverage of primary education by 2015 (FDRE 2004), which could be a good step forward to alleviate the problem of early marriage. However, primary education alone may not bring about behavioral changes concerning teenage pregnancy that would allow girls to stay in school throughout their teenage years. The secondary school enrollment ratio for both sexes is low in Ethiopia, but it is lower for girls than for boys, which has implications for early pregnancy by making early marriage more likely, especially in rural communities (CSA 2009). We should note that there is a limitation in measuring education using EDHS data since the education status at the time of the survey might not be exactly the same as the education status when young girls encountered early teenage pregnancy some years back. This limitation is of course inherent in taking younger women as study participants.

The deeply rooted cultures of early marriage in Ethiopia cannot be changed within a short period of time, probably due to low levels of access to information and reproductive health services. The higher rate of pregnancy before age 17 among rural residents in 2005 compared with 2000 shows the impact of limited access to information and services. Meanwhile, the fact that the majority of first early pregnancies occurred within marriage shows that revision of the legal age of first marriage in the country has not brought about change in the reproductive lives of teenage women in the country.

The fact that early teenage pregnancy was less likely among Christian groups compared with Muslims in the most recent EDHS could be attributed to more practice of early marriage among Muslims than Christians in Ethiopia, because of a belief that early marriage will bring benefits to the family in the long run (Pathfinder International 2006). The fact that early teenage pregnancy was more than twice as high among all ethnic groups in Ethiopia compared with

Guraghes could be attributed to cultural and mobility differences, since Guraghe nationals are highly mobile in Ethiopia (Byass et al. 2003), which disrupts spousal partnerships and thus the risk of pregnancy. Teenage Guraghes move from their usual place of residence to seek employment as domestic workers, thus reducing the likelihood of marriage.

CONCLUSIONS AND RECOMMENDATIONS

A decline in early teenage pregnancy is far from being attained in Ethiopia, due to age-old traditions of maintaining family status in the community by arranging early marriage for girls. Early teenage pregnancy among young women currently age 17-24 increased between 2000 and 2005 despite efforts to curb it. To address this problem, stronger measures should be taken on the implementation of the law increasing the age at first marriage to 18 years. More effort should be exerted to change the traditions of early marriage by addressing the culture of maintaining family status in the community, which is a root cause of the problem of early pregnancy.

In addition to increasing girls' enrollment in secondary schools, the government of Ethiopia should scale up adult education programs for out-of-school young women, with more emphasis on reproductive health issues in the curriculum. Furthermore, the public should be made aware on the adverse outcomes of early marriage and teenage pregnancy by involving religious and community leaders. The impact of creating awareness in bringing about behavioral change to improve reproductive health outcomes should be periodically evaluated.

REFERENCES

Argaw, H. 2007. *The Health Extension Program (HEP) of Ethiopia: Summary of Concepts, Progress, Acheivement and Challehnge.* Addis Ababa, Ethiopia: WHO Ethiopia Country Office.

Browning, A., and B. Menber. 2008. "Women with Obstetric Fistula in Ethiopia: A 6-month Follow Up after Surgical Treatment." *BJOG* 115(12): 1564-9.

Byass, P., Y. Berhane, A. Emmelin, and S. Wall. 2003. "Patterns of Local Migration and Their Consequences in a Rural Ethiopian Population." *Scand J Public Health* 31(1): 58-62.

Central Statistical Agency (CSA) [Ethiopia]. 2009. *The Country Level Report of the 2007 Ethiopian Census.* Addis Ababa, Ethiopia: Central Statistical Agency.

Central Statistical Agency (CSA) [Ethiopia]. 2008. *Summary and Statistical Report of the 2007 Population and Housing Census 2008.* Addis Ababa, Ethiopia: Federal Democratic Republic of Ethiopia Population Census Commission.

Central Statistical Agency (CSA) [Ethiopia], and ICF Macro. 2011. *Ethiopia Demographic and Health Survey 2011.* Addis Ababa, Ethiopia: Central Statistical Agency and ICF Macro.

Central Statistical Agency (CSA) [Ethiopia], and ORC Macro. 2006. *Ethiopia Demographic and Health Survey 2005.* Addis Ababa, Ethiopia: Central Statistical Agency and ORC Macro.

Central Statistical Agency (CSA) [Ethiopia], and ORC Macro. 2001. E*thiopia Demographic and Health Survey 2001.* Addis Ababa, Ethiopia: Central Statistical Agency and ORC Macro.

Coleman, J., and C. Dennison. 1998. "Teenage Parenthood." *Children & Society* 22: 306-314.

Cunnington, A. 2001. "What Is So Bad about Teenage Pregnancy?" *The Journal of Family Planning and Reproductive Health Care* 27(1): 36-41.

Federal Democratic Republic of Ethiopia (FDRE). 2004. "Report on the Development of Education in Ethiopia" Paper presented at the UNESCO forty seventh session on the International Conference on Education, Geneva, Switzerland, September 8-11.

Federal Democratic Republic of Ethiopia (FDRE). 2000a. *The Revised Family Code, F.N.G.o.t.F.D.R.o.* Addis Ababa, Ethiopia: FDRE.

Federal Democratic Republic of Ethiopia (FDRE). 2000b. *The Revised Family Code of Ethiopia, F.N.G.o.t.* Addis Ababa, Ethiopia: FDRE.

Glei, D.A. 1999. "Measuring Contraceptive Use Patterns among Teenage and Adult Women." *Family Planning Perspectives* 31(2): 73-80.

Govindasamy, P., A. Kidanu, and H. Bantayerga. 2002. *Youth Reproductive Health in Ethiopia.* Calverton, MD, USA: ORC Macro.

Gupta, N., and I.d.C. Leite. 1999. "Adolescent Fertility Behavior: Trends and Determinants in Northeastern Brazil." *International Family Planning Perspectives* 25(3): 125-130.

Haile, A. 1992. "Unintended Conception and Unwanted Fertility in Gondar, Ethiopia." *East Afr Med J* 69(7): 355-9.

Haldre, K., K. Rahu, M. Rahu, and H. Karro. 2009. "Individual and Familial Factors Associated with Teenage Pregnancy: An Interview Study." *European Journal of Public Health* 19(3): 226-270.

International Center for Research on Women (ICRW). 2007. *How to End Child Marriage: Action Strategies for Prevention and Protection.* Washington DC., USA: International Center for Research on Women.

Kelly, J. 1995. "Ethiopia: An Epidemiological Study of Vesico-Vaginal Fistula in Addis Ababa." *World Health Stat* Q 48(1): 15-7.

Kumbi, S., and A. Isehak. 1999. "Obstetric Outcome of Teenage Pregnancy in Northwestern Ethiopia." *East Afr Med J* 76(3): 138-40.

Melhuish, E., and A. Phoenix. 1987. "Motherhood under Twenty: Prevailing Ideologies and Research." *Children & Society* 4: 288-98.

Ministry of Health (MOH) [Ethiopia]. 2006. *National Reproductive Health Strategy 2006-2015.* Addis Ababa, Ethiopia: Federal Democratic Republic of Ethiopia, Ministry of Health.

Mukhopadhyay, P., R.N. Chaudhuri, and B. Paul. 2010. "Hospital-based Perinatal Outcomes and Complications in Teenage Pregnancy in India." *J Health Popul Nutr* 28(5): 494-500.

Muleta, M., M. Fantahun, B. Tafesse, E.C. Hamlin, and R.C. Kennedy. 2007. "Obstetric Fistula in Rural Ethiopia." *East Afr Med J* 84(11): 525-33.

Muleta, M., E.C. Hamlin, M. Fantahun, R.C. Kennedy, and B. Tafesse. 2008. "Health and Social Problems Encountered by Treated and Untreated Obstetric Fistula Patients in Rural Ethiopia." *J Obstet Gynaecol Can* 30(1): 44-50.

Mutihir, J.T., and W.E. Maduka. 2006. "Comparison of Pregnancy Outcome between Teenage and Older Primigravidae in Jos University Teaching Hpspital, Jos, North-Central Nigeria." *Annals of African Medicine* 5(2): 101-106.

Pathfinder International. 2006. *Report on Causes and Consequencies of Early Marriage in Amhara Region, Ethiopia.* Addis Ababa, Ethiopia: Pathfinder International, Ethiopia.

Population Council. 2004. *Child Marriage Briefing Ethiopia.* New York, NY, USA: Population Council.

Singh, S., T. Fetters, H. Gebreselassie, A. Abdella, Y. Gebrehiwot, S. Kumbi, and S. Audam. 2010. "The Estimated Incidence of Induced Abortion in Ethiopia, 2008." *International Perspectives on Sexual and Reproductive Health* 36(1): 16-25.

Swann, C., K. Bowe, G. McCormick, and M. Kosmin. 2003. *Teenage Pregnancy and Parenthood: A Review of Reviews Evidence Briefing.* London, UK: NHS Health Development Agency.

Taffa, N., and F. Obare. 2004. "Pregnancy and Child Health Outcomes among Adolescents in Ethiopia." *Ethiop J. Health* 18(2): 90-5.

Thomson, A.M. 2007. "Women with Obstetric Fistula in Ethiopia." *Midwifery* 23(4): 335-6.

Tilson, D., and U. Larsen. 2000. "Divorce in Ethiopia: The Impact of Early Marriage and Childlessness." *J Biosoc Sci* 32(3): 355-72.

Transitional Government of Ethiopia (TGE). 1993. *The National Population Policy of Ethiopia.* Addis Ababa, Ethiopia: TGE.

Woldemicael, G. 2005. *Teenage Childbearing and Child Health in Eritrea.* MPIDR Working Paper WP 2005-029. Rostock, Germany: Max Planck Institute for Demographic Research.

World Health Organization (WHO). 1999. *Programming for Adolescent Health and Development Report of WHO/UNFPA/UNICEF Study Group on Programming for Adolescent Health.* Geneva, Switzerland: WHO.

Appendix

Appendix A. Measurement of dependent and independent variables

Dependent Variables	Measurement
Pregnancy before age 17	0. never pregnant, or first pregnancy at age 17+ 1. pregnant before age 17
Independent Variable	**Measurement**
Age group 20-24 25-29	They were also used to specify study participants (women age 20-29)
Age at first sex	I created a duration of sex exposure categorized as: 0. had no sex 1. 0-4 years 2. 5 and over years
Age at first marriage	Age at first marriage is categorized as 0. not married, 1. <15, 2. 15-16, 3. 17-19, 4. 20+
Educational status	0. none, 1. primary, 2. secondary plus
Place of residence	1. urban, 2. rural
Employment status	0. students 1. unemployed, 2. employed
Marital status	0. never married, 1. currently married, 2. formerly married
Religion	1. Orthodox, 2. other Christians, 3. Muslim
Ethnicity	1. Oromo, 2. Amhara, 3. Tigraway, 4. Guragie, 5. others
Wealth index	1. poor, 2. medium, 3. rich
Frequency of listening to radio	0. not at all, 1. Occasionally, 2. almost everyday
Frequency of watching TV	0. not at all, 1. Occasionally, 2. almost everyday
Knowledge of family planning method	0. don't know any method, 1. knows at least one