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ABSTRACT

Accessing family planning can reduce a significant proportion of maternal, infant, and childhood deaths. In Ethiopia, use of modern contraceptive methods is low but is increasing. This study aimed to analyze the levels, trends, and determinants of modern contraceptive use and changes over time among young married women in Ethiopia.

The study used data from the three Demographic Health Surveys (DHS) conducted in Ethiopia, in 2000, 2005, and 2011. Non-pregnant, young married women age 15-24 were included in the final samples, for sample sizes of 2,157 in 2000, 1,904 in 2005, and 2,146 in 2011. The major statistical techniques used were logistic regression for analysis of determinants of current contraceptive use and logit-based decomposition analysis of factors contributing to the recent changes. STATA 12 was employed for data management and analyses. All calculations presented in this paper were weighted for the sampling probabilities and non-response. Complex sampling procedures were also considered during testing of statistical significance.

Among young married women, modern contraceptive prevalence increased from 6% in 2000 to 16% in 2005 and to 36% in 2011. The study found that young women's wealth status, age, religion, education, family size concordance with husbands, and fertility preference for spacing or limiting births were significantly associated with their use of modern contraception. The decomposition analysis indicated that about a third of the overall change in modern contraceptive use was due to difference in women's characteristics. For this component, changes in women's age, educational status, religion, family size concordance, and fertility preference were significantly associated with change in modern contraceptive use. Particularly, an increase in women's attainment of primary and above education accounted for about a tenth of the change in modern contraceptive use over the study period.

About two-thirds of the increase in contraceptive use was due to difference in coefficients. Change in contraceptive use behavior among the rural population and among Orthodox Christians and Protestants showed a significant contribution to the increase. Other things being constant, about a third of the increase in modern contraceptive use in the past decade was due to change in contraceptive use behavior among the rural population.

Programmatic interventions targeting poor, younger (adolescent), illiterate, and Muslim women would help to maintain the increasing trend in contraceptive use among young women in Ethiopia.

Keywords: Modern contraceptive use, young women, DHS, decomposition, Ethiopia

INTRODUCTION

Ethiopia is one of three countries (along with Malawi and Rwanda) in sub-Saharan Africa that have achieved a much more rapid increase in the contraceptive prevalence rate (CPR) than any other countries in the region in the last 10 years, according to an analysis of modern contraceptive prevalence in recent Demographic and Health Surveys (DHS) (USAID/Africa Bureau 2011). Modern family planning service in Ethiopia was pioneered by the Family Guidance Association (FGAE), established in 1966 (FMOH 2011). After 1980, the Ministry of Health expanded its family planning services with country support programs by United Nations Population Fund (UNFPA) and other stakeholders.

With the adoption of the population policy in 1993 (Transitional Government of Ethiopia 1993), numerous local and international family planning organizations have partnered with the government in expanding family planning programs and services. In 1996, the Ministry of Health released Guidelines for Family Planning Services in Ethiopia to guide health providers and managers, as well as to expand and ensure quality family planning services in the country (FMOH 2011). Since 2002, the Government of Ethiopia and non-governmental organizations (NGOs) have expanded community-based distribution of family planning services through health extension programs. The government has removed all duty and taxes on imported contraceptives since family planning is considered key for the country's development (USAID/Africa Bureau 2011). The Ministry of Health also developed a youth reproductive strategy in 2006 to address the increasing needs of the youth population. About a quarter of women in Ethiopia are teenagers.

Family planning is a key investment in reducing the broader costs of health care (Singh and Darroch 2012) and reducing risks associated with pregnancy and childbirth. Accessing family planning can reduce maternal deaths by 40% (Ahmed et al. 2012; Cleland et al. 2012), infant mortality by 10%, and childhood mortality by 21% (Cleland et al. 2012). In Ethiopia every dollar invested in family planning has shown two dollars of savings in other development areas (Cleland et al. 2006; Population Action International 2013). It is well known that reproductive choices made by young women and men have an enormous impact on their prospects for health, schooling, and employment, as well as their overall transition to adulthood (Hogan et al. 2010; World Bank 2007, 2010). If adolescents become pregnant, they will have increased risk of

medical complications that might result in infant or maternal death (Rama Rao et al. 2003). The risk is much higher when pregnancy is unintended. Most pregnancies to young girls in sub-Saharan Africa are unintended or mistimed (Cleland, Ali, and Shah 2006). In Ethiopia, 28% of adolescents age 15-19 and 24% of young women age 20-24 have had unintended pregnancies (Central Statistical Agency [Ethiopia] and ICF International 2012).

Worldwide, contraceptive prevalence increased from 55% in 1990 to 63% in 2010. In turn, unmet need for family planning decreased from 15% in 1990 to 12% in 2010 (Alkema et al. 2013). The World Health Organization (WHO) has reported that the highest contraceptive prevalence is in Asia and Latin America, whereas sub-Saharan African countries have the lowest contraceptive prevalence (WHO 2013). According to the World Bank, the average CPR in sub-Saharan Africa is 21% (World Bank 2010). Countries in East Africa have observed a greater increase in modern contraceptive use than countries in West and Central Africa (Emina, Chirwa, and Kandala 2014). For example, modern contraceptive use increased in Malawi from 26% in 2004 to 42% in 2012 (Chintsanya 2013) and in Rwanda from 10% in 2005 to 45% in 2010, but in Ghana only from 13% in 1998 to 17% in 2008 (ICF International 2012). In Ethiopia, the change was from 8% in 2000 to 29% in 2011(UNFPA 2012).

Studies indicate that in Ethiopia women in the richest household wealth quintile, educated women, employed women, urban women, and women who follow the Christian religion tend to use modern contraception more than other women (Lakew et al. 2013; Mekonnen and Worku 2011; UNFPA 2012). Moreover, having a higher number of living children (Mohammed et al. 2014), being in a monogamous relationship, having family size concordance (couple's agreement on family size), desire to limit or space births, attending community conversation, and being visited by health workers at home have been identified as determinants of modern contraceptive use (Lakew et al. 2013; UNFPA 2012).

Researchers have conducted decomposition analyses to understand and explain the sources of changes in the use of contraception in recent decades. A study in Cameroon showed that between 1991 and 2004 more than 37% of the change in contraceptive use was due to coefficients. However, compositional changes contributed more (45%) to the increase in modern contraceptive use. Improvements in husbands' positive attitudes toward contraceptive use,

secondary school education, and couple's discussion on contraceptive use contributed the most to increases in contraceptive use (Pillai and Teboh 2011).

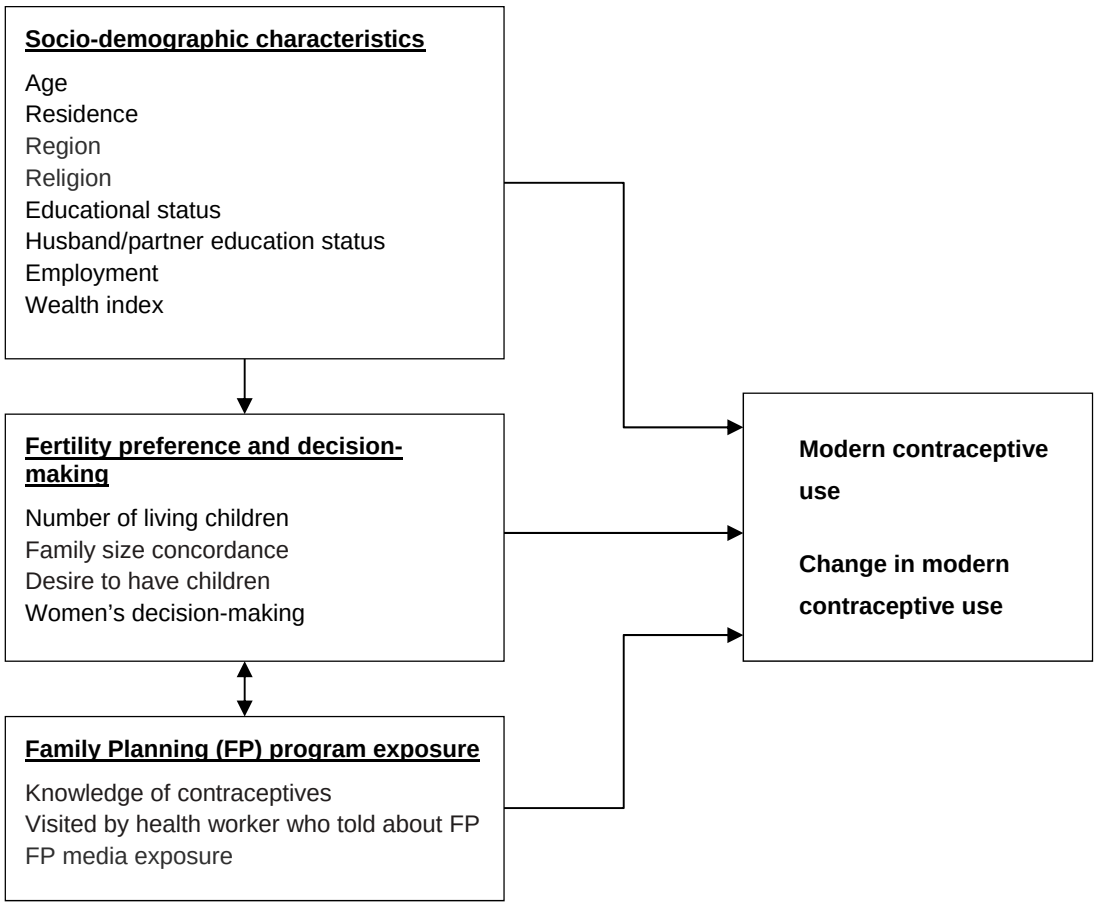
In a study in Rwanda, about three-quarters (78%) of the change in contraceptive use between 2005 and 2010 was due to changes in effects of women's characteristics, particularly women's education and place of residence (Muhoza, Rutayisire, and Umubyeyi 2013). A study in Ethiopia using decomposition analysis showed that 69% of the change in contraceptive use during the period 2000-2011 was attributable to compositional changes, and about 23% of the overall contraceptive increase was attributable to changes in coefficients. The change was mainly due to an increase in the effects of religion, experience of child death, ideal family size, and working for pay among women (UNFPA 2012).

According to our review of the literature, contraceptive prevalence is still low in Ethiopia but is steadily increasing, both among all women age 15-49 and among young women age 15-24. As mentioned earlier, young women, especially adolescents, are at higher risk of morbidity and mortality associated with pregnancy and childbirth. Identifying the contributing factors to the changes in contraceptive use among women age 15-24 helps to improve young women's contraceptive use. The increasing trend in contraceptive use could be due to the current changes in population composition, including urbanization, education of girls, and other development activities, or it could be due to changes in contraceptive behavior. Therefore, investigating the major factors contributing to such a dramatic change helps to plan strategies for family planning programs. Hence, this study analyzed the levels, trends, and determinants of modern contraceptive use and change among young married women in Ethiopia.

CONCEPTUAL FRAMEWORK

Figure 1 shows the conceptual framework for this study, based on the reviewed literature. The determinant variables are classified in three major categories: women's socio-demographic characteristics, fertility preference and decision-making, and family planning program exposure. As the diagram depicts, the determinants are linked to each other and affect both modern contraceptive use and the changes overtime. The change in modern contraceptive use has two major components: change in composition and change in effects. Based on this conceptual framework, the analysis evaluated the effects of the outlined determinants on modern contraceptive use, as well as the changes that occurred in the last 10 years.

Figure 1. Conceptual framework



Research Questions

The increasing need for contraceptive services among the young population in Ethiopia and the consequences of non-use of contraception warrant answers to several important research questions surrounding determinants of contraceptive use and changes in use over time:

1. What are the levels and trends in contraceptive use among young married women age 15-24 in Ethiopia over a 10-year period?
2. What are the factors associated with contraceptive use among currently married young women age 15-24 in Ethiopia?
3. What are the main factors contributing to the recent changes in contraceptive use among young married women in Ethiopia?

Hypotheses

1. There has been significant change in the use of contraception among young married women in the past 10 years.
2. Different factors (residence, education, region, wealth index, media access) affect contraceptive use among the study group.
3. The increase in contraceptive use in Ethiopia between 2000 and 2011 can be explained by the compositional change in women's characteristics.

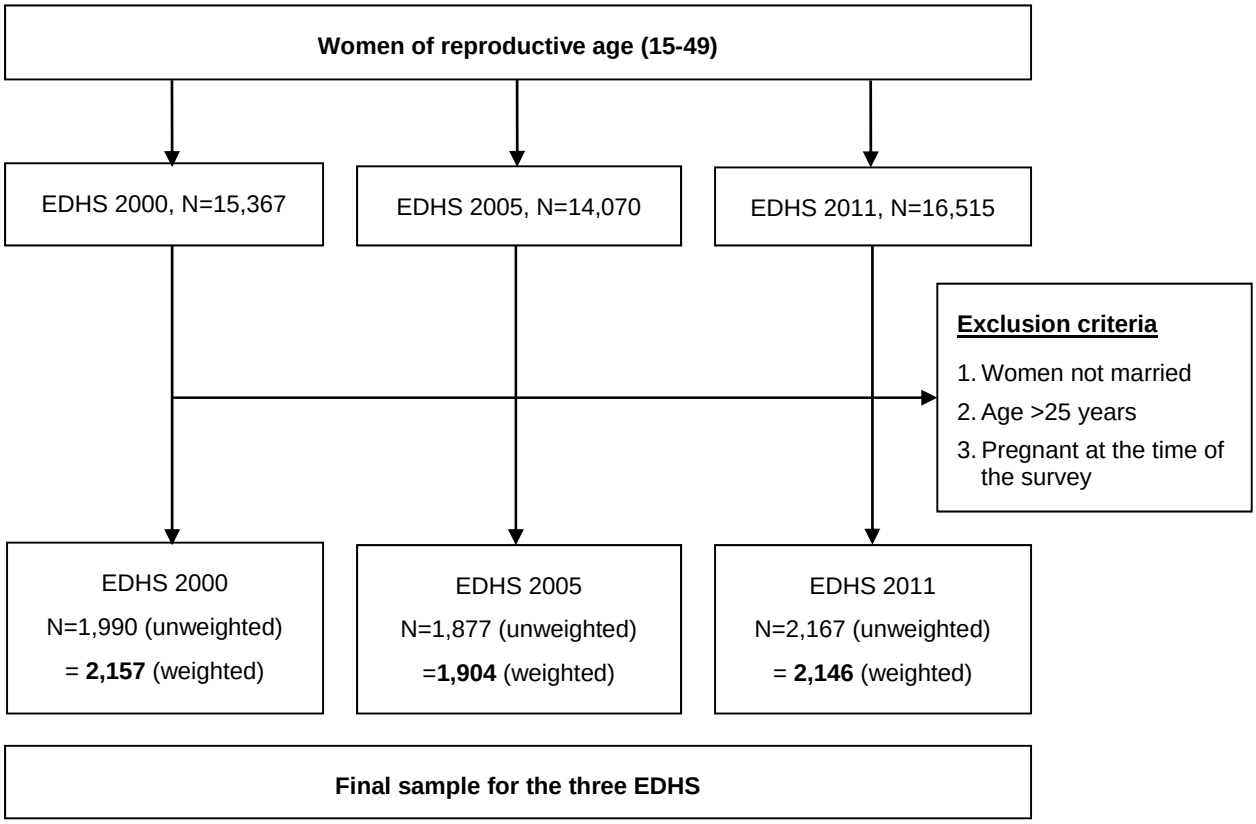
DATA AND METHODS

Data

The data for this study were accessed from the DHS program official database, after permission was granted through an online request explaining the objective of our study. The DHS collects data through nationally representative cross-sectional surveys in over 40 developing countries. The survey is usually conducted at five-year intervals in a country. Ethiopia has undertaken three consecutive DHS surveys, in 2000, 2005, and 2011.

In this study, our data are restricted to married and non-pregnant women age 15-24. Based on these criteria, our sample sizes from the three Ethiopian Demographic and Health Surveys (EDHS) were 1,990 women in 2000, 1,877 in 2005, and 2,167 in 2011 (Figure 2).

Figure 2. The exclusion procedures to identify the final sample size



Key Variables and Measurements

The study variables were classified into dependent and independent variables. The dependent variable was current modern contraceptive use, categorized dichotomously as a "Yes/No" variable. Respondents who were currently using a modern contraceptive method were categorized as "Yes," otherwise as "No."

The key independent variables were the following:

Socio-demographic variables

Socio-demographic factors can affect contraceptive use in different ways. For instance, more educated women, urban residents, and those in the richest quintile are generally more likely to use contraceptives. In addition, changes in the composition of the population for socio-demographic characteristics or changes in their effects could lead to an improvement in contraceptive use over time. The variables included in this category were age [15-19, 20-24], residence [rural, urban], region, religion [Orthodox, Muslim, Protestant, others], wealth index [poorest, poorer, middle, richer, richest], women's education [no education, primary, secondary and above], partner's education [no education, primary, secondary and above], working status [not working, working but not paid/paid in kind, paid in cash], and number of living children [0, 1, 2, 3+].

Fertility preference and decision-making

The literature suggests that family planning size concordance—couples agreement on family size—would affect women's contraceptive use. When a husband wants more children, the wife might not use contraception due to gender influence. Women's decision-making ability might have a positive influence on their contraceptive use. In addition, fertility preference in the timing of births affects women's contraceptive use. We also expect that there have been behavioral changes based on these variables that have affected contraceptive use over the last decade. The following operational definitions were applied to these variables: family planning size concordance [both want the same, husband wants more, husband wants fewer, do not know/missing]; women's participation in decision-making [not participated, participated]; and fertility preference [wants soon, wants later, wants no more].

Family planning program exposure

It is known that having previous exposure to family planning services and being knowledgeable about family planning increase contraceptive use. For this study, two variables were considered and defined in the following way: Family planning media exposure was taken when respondents heard about family planning on radio or television, or read about it in a newspaper. If not, they were considered as not having family planning media exposure. Moreover, when women are visited by health providers, including family planning workers, they can be encouraged to consider contraception in case they wanted to do so. For the study, being visited by family planning workers in the last 12 months was dichotomized as “Yes” and “No.” Similarly, knowing about different contraceptive methods is likely to have a positive effect on contraceptive use. Thus, in the study being knowledgeable about family planning was classified as “Yes” for knowledgeable and “No” for non-knowledgeable.

STATISTICAL ANALYSES

This study employed descriptive and trend analysis of modern contraceptive use, examination of the determinants of use, and decomposition of changes in modern contraceptive use. The trend in modern contraceptive use was analyzed using descriptive analyses, stratified by region, urban-rural residence, and selected socio-demographic characteristics. The trend was examined separately for the periods 2000-2005, 2005-2011, and 2000-2011.

Logistic regression analysis was also done to identify the determinants of contraceptive use among young married women, using data from the 2011 EDHS. Complex sample survey methodology was considered during analysis. Hence, the study adjusted for the effects of clustering due to sampling procedures and non-response.

Multivariate decomposition analysis of change in modern contraceptive use was employed to answer the major research question of this study. The analysis was a regression decomposition of the difference in modern contraceptive use between two surveys. The purpose of the decomposition analysis was to identify the sources of changes in the use of contraception in the last decade. Both changes in population composition and population behavior related to contraceptive use (effect) are important. This method is used for several purposes in demography, economics, and other fields. The present analysis focused on how use of contraception responds to changes in women's characteristics and how these factors shape differences across surveys conducted at different times.

The technique utilizes the output from a logistic regression model to parcel out the observed difference in contraceptive use into components. This difference can be attributed to compositional changes between surveys (i.e. differences in characteristics) and to changes in effects of the selected explanatory variables (i.e. differences in the coefficients due to changes in population behavior). Hence, the observed difference in modern contraceptive use between different surveys is additively decomposed into a characteristics (or endowments) component and a coefficient (or effects of characteristics) component.

For linear relations, the dependent variable is a function of a linear combination of predictors and regression coefficients, where:

$Y = F(X\beta)$ where Y denotes the N x 1 dependent variable, X is an N x K matrix of independent variables, and β is a K x 1 vector of coefficients, where A and B represent DHS 2011 and 2000 respectively.

The mean difference in Y between groups A and B can be decomposed as:

$$Y_A - Y_B = F(X_A\beta_A) - F(X_B\beta_B)$$

For our logistic regression, the logit or log-odds of modern contraceptive use is taken as:

$$\text{Logit (A) - Logit (B)} = F(X_A\beta_A) - F(X_B\beta_B)$$

$$= \underbrace{[F(X_A\beta_A) - F(X_B\beta_A)]}_{E} + \underbrace{[F(X_B\beta_A) - F(X_B\beta_B]}_{C}$$

The *E* component refers to the part of the differential owing to differences in *endowments* or characteristics. The *C* component refers to that part of the differential attributable to differences in coefficients or effects.

The equation can be presented as:

$$\text{Logit (A) - Logit (B)} = [\beta_{0A} - \beta_{0B}] + \Sigma X_{ijB} * [\beta_{ijA} - \beta_{ijB}] + \Sigma\beta_{ijB} * [X_{ijA} - X_{ijB}]$$

- X_{ijB} is the proportion of the jth category of the ith determinant in the DHS 2000,
- X_{ijA} is the proportion of the jth category of the ith determinant in DHS 2011,
- β_{ijB} is the coefficient of the jth category of the ith determinant in DHS 2000,
- β_{ijA} is the coefficient of the jth category of the ith determinant in DHS 2011,
- β_{0B} is the intercept in the regression equation fitted to DHS 2000, and
- β_{0A} is the intercept in the regression equation fitted to DHS 2011.

Data Analysis Software

STATA 12 was employed for data management and analyses. STATA commands were applied during the process of analysis. All calculations presented in this paper were weighted for the sampling probabilities and non-response. During testing of statistical significance or associations (95% confidence interval calculations), complex sampling procedures were considered.

RESULTS

Characteristics of the Study Population

Table 1 presents the characteristics of respondents (married women age 15-24) over the three EDHS periods. Among the respondents, about seven out of 10 in all three surveys were age 20-24. In terms of residence, in 2000 and 2005, 10% of respondents resided in urban areas, increasing to 18% in 2011. With regard to educational status, in the first two surveys about three-quarters (79% in 2000 and 74% in 2005) were not educated, while in EDHS 2011 only 49% were not educated. The proportion with primary education rose from 15% in 2000 to 41% in 2011.

Across the three DHS surveys, the proportion of Orthodox Christians showed a slight decline, from 52% to 47% between 2000 and 2011, while Protestants increased from 14% to 20%. The mean number of living children remained more or less similar across all three surveys. Concerning family size concordance, the percentage of husbands who wanted more children than their wives declined from 23% in 2000 to 14% in 2005, rising again to 19% in 2011. The percentage of husbands wanting the same number of children as their wives wanted (concordance) rose from 35% in 2000 to 48% in 2011.

Regarding young women's fertility preference, no difference was observed between 2000 and 2011 in the proportion wanting no more children. In all three surveys only a small proportion of women reported having been visited by a health worker, but the percentage rose from less than 2 percent in 2000 to 13% in 2011. The proportion of women with exposure to family planning information in the media doubled, from 16% in 2000 to 34% in 2011.

Except for age, region, religion, and number of living children, all other variables listed in Table 1 showed significant changes, when comparing the sample population in year 2000 with 2011.

Table 1. Percentage distribution of characteristics of the respondents, 2000, 2005, and 2011 Ethiopia Demographic and Health Surveys

Characteristics		2000 N=2,157	2005 N= 1,904	2011 N= 2,146
SOCIO-DEMOGRAPHIC CHARACTERISTICS				
Age	15-19	31.5	30.7	30.0
	20-24	68.5	69.3	70.0
Residence	Urban	10.2	10.1	17.8
	Rural	89.8	89.9	82.2
Region	Tigray	8.1	6.7	7.3
	Afar	1.4	1.4	1.2
	Amhara	29.6	30.6	30.6
	Oromiya	40.5	37.1	39.7
	Somali	0.8	3.2	1.9
	Ben-gumz	1.2	1.3	1.3
	SNNPR	16.4	16.5	14.0
	Gambela	0.4	0.4	0.6
	Harari	0.2	0.3	0.3
	Addis Ababa	1.2	2.0	2.8
	Dire Dawa	0.2	0.4	0.3
Religion	Orthodox	51.5	49.0	46.8
	Muslim	31.5	32.6	31.5
	Protestant	13.6	15.6	19.5
	Other/missing	3.5	2.8	2.2
Educational status	None	79.1	73.5	49.2
	Primary	14.6	19.2	40.6
	Secondary or above	6.3	7.4	10.2
Partner's educational status	None	56.20	51.9	39.9
	Primary	31.3	33.3	44.8
	Secondary or above	12.5	14.8	15.3
Working status	Not working	39.1	71.9	48.7
	Working but not paid/paid in kind only	43.8	21.5	22.8
	paid with cash	17.1	6.6	28.5
Wealth index	Poorest	9.8	22.8	26.4
	Poorer	18.6	18.4	16.8
	Middle	26.8	17.9	16.1
	Richer	21.4	15.6	15.4
	Richest	23.5	25.3	25.4
FERTILITY PREFERENCE AND DECISION-MAKING				
Number of living children	0	25.1	22.3	25.5
	1	38.7	39.4	37.6
	2	24.0	25.5	26.3
	3+	12.2	12.8	10.6
	Mean	1.1	1.2	1.2

(Continued...)

Table 1. – *Continued*

Characteristics		2000 N=2,157	2005 N= 1,904	2011 N= 2,146
Family size concordance	Both want same	35.3	37.0	47.9
	Husband wants more	21.0	14.3	18.6
	Husband wants fewer	3.6	4.2	5.9
	Do not know/missing	40.2	44.5	27.6
Fertility preference	Wants soon	30.3	22.1	22.1
	Wants later	56.7	58.2	64.2
	Wants no more	10.8	18.8	11.6
	Undecided	2.2	0.9	2.2
Women's decision-making	Not participated	NA	57.4	47.8
	Participated	NA	42.6	52.2
FAMILY PLANNING PROGRAM EXPOSURE				
Knowledge of modern contraceptives	No	16.7	13.0	2.8
	Yes	83.3	87.0	97.2
Visited by health worker	No	98.5	93.2	87.2
	Yes	1.5	6.8	12.8
FP media exposure	No	83.7	72.9	66.3
	Yes	16.3	27.1	33.7

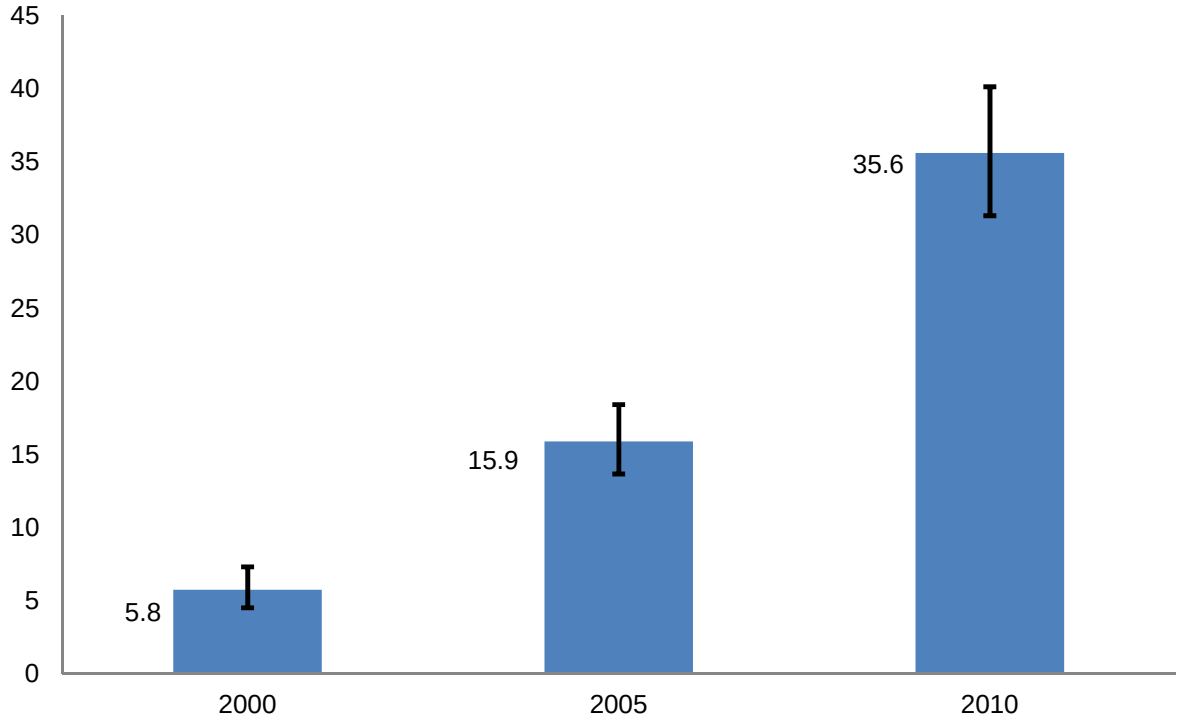
Trends in Contraceptive Use

This section presents trends in contraceptive use during the period 2000-2011. Looking at the overall trend, Ethiopia has shown a significant increase in modern contraceptive use among young married women over the study period, from 6% in 2000 to 16% in 2005, and to 36% in 2011 (Figure 3).

The trend period was divided into two phases, 2000-2005 and 2005-2011, to see the differences in increase over time. The largest increase in modern contraceptive use was seen in the second phase (2005-2011) with a 19.7 percentage point change compared with a 10.4 percentage point change in the first phase (2000-2005) (Table 2).

The trends in modern contraceptive use by young women showed variation according to their characteristics. Major increases in contraceptive use were observed in some of the categories. Among rural residents, the largest increase in modern contraceptive use was observed during the second phase of the study period (2005-2011), at a 16.9 percentage point increase compared with a 9.5 percentage point increase during the first phase (2000-2005).

Figure 3. Trends in contraceptive use among Ethiopian young married women in the past 10 years, Ethiopia Demographic and Health Surveys 2000-2011



Bars indicate 95% confidence interval

Three regions—Amhara; Oromia; and Southern Nations, Nationalities, and Peoples' Region (SNNPR)—showed the greatest increases in modern contraceptive use between 2000 and 2011. Young women with secondary and above education showed a 34.3 percentage point increase in contraceptive use between 2000 and 2011.

Both young age groups (15-19 and 20-24) showed an increase in modern contraceptive use. Women age 20-24 showed a larger increase in contraceptive use than women age 15-19. Regarding family size concordance, among women whose husbands wanted the same number of children as they did, contraceptive use increased by 37.7 percentage points between 2000 and 2011, nearly twice as much as among women whose husbands wanted more children than they did (20.5 percentage points) (Table 2).

Table 2. Trend in modern contraceptive use among young currently married women by selected characteristics, 2000, 2005, and 2011 Ethiopia Demographic and Health Surveys

Characteristics	EDHS 2000 n=2,157	EDHS 2005 n=1,904	EDHS 2011 n=2,146	Percentage point difference in modern contraceptive use		
				Phase I 2005-2000	Phase II 2011-2005	Overall 2011-2000
Residence						
Urban	35.0	51.4	66.7	16.4	15.3	31.7
Rural	2.42	11.9	28.9	9.5	16.9	26.4
Region						
Tigray	8.7	17.1	24.5	8.4	7.4	15.8
Afar	11.4	11.0	11.4	-0.4	0.4	0.0
Amhara	4.8	17.3	38.5	12.6	21.2	33.8
Oromiya	3.9	14.3	33.4	10.4	19.1	29.5
Somali	4.6	0.0	3.8	-4.6	3.8	-0.8
Benishangul-Gumuz	14.1	13.3	41.4	-0.8	28.1	27.3
SNNP	5.8	13.5	37.8	7.7	24.3	32.0
Gambela	12.0	23.6	47.7	11.6	24.0	35.7
Harari	24.1	32.1	39.6	8.1	7.5	15.5
Addis Ababa	48.3	62.1	79.2	13.8	17.2	31.0
Dire Dawa	28.3	35.3	38.4	7.1	3.1	10.2
Age						
15-19	3.9	10.4	27.3	6.6	16.9	23.4
20-24	6.6	18.3	39.2	11.7	20.9	32.6
Women's education						
No education	2.6	10.3	24.4	7.7	14.2	21.9
Primary	10.8	24.7	41.0	13.9	16.3	30.1
Secondary +	34.2	49.5	68.5	15.3	19.0	34.3
Husbands' education						
No education	2.1	9.1	24.5	7.1	15.3	22.4
Primary	6.2	19.2	38.4	13.0	19.2	32.3
Secondary +	21.3	32.4	56.5	11.0	24.1	35.2
Religion						
Orthodox	6.6	21.4	42.3	14.8	20.9	35.7
Muslim	5.0	12.1	22.2	7.1	10.1	17.2
Protestant	5.9	8.5	43.7	2.6	35.2	37.8
Others	0.0	5.2	14.4	5.2	9.2	14.3
Working status						
Not working	6.3	14.0	34.5	7.7	20.5	28.1
Working but not paid	2.7	15.7	27.2	13.0	11.5	24.5
Paid with cash	12.3	37.4	44.3	25.1	6.9	32.0
Visited by health worker						
Yes	(36.9)	20.4	38.6	-16.5	18.2	1.7
No	5.2	15.6	35.2	10.4	19.6	30.0

(Continued...)

Table 2. – *Continued*

Characteristics	EDHS 2000 n=2,157	EDHS 2005 n=1,904	EDHS 2011 n=2,146	Percentage point difference in modern contraceptive use		
				Phase I 2005-2000	Phase II 2011-2005	Overall 2011-2000
FP media exposure						
No	3.8	10.0	27.6	6.2	17.6	23.8
Yes	15.6	31.8	51.2	16.2	19.4	35.6
Family size concordance						
Both want same	9.3	23.9	50.0	14.5	23.1	37.7
Husband wants more	5.8	11.6	26.3	5.8	14.7	20.5
Husband wants fewer	9.1	23.1	39.7	14.0	16.6	30.6
Do not know/missing	2.3	9.9	21.3	7.6	11.4	19.0
Total	5.8	15.9	35.6	10.1	19.7	29.9

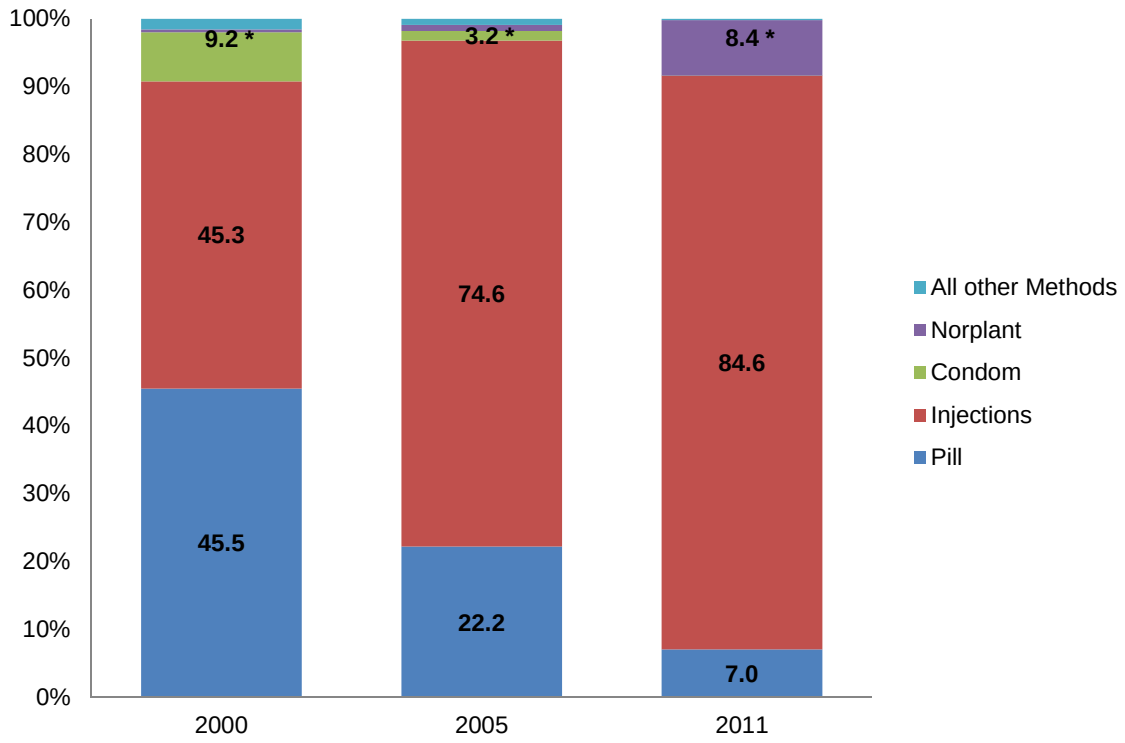
Figures are presented in percentages of users from weighted sample (n)
Figures in "( )" indicate sample size is <50

Trends in Contraceptive Method Mix

Figure 4 depicts trends in modern contraceptive method mix among young married women in the three EDHS. In 2000, pills and injectables were used about equally, but by 2011 the proportion using pills had declined from 46% in 2000 to only 7%, while the proportion of contraceptive users relying on injectables nearly doubled, to 85% in 2011.

In all three surveys the main source of contraception for young married women was the public sector (75% in 2000, 79% in 2005, and 81% in 2011). The private sector contributed about 17%, at nearly similar levels over the three surveys.

Figure 4. Trends in contraceptive method mix among young married women in 2000, 2005, and 2011 Ethiopia Demographic and Health Surveys



* The top number in each bar is the subtotal for condoms, Norplant, and all other methods.

Determinants of Contraceptive Use

The variables selected for multivariate logistic regression based on the conceptual framework were related to socio-demographic characteristics, fertility preference, and family planning program exposure.

The multivariate analysis indicated that wealth index, age, religion, women's education, family size concordance, and fertility preference remained significant in the final model (Table 3).

The odds of contraceptive use were higher for women with secondary and above education, women age 20-24, and women wanting a child later or wanting no more children, compared with women with no formal education, women age 15-24, and women wanting a child soon.

Table 3. Final logistic regression model with crude and adjusted odds ratio using the 2011 Ethiopia Demographic and Health Survey (n=2,146)

Variables		Contraceptive use (%)	COR	AOR	95% CI AOR
Wealth index	Poorest	14.8			
	Poorer	26.9	2.12**	1.81*	1.08 - 3.05
	Middle	31.4	2.64**	2.29**	1.36 - 3.84
	Richer	37.4	3.48**	2.97***	1.67 - 5.31
	Richest	66.5	11.44**	5.49***	2.74 - 10.98
Age	15-19	27.3			
	20-24	39.2	1.72**	1.64**	1.15 - 2.34
Residence	Urban	66.9			
	Rural	28.9	0.20	1.18	0.65 – 2.13
FP media exposure	No	27.7			
	Yes	51.3	1.16	1.20	0.84 - 1.73
Women's education	None	24.4			
	Primary	50.0	2.15	1.41	0.96 - 2.08
	Secondary+	68.5	6.72	2.17*	1.12 - 4.22
Husbands' education	None	24.5			
	Primary	38.4	1.93***	0.97	0.67 - 1.39
	Secondary+	56.5	4.00***	0.60	0.33 - 1.12
Religion	Muslim	22.2			
	Orthodox	42.3	2.56	2.55***	1.68-3.87
	Protestant	43.7	2.72	2.45**	1.38 – 4.34
	Others/Missing	14.4	0.59	1.10	0.27 -4.47
Occupation	Not working	34.5			
	Paid in kind	27.2	0.71	0.82	0.54 - 1.23
	Paid with cash	44.3	1.51*	1.10	0.78 - 1.54
Family size concordance	Both want same	47.0			
	Husband wants more	26.3	0.40***	0.45***	0.29 - 0.70
	Husband wants fewer	39.7	0.74	0.79	0.44 - 1.43
	Don't know/ Missing	21.3	0.31***	0.40***	0.28 - 0.58
Number of living children	0	34.1			
	1	39.8	1.27	0.98	0.63 - 1.53
	2	35.5	1.06	0.88	0.53 - 1.47
	3+	24.6	0.63	0.61	0.32 - 1.14
Women's decision-making	Not participated	28.0			
	Participated	42.6	1.91***	1.21	0.82 - 1.79
Fertility preference	Wants soon	24.0			
	Wants later	38.7	1.99***	2.03**	1.31 - 3.13
	Wants no more	41.0	2.19**	2.09*	1.15 - 3.82
	Undecided	33.3	1.57	2.28	0.82 - 6.33

Significant at α value of *=0.05, **= 0.01, ***=0.001

The odds of modern contraceptive use increase as wealth increases. Compared with the poorest quintile of women, the odds of using contraceptive were 1.81, 2.29, 2.97, and 5.49 times higher among the poorer, middle, richer, and richest women, respectively. Women age 20-24 had 1.64 times higher odds of contraceptive use than women age 15-19. Women with secondary or above education had 2.17 times higher odds of contraceptive use compared with non-educated women. Women belonging to the Orthodox Christian or Protestant religious groups had more than twice the odds of contraceptive use compared with Muslim women.

Women whose husbands wanted more children had 55% lower odds of contraceptive use than women whose husbands wanted the same number of children as they did. Likewise, women had 60% lower odds of contraceptive use if they did not know how many children their husbands wanted to have. The odds of contraceptive use were about twice as high among women wanting a child later or wanting no more children, compared with women who wanted a child soon.

Decomposition Analysis

Difference due to characteristics

The decomposition analysis revealed that about 24% of the overall percentage change in modern contraceptive use by young married women was due to difference in characteristics (compositional factors). Among the compositional factors, a significant contribution to the positive change in contraceptive use was associated with women's education. Education is an important variable for use of contraception (Table 3). Thus an increase in the composition of women's attainment of primary and above education over the survey period (Table 1) showed a significant contribution to the change in modern contraceptive use (Table 4).

Although compositional changes were small (Table 1), an increase in the proportion of young women age 20-24 in the sample made a significant contribution to increasing use of modern contraception (Table 4). As indicated in Table 3, Orthodox Christian and Protestant religions were associated with more use of contraception compared with the Muslim religion. Hence, a decreasing proportion of Orthodox Christians in the sample (Table 1) showed a significant negative impact on the use of modern contraceptive methods. On the other hand, an increasing proportion of Protestants in the sample was associated with a significant contribution to the percentage increase of modern contraceptive use (Table 4).

Another compositional factor affecting contraceptive use was family size concordance. A decline over the survey period in the proportion of husbands wanting to have more children than their wives wanted significantly contributed to the increasing use of modern contraceptive use in the last decade (Table 4). Similarly, an increase in the composition of women with fertility preference for spacing and limiting births showed significant contributions to the observed changes in modern contraceptive use among young women (Table 4).

Difference due to effects of characteristics

After controlling for the role of compositional changes, about two-thirds of the increase in contraceptive use was due to difference in the effects of characteristics. Factors including residence and religion showed a significant effect for the observed positive change in contraceptive use. Other things being equal, about one-third of the increase in modern contraceptive use in the past decade was due to a change in modern contraceptive use behavior among the rural population. Compared with followers of the Muslim religion, followers of other religions, especially the Orthodox Christian religion, showed a significant contribution to the observed percentage increase in modern contraceptive use over the decade. The effect of religion has become more important over time (Table 4).

Table 4. Decomposition of change in modern contraceptive use among young married women in Ethiopia, 2000 to 2011

		Difference due to characteristics (E)		Difference due to coefficients (C)	
Modern contraceptive use		**Coef.**	**Pct**	**Coef.**	**Pct.**
Age	15-19				
	20-24	0.00133**	0.44522	0.01218	4.07930
Residence	Urban				
	Rural	0.01202***	4.02580	0.09849**	32.99700
FP media exposure	No				
	Yes	0.00857	2.86960	0.00056	0.18869
Women's education	None				
	Primary	0.02170**	7.26820	-0.00042	-0.13943
	Secondary+	0.00723**	2.42230	-0.00114	-0.38330
Husbands' education	None				
	Primary	0.00210	0.70214	-0.01365	-4.57230
	Secondary+	-0.00100	-0.33537	-0.00382	-1.27900
Religion	Muslim				
	Orthodox	-0.00770**	-2.57820	0.04824**	16.16200
	Protestant	0.00879**	2.94380	0.01295*	4.33810
	Others/Missing	0.00034	0.11506	0.01268***	4.24880
Occupation	Not working				
	Paid in kind	0.00991	3.31950	-0.01263	-4.23260
	Paid with cash	0.00254	0.84942	-0.00641	-2.14660
Family size concordance	Both want same				
	Husband wants more	0.00356**	1.19130	-0.00803	-2.68980
	Husband wants fewer	-0.00135	-0.45294	0.00097	0.32619
	Don't know/ Missing	0.02186**	7.32320	-0.00319	-1.06850
Number of living children	0				
	1	0.00002	0.00626	0.00856	2.86700
	2	-0.00033	-0.11104	-0.00046	-0.15287
	3+	0.00124	0.41442	0.00038	0.12588
Fertility preference	Wants soon				
	Wants later	0.00917**	3.07120	-0.00198	-0.66481
	Wants no more	0.00099*	0.33123	-0.00591	-1.98040
	Undecided	0.00003	0.00902	0.00308	1.03020
Constant				0.05662	18.97000
Total		0.1014**	33.977	0.197**	66.023

*Significant at 0.05, **Significant at 0.01, ***Significant at <0.001

DISCUSSION

This study examined the trends and determinants of modern contraceptive use among young married women in Ethiopia. The study was designed to identify the major factors positively or negatively contributing to the changes in contraceptive use in the past 10 years. The study used data from the 2000, 2005, and 2011 Ethiopia DHS surveys.

Trends in Contraceptive Use

Young women's modern contraceptive use increased substantially over the last decade. Ethiopia is one of the three counties in sub-Saharan Africa with the most rapid increase in modern contraceptive use (USAID/Africa Bureau 2011). Except for 2000, young married women show a higher trend of contraceptive use compared with the overall prevalence trend in Ethiopia (UNFPA 2012). The largest increase in modern contraceptive use was in the second survey period, 2005-2011. This may be attributed to rigorous family planning programs by the government and NGOs, through improvement in the health care infrastructure and government attention to meeting the Millennium Development Goals (MDGs) through health sector development strategies (USAID/Africa Bureau 2011).

Current Determinants of Contraceptive Use

Modern contraceptive use showed significant variation according to socio-demographic characteristics of Ethiopian young women. Based on analysis of the 2011 EDHS, the odds of using contraception are higher among women age 20-24 compared with age 15-19. This could be partly explained by the fact that as young women grow older many changes come together, such as cognitive maturation, awareness, and other psychosocial skill developments. As a result, they are more likely than younger women to consider contraceptive options.

Young women in the richer wealth index quintiles are more likely to use modern contraceptive methods compared with the poorest wealth category. A similar finding is observed in studies conducted in different African countries (Adebowale et al. 2014; Creanga et al. 2011; Nketiah-Amponsah, Arthur, and Aaron 2012; Wenjuan et al. 2012). This could be linked with many factors. Poor women might face difficulties in getting access to services. Moreover, economic power is the source of an ability to exercise one's rights. Hence, poor women may not achieve their family planning needs to the same extent that wealthier women are able to.

Compared with non-educated women, contraceptive use is significantly higher among women with secondary and above educational status. This is because higher educational attainment can provide opportunity for better information on contraceptive methods and better access to services. Moreover, women with more education are more likely to be engaged in professional and other employment activities and thus more likely to want to limit their number of children. A recent study conducted in Malawi is in line with this finding (Adebowale et al. 2014).

The analysis revealed significant differences in contraceptive use across different religious groups. Muslim women have lower odds of contraceptive use compared with Orthodox Christian or Protestant women. Some studies indicate similar observations (Lakew et al. 2013; Srikanthan and Reid 2008). However, the role of religion on contraceptive use is not well studied in Africa.

Beyond the socio-demographic variables, couple's family size concordance and women's fertility preference are significantly associated with modern contraceptive use among young women. Women whose husbands want to have more children than they do have lower odds of contraceptive use compared with women whose husbands want a similar number of children. Likewise, they have lower odds of contraceptive use if they do not know how many children their husbands want to have. This might be due to husbands' demands for more children having a negative influence on women's contraceptive use, which in turn might affect decisions on the number of children desired (Bankole and Singh 1998; Nalwadda et al. 2010; Nketiah-Amponsah, Arthur, and Aaron 2012). As expected, the study found that the odds of contraceptive use are higher when women want a child later or want to limit births, compared with women who want a child soon.

Decomposition of Changes in Contraceptive Use

Analysis of the 10-year trend (2000 to 2011) showed a remarkable change in the use of modern contraceptives in Ethiopia. Hence, understanding the source of change has programmatic importance for both Ethiopia and other countries.

Difference due to women's characteristics

About a third of the overall change in modern contraceptive use by young married women is due to difference in characteristics. The finding is much lower than the previous reports based on analysis of women age 15-49 in Ethiopia (UNFPA 2012) and a study in Cameroon (Pillai and Teboh 2011). The most important concept in this part is that significant contribution of the change arises when the composition of the population changes according to important variables.

An increase in the composition of women's attainment of primary and above education showed a significant effect on contraceptive use and contributed about 10% of the changes. Currently, girls' education is on the government priority agenda in Ethiopia. Therefore, the proportion of educated young women is expected to rise and to continue having an impact on contraceptive use in the future.

Compositional changes by categories of religion are associated with both negative and positive impacts on the trend in use of contraception. A decreasing proportion of Orthodox Christians (who use contraception more than Muslims) negatively affected the trends in contraceptive prevalence, and an increasing proportion of Protestants (who also use contraception more than Muslims) had a positive effect on the prevalence trends. The finding implies that appropriate strategies are needed to improve service access and benefits of family planning programs, especially in Muslim-dominated regions of the country.

The decline over time in the proportion of husbands who want more children than their wives want has contributed significantly to increasing modern contraceptive use in the last decade. This finding can reflect an increasing trend of discussion and agreement between husbands and wives on family size and contraceptive use. In this case, the decision of the husband is particularly important in patriarchic societies like Ethiopia.

The analysis also showed that an increase in the composition of women having a fertility preference for spacing and limiting their births contributed significantly to the observed changes in modern contraceptive use among young women. Such a change can be a reflection of a growing awareness of the importance of family planning and of new attitudes toward lower fertility. A decline in desire for having more children can reflect the growing engagement of young women in development activities, including education.

Difference due to effects of characteristics

The decomposition analysis revealed that about two-thirds of the increase in contraceptive use over the past decade is due to difference in the effects of characteristics (coefficients). This finding is in line with a study in Rwanda, where most of the increase in contraceptive use was found to be due to change in coefficients (Muhoza, Rutayisire, and Umubyeyi 2013).

One of the striking findings from the decomposition analysis is the effect of residence. About a third of the increase in modern contraceptive use among young married women in the past decade is due to changes in contraceptive use behavior of the rural population. Although urban women's prevalence of contraceptive use (67%) still far exceeds rural prevalence (29%), the biggest increase has been in the rural areas, where most of the population lives (an 11-fold increase in rural areas compared with a two-fold increase in urban areas). Overall, the finding shows that the behavior of the rural population in using contraception is improving over time.

Government commitments to improve family planning and other health service access might explain this finding. As noted in previous studies (Medhanyie et al. 2012; USAID/Africa Bureau 2011), the implementation of the Health Extension Program is the major reason, with provision of family planning services in the rural areas and recently in urban settings of the country. For this purpose, more than 33,000 Health Extension Workers were deployed, mostly in the rural parts of the country. The family planning package, one of the 16 aspects of rural health care provided by Health Extension Workers, has as its objectives to address misconceptions concerning family planning in the community, to counsel clients on all family planning methods, and to provide short-acting contraceptive methods (FMOH 2007).

Another remarkable finding in this part of the analysis is the effect of religion. The changes in contraceptive use behavior differ significantly among the categories of religion. Most of the increase in contraceptive use since 2000 has been among followers of the Orthodox Christian and Protestant religions. As recognized in previous studies (UNFPA 2012), the effect of religion has become more important over time. In 2000, contraceptive use was more or less similar in the three major religions (5% to 6%). Over the 10-year period studied, Orthodox Christian and Protestants showed a 36% and 38% increase, respectively, compared with 17% among Muslims (Table 2). Although there is no supporting evidence on the reasons for the

difference among religions, religious belief is one of the psychosocial barriers when women think about using a method for fertility regulation. However, studies may need to understand the major reasons for slow progress in adopting family planning, in order to identify factors with programmatic relevance.

Strengths and Limitations of the Study

This study had a number of strengths. First, the study utilized large datasets representing the whole country, and thus the findings were based on adequate statistical power. Second, calculations were done after the data were weighted for the sampling probabilities and non-response. Complex sampling procedures were also considered during testing of statistical significance. Third, analytic techniques such as decomposition analysis were applied, to understand the sources of change in modern contraceptive use.

This study highlighted important findings to support family planning programs in Ethiopia, but it is not without limitations, which could affect conclusions based on some of the findings. During decomposition analysis, important variables such as women's decision-making, representing women's autonomy, were not included due to lack of data about this variable in the 2000 EDHS. However, some of the contribution of this variable can be represented by the variable "couple's concordance on family size." Comparability of the wealth index across the three surveys was difficult, as the EDHS measurement tools for the wealth index were different among the surveys, and hence this variable was excluded from the trend analysis.

CONCLUSIONS

Modern contraceptive use among young married women has showed a remarkable increase over the last decade in Ethiopia. Wealth index, age, religion, women's education, family size concordance, and fertility preference were significantly associated with young women's modern contraceptive use in 2011.

One-third of the overall change in modern contraceptive use by young married women over the decade was due to difference in characteristics between the 2000 and 2011 EDHS. Changes in the composition of young women's characteristics according to age, educational status, religion, couple concordance on family size, and fertility preference were the major sources of the increase in contraceptive prevalence among this group.

Two-thirds of the increase in contraceptive use was due to change in contraceptive use behavior. Most importantly, the increase was due to change in contraceptive use behavior among the rural population and among Orthodox Christians and Protestants.

Recommendations

Program interventions, including health behavior education and family planning services and counseling, are especially needed for some categories of the population, including poor, younger (adolescents), illiterate, and Muslim young married women. Strengthening community-based and school-based family planning programs are strategies to maintain young women's contraceptive use and to advance it further. It is mandatory to continue education of the young population, as education is one of the major factors contributing to increasing contraceptive use among young people in Ethiopia.

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