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## **ABSTRACT**

In Ethiopia, the proportion of births that occur at home remains high, and skilled health professionals attend very few births. Considering these facts, this study examined factors determining institutional delivery care service utilization in Ethiopia, using data from two rounds of the Demographic and Health Surveys (DHS) in Ethiopia (2000 and 2005). Using the binomial logistic regression model, the study showed that women residing in urban areas, women with secondary and higher education, and women from the wealthiest households were most likely to utilize delivery care services. In addition, the study found that four or more antenatal visits and birth order of children were significant predictors of institutional delivery. Further, the study showed that delivery service utilization did not change significantly between the two survey years.

Based on these findings, it can be recommended that there should be progress toward a health education program that enables more women to utilize maternal health care services, including delivery care. To meet the goal, this program should target specific groups, including rural and uneducated women, through appropriate media. It should also target mothers with higher birth orders and should encourage more use of antenatal care during pregnancy. Finally, improvement in the socioeconomic status of women is crucial to enabling more women to seek care during pregnancy and delivery.





## INTRODUCTION

Maternal deaths cause considerable social and personal distress in families, especially because women have the major responsibility in most family matters, including raising children (Mekonnen 2003). In 2008, 358,000 maternal deaths occurred worldwide from preventable complications during pregnancy and childbirth, according to estimates by WHO, UNICEF, UNFPA, and the World Bank. Moreover, 99 percent of maternal deaths (355,000) in 2008 occurred in developing countries, and an estimated 87 percent (313,000) occurred in sub-Saharan Africa and South Asia (WHO 2008). Similarly, the World Health Organization (WHO) has reported that the proportion of deliveries attended by skilled health providers rose from 58 percent in 1990 to 68 percent in 2008 worldwide, but remained at only about 50 percent Africa (WHO 2011).

In Ethiopia, maternal mortality and morbidity levels are among the highest in the world (CSA and ORC Macro 2001, 2006). According to the 2000 Ethiopia Demographic and Health Survey (EDHS), the maternal mortality ratio in 2000 was 871 maternal deaths per 100,000 live births (CSA and ORC Macro 2001). The corresponding figure reported in the 2005 EDHS was 673 deaths per 100,000 live births (CSA and ORC Macro 2006). An explanation for this poor health status among women could be that a considerable proportion of women in the country do not have access to or do not use health services (Mesfin et al. 2004).

The proportion of births that occur at home remains high in Ethiopia, and skilled health professionals attend very few births. The proportion of births attended by a skilled health professional and delivered in a health facility has remained around 6 percent over the past five years (Macro International 2007), a far lower level than in other African countries, such as Cameroon (62 percent), Senegal (62 percent), Malawi (57 percent), and Lesotho (52 percent). Increasing the proportion of births delivered in a health facility and under the supervision of health professionals is important to lowering health risks among mothers and children (Macro International 2007).

The safe motherhood initiative strongly emphasizes ensuring the availability and accessibility of skilled care during pregnancy and childbirth, of which institutional delivery is one element. This would avoid most maternal deaths occurring from preventable obstetric complications. However, as previous studies have clearly demonstrated, the utilization of

existing maternal health services is very low in Ethiopia (CSA and ORC Macro 2001, Mekonnen 2003).

Previous studies have identified several factors hindering maternal delivery care service utilization. Even if there is physical access to institutional delivery services, many women may not use them because of demographic and socioeconomic factors at individual, household, and community levels that shape an individual's ability to seek health care. However, few attempts have been made to show how these factors affect institutional delivery in Ethiopia.

This study, therefore, has tried to fill the gaps in understanding the status of women using healthcare services for delivery by identifying determinants of facility delivery in Ethiopia and their change over time. By doing so, the findings could inform interventions aimed at improving institutional delivery service utilization in the country.

## **REVIEW OF RELATED LITERATURE AND CONCEPTUAL FRAMEWORK OF THE STUDY**

### **Magnitude of Delivery Care Service Utilization**

Maternal health care service utilization is important for the improvement of both maternal and child health. In a study of six African countries, lower rates of maternal and neonatal mortality and morbidity were shown to have a positive relationship with giving birth in a health facility with the help of skilled medical personnel (Stephenson et al. 2006). Improving maternal and child health requires increasing the percentage of women giving birth in health institutions with the assistance of trained staff, which is the central goal of the safe motherhood and child survival movements (Kesterton et al. 2010).

However, in many developing countries the majority of births are delivered at home. According to an analysis of DHS data from 48 developing countries since 2003, in 23 countries more than half of the births are reported to take place at home (Montagu et al. 2011). A study on delivery practices among women in rural India, Punjab, showed that more respondents reported home delivery than reported institutional delivery (Garg et al. 2010). Another study in a semi-urban settlement of Zaria Northern Nigeria showed that most women (70 percent) delivered at home and that a majority of deliveries (78 percent) were not supervised by skilled personnel (Idris et al. 2006).

In Ethiopia, according to the 2000 EDHS the great majority of births (95 percent) are attended at home, but with a large difference between urban areas (68 percent) and rural areas (98 percent). Further, as reported in the 2005 EDHS, the majority of births at home take place in poor hygienic conditions, while only 6 percent are in a health facility and are assisted by trained personnel (CSA and ORC Macro 2006). Moreover, a study among mothers of childbearing age in North Gonder Zone and North West Ethiopia showed that the vast majority of births occurred at home (Mesfin et al. 2004). Another finding from the John Snow Inc. L10K baseline survey conducted in 2009 showed that, although institutional delivery improved over the four years since the 2005 EDHS, it was only 12 percent in 2009, and few deliveries were assisted by Health Extension Workers (HEWs), even though the HEWs had received in-service training (JSI 2009).

## **Factors Associated with Delivery Care Service Utilization**

Several studies have shown that women's use of health facility delivery services is influenced by their demographic background characteristics and their socioeconomic status. A study in rural India showed that institutional delivery is much more common for first births than for subsequent births (Kesterton et al. 2010). Regarding age at delivery, another study in rural India, Punjab, revealed that institutional deliveries were more common in comparatively younger age groups, at 43 percent for women age 18-25 compared with 23 percent for women age 36-45 (Garg et al. 2010).

A study in Kathmandu, Nepal, showed that 70 percent of women age 20-34 had their most recent birth in a health facility compared with 58 percent of women age 35. The same study revealed that about 79 percent of women with a first pregnancy and 70 percent of women with a second pregnancy delivered in a health facility compared with 50 percent of women with a fourth or higher-order pregnancy (Pradhan 2005).

Home delivery is more common among poorer than wealthier women. In a study in Nepal, a higher percentage of women with a higher income level gave birth in a hospital compared with those with a lower income (Pradhan 2005). A study among expectant mothers in Ghana found that women from households in the highest income quintile were more likely to demand institutional delivery, by 18 percentage points, compared with women in the lowest wealth quintile (Nketiah-Amponsah and Sagoe-Moses 2009). Exposure to mass media is also another important factor associated with place of delivery. The same study in Ghana found that women who had access to media/health information via television were more likely to have institutional delivery (Nketiah-Amponsah and Sagoe-Moses 2009). A maternal health care service utilization study conducted in three states of South India with different social settings also found that mass media exposure had a positive association with delivering at health facilities (Navaneetham and Dharmalingam 2000).

In the Nepal study, the percentage of deliveries in a health facility was nearly double for women at the highest education level compared with uneducated women (Pradhan 2005). In addition, according to the analysis of DHS data in six sub-Saharan countries cited above, women's higher level of education was associated with an increase in the decision to seek health

care. In Malawi, Tanzania, and Ghana, living in urban areas increased the probability of a woman having her most recent birth in a health facility (Stephenson et al. 2006).

Antenatal care (ANC) utilization is also another factor associated with institutional delivery. A study among expectant mothers in Ghana indicated that women with at least four ANC visits were more likely to give birth in health institutions (Nketiah-Amponsah and Sagoe-Moses 2009). A similar finding was seen in a community-based study among rural women in western Kenya. In this study, among women who did not visit an antenatal clinic only 1.6 percent delivered in a health facility compared with 10 percent among women who made one to three visits, and 27 percent among women who made four or more visits (Navaneetham and Dharmalingam 2000).

In Ethiopia, several studies have also shown that antenatal care service utilization is a strong determinant of utilization of institutional delivery. Analysis of 2005 EDHS data showed that seeking assistance during delivery was strongly associated with use of ANC services (Eyerusalem 2010). Moreover, a study from Amhara region North Shewa zone showed that women who had made at least one ANC visit were at least six times more likely than women with no ANC visits to give birth at health facility. In addition, women with five or more ANC visits were at least two or three times more likely to use a health facility for delivery compared with women with two to four visits, or only one visit. Mothers with at least five ANC visits during their last pregnancy were also significantly more likely to give birth in a facility than mothers with only one ANC visit. Concerning the reasons for not using modern health services, in the same study 44 percent of respondents reported that they were not seriously ill, while 15 percent said they were too busy with household chores, and 14 percent cited the high cost of the facility (Geberehiwot 2009).

Determinants of low utilization of institutional delivery in Ethiopia include maternal age, birth order of the child, low educational level, low income, and rural-urban residence (Mekonnen and Mekonnen 2002). According to the 2005 EDHS, births to younger mothers (under age 35), first births, and births to women with more education are more likely to be assisted by a trained health professional (CSA and ORC Macro 2006). Further, the community-based study in North Gonder revealed that the higher the level of mothers' education the more likely mothers were to give birth at a health facility. The same study showed that access to radio had a positive

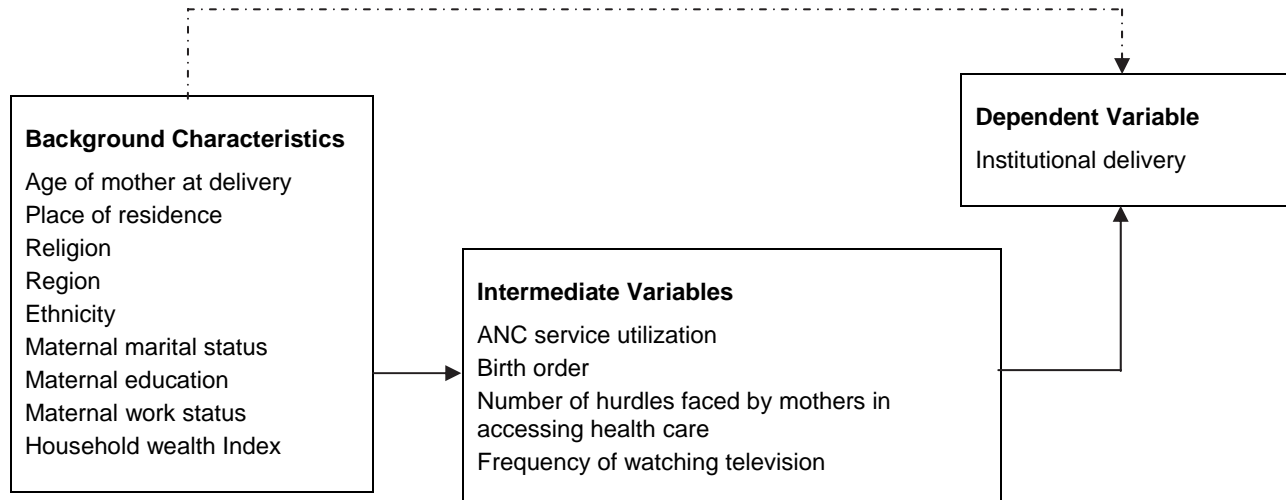
association with giving birth at health institutions (Mesfin et al. 2004). Additionally, a study conducted in Amhara region North shoa zone revealed that women in households that possessed a radio were more than three times as likely as households without a radio to deliver in health facilities (Geberehiwot 2009).

An in-depth analysis of the 2005 EDHS showed a remarkable level of difference in utilization of delivery services by place of residence, whether urban or rural. Women living in Addis Ababa were 40 times more likely to get skilled help giving birth than women in rural areas (Ethiopian Society of Population Studies 2008). Another study in Southern Ethiopia also showed great variation in professionally assisted delivery between rural and urban areas. In rural areas trained medical personnel attended only 1.2 percent of deliveries compared with 43 percent in urban areas (Mekonnen 2003).

### **Conceptual Framework of the Study**

This study tried to explore different factors that may influence women's delivery service utilization provided at health facilities. The selection of the explanatory variables (see Conceptual framework) is based on their theoretical and empirical importance, as reported in the literature, for the use of delivery services on the one hand, and their availability in the DHS dataset on the other. The demographic background characteristics such as the variables age of mother at delivery and birth order, and the socioeconomic variables such as maternal marital status and maternal education reflect the individual's own influence on use health facilities for delivery. The other factors that are hypothesized to come between these explanatory variables and the dependent variable include factors that impede delivery service utilization, such as hurdles in accessing health care, or facilitate delivery care, such as ANC visits. However, in this study no attempt was made to measure the quality and content of ANC services.

**Figure 1. Conceptual framework developed from review of various studies**



## **OBJECTIVES OF THE STUDY**

### **General Objective of the Study**

As its main objective, this study aimed to assess changes in levels of institutional delivery service utilization and associated factors among mothers in Ethiopia, using EDHS data for 2000 and 2005.

### **Specific Study Objectives**

- To determine the level and the percentage change in institutional delivery service utilization during the two survey years.
- To identify the most contributing factors associated with institutional delivery service utilization in the country and the changes by the factors in utilization pattern during the two survey years.

### **Research Questions**

- What is the level and percentage change of institutional delivery service utilization among women for their most recent birth five years preceding each of the two EDHS (2000 and 2005)?
- What are the factors that hinder women from delivering at health facilities, and how have they changed over time?



## **DATA AND METHODS**

### **Data Sources**

The data for this study come from the two nationally representative and internationally comparable EDHS conducted in 2000 and 2005. The EDHS collects information about social, behavioral, and demographic indicators including health status and reproductive health issues from women age 15-49 and men age 15-59. The detailed sampling procedure for the survey has been reported elsewhere (CSA and ORC Macro 2001, 2006). For the survey three separate structured questionnaires were administered: for the household, women, and men. The Women's Questionnaire included questions about women's demographic characteristics, reproductive history, pregnancy, and postnatal care, as well as immunization and nutrition. For this study data were directly downloaded from the Measure DHS website, after obtaining approval for use of the data. The data downloaded were individual recode files that contain information about all women for both the 2000 and 2005 EDHS datasets. A total of 15,367 and 14,700 eligible women were included in the 2000 and 2005 EDHS, respectively.

In the present study, analysis was based on mothers' most recent birth in the five years preceding the survey, since the most detailed health service information is available for the most recent birth. In this study there were two cases in which information on the relevant variable was missing from the 2000 EDHS and six such cases in the 2005 EDHS, and these were excluded from the analysis. Therefore, analysis was based on weighted samples of 7,976 and 7,301 women in the 2000 EDHS and 2005 EDHS, respectively.

### **Variable Description and Measures**

The primary outcome variable of this study is utilization of delivery care services. The EDHS assessed place of delivery by asking women "Where did you give birth to (name of child)?" and for this analysis responses were classified in two categories: delivery at health facilities (public or private) and delivery at home (including all women who delivered out of health facilities: at home, on the road, neighbor's house, etc.), for the most recent birth in the five years preceding the survey. In all cases the dependent variable was coded as '1' if the woman gave birth at a health institution, and coded as '0' if the women gave birth elsewhere.

In this study the explanatory variables include the socioeconomic and demographic variables (mother's age at delivery, maternal marital status, maternal work status, maternal education, religion and ethnicity, household wealth index, rural-urban residence, and region), and the most proximate determinants for the dependent variable are ANC service utilization, birth order, and frequency of watching television. Another explanatory variable used for this study is number of hurdles faced by mothers in accessing health care (an index of five items).

Measurement for the independent variables was as follows:

**Mother's age at delivery:** Mother's age in completed years measured by subtracting CMC (Date of birth) of the mother from CMC (Date of birth) of most recent birth within five years of the survey, then dividing the value obtained by 12 to give the mother's age at delivery. It was categorized into three groups: <20, 20-34 and 35-49.

**Maternal marital status:** Current marital status of women at the time of the survey. It was categorized into two groups: 0-Not married and 1-Married. Classification of this variable was developed by putting the never-married, widowed, divorced, and not living together as currently not married, and putting married and living together as currently married.

**Maternal education:** Highest level of education attained. This was categorized into three groups: no education, primary, and secondary and higher. For this study, primary and secondary levels were merged because the number of women in the highest education level was very small.

**Religion:** Categorized into four groups: Orthodox and Catholic merged together, Protestant, Muslim, and traditional and other religions merged together, since both traditional and others had few cases.

**Ethnicity:** In Ethiopia there are around 70 ethnic groups. For this study the categorization was based on the major ethnic groups in the country, categorized into five groups: 1-Oromo, 2-Amhara, 3-Tigraway, 4-Gurage, and 5-others.

**Region:** All 15 regions of Ethiopia, including the two administrative regions—the cities of Addis Ababa and Dire Dawa.

**Household wealth index:** This variable in the data set was recoded into five groups. However, for this study it was categorized into three groups by assigning the same values as that of the original variable. The three categories are: wealthiest, middle, and poorest.

**Birth order:** The order of the child at birth, in four categories: 1, 2-3, 4-5, and 6 to highest.

**Place of residence:** Where the woman was living at the time of the survey. This variable was categorized into two groups and coded as 1-urban and 2-rural.

**Antenatal care service utilization:** A women was considered to have used ANC if she was checked by a health professional (doctor, nurse, and midwife) at least once during her pregnancy. The variable was categorized into four categories: 0-no ANC, 1-one ANC visit, 2-two to three visits, and 3-four or more visits.

**Number of hurdles faced by mothers in accessing health services:** This variable was computed from questions in the survey, which asked women, “Many different factors can prevent women from getting medical advice or treatment for themselves. When you are sick and want to get medical advice or treatment, is each of the following a big problem or not?” To calculate this index, five questions were taken into account: getting permission to go; distance to the health facility; no transportation; not wanting to go alone; no one to finish household chores. Finally, the index was grouped into two categories: women who specified none or some of the problems (score 0 to 3) and women who specified more problems (score 4 to 5) as factors not allowing her to seek medical care for herself.

Each of the independent variables was selected for inclusion in the analysis based on review of literature.

## **Statistical Analysis**

The analysis for this study was conducted at several steps. First, simple descriptive statistics such as a frequency distribution and percentages were performed to describe the demographic, socioeconomic, and health-related characteristics of women with a recent birth, for the two surveys separately. This was followed by a bivariate analysis to see the factors associated with institutional delivery for the two survey years separately. In addition, at the second step the percentage change of each characteristic and its significance on the dependent variable in the 2000 and 2005 EDHS was done at the 5 percent significance level, using the confidence interval approach. In addition, a simple cross-tabulation was done by urban and rural residence to see

some of the reasons given by mothers in 2005 EDHS as to why they did not give birth at a health facility, since this information was not collected in 2000 EDHS. Multivariate logistic regression analysis was run for each set of survey data to estimate the effect of the indicator variables on the outcome variable. In addition to these, 95 percent confidence interval for the difference in B (Beta) values for each characteristic from both surveys' logistic regression was conducted to see whether there was any significant change over the two survey years.

In determining the magnitude of institutional delivery, the reference period refers to the time of the surveys. The numerators used in the analysis were women who attended and/or used the institutional delivery service for their most recent birth; the denominator included women who gave birth in the five years preceding the survey.

All analyses were performed using SPSS Version 15. SPSS complex samples analysis, which takes into account the complex survey design of DHS by incorporating women's sampling weights and adjusting the standard errors for the cluster sampling of primary sampling units. Therefore, population-based estimates take into account the differential probability of selection into the survey.

## RESULTS

Table 1 presents selected background characteristics of women with their most recent birth five years prior to the survey, for the 2000 and 2005 EDHS. In both surveys about two-thirds of births (67 percent) were to women age 20-34. The great majority of women lived in rural areas. More than one-third of women were from the Oromo ethnic group, and about one-quarter from the Amhara group. Most women had no education, at 82 percent in 2000 and 79 percent in 2005.

**Table 1. Percent distribution of some background characteristics of women who had a live birth in the five years preceding the surveys (2000 and 2005 EDHS)**

Background characteristic	Percentage distribution of women			
	2000 (%)	2000 (N)	2005 (%)	2005 (N)
<b>Mother's age at delivery</b>				
<20	12.7	1,016	13.6	994
20-34	66.6	5,310	67.4	4,923
35-49	20.7	1,652	19.0	1,391
<b>Place of residence</b>				
Rural	88.6	7,070	91.3	6,670
Other urban	9.5	760	7.0	509
Addis Ababa	1.9	148	1.8	129
<b>Religion</b>				
Orthodox/Catholic	51.6	4,116	45.7	3,338
Protestant	15.4	1,232	19.2	1,404
Muslim	29.3	2,337	32.6	2,382
Traditional/Others	3.7	293	2.5	183
<b>Region</b>				
Oromiya	38.3	3,059	37.3	2,723
Amhara	27.5	2,224	25.4	1,856
SNNP	21.2	1,695	22.3	1,632
Tigray	6.7	536	6.6	480
Addis Ababa	1.9	148	1.8	129
Somali	1.1	85	3.9	288
Afar	1.1	85	0.9	68
Ben-Gumz	1.0	81	0.9	69
Dire Dawa	0.3	27	0.3	25
Gambela	0.3	22	0.3	23
Harari	0.2	16	0.2	15

Cont'd...

**Table 1. Cont'd**

Background characteristic	Percentage distribution of women			
	2000 (%)	2000 (N)	2005 (%)	2005 (N)
<b>Ethnicity</b>				
Oromo	34.5	2,751	34.4	2,514
Amhara	32.1	2,562	29.1	2,128
Tigraway	6.8	545	6.4	469
Gurage	4.5	355	3.8	279
Others	22.1	1,765	26.2	1,916
<b>Maternal current marital status</b>				
Not married	9.8	785	7.3	535
Married	90.8	7,193	92.7	6,772
<b>Maternal work status</b>				
Not working	65.2	5,200	68.8	5,026
Working	34.8	2,778	31.2	2,281
<b>Maternal education status</b>				
No education	82.1	6,550	78.5	5,734
Primary	12.6	1,003	16.5	1,205
Secondary and higher	5.3	425	5.0	368
<b>Household wealth index</b>				
Poorest	36.8	2,938	33.3	2,435
Middle household wealth	36.6	2,917	33.4	2,438
Wealthiest	26.6	2,123	33.3	2,435
<b>Total</b>	100.0	7,978	100.0	7,307

Table 2 reports summary statistics by place of delivery for the 2000 and 2005 surveys. The results showed that 5.4 percent of the most recent births in the five years preceding the 2000 EDHS occurred in health facilities, increasing to 6.4 percent in the 2005 EDHS. In both surveys a higher proportion of births in urban areas than in rural areas occurred in health facilities. In the 2005 EDHS, 80 percent of births to women in the capital city, Addis Ababa, were in health facilities, and 37 percent in other urban areas. In urban areas these percentages for 2005 represent a substantial increase over 2000. In contrast, in 2000 only 1.8 percent of births among women in rural areas were delivered in health facilities, rising to just 2.6 percent in 2005.

Between 2000 and 2005, the percentage of births in health institutions decreased among women in Somali, Afar, Ben-Gumuz, Dire Dawa, and Gambela regions but increased in the rest

of the regions. The percentage of births to women in the Gurage ethnic group showed a relatively large increase in the 2005 EDHS compared with 2000.

The data confirm an association between women's level of education and delivery in health facilities. Forty-four percent of births in a health facility in the five years preceding the 2000 survey were to women with at least secondary education, rising to 54 percent in the 2005 EDHS. In both surveys mothers were more likely to use health facility delivery services for their first birth than for their second and higher-order births.

As recommended by WHO, at least four antenatal care (ANC) visits are important for maternal health, and many studies have viewed ANC as a pathway to institutional delivery. The result of this study showed a significant difference in the percentage of health facility delivery among women who made four or more ANC visits compared with women who had no ANC visits. In 2000, less than 2 percent of women with no ANC visits delivered in a health facility compared with 10 percent of women who had two to three ANC visits, and 30 percent of women with four or more ANC visits. Differences are comparable for 2005.

A significant difference was also observed in institutional delivery by women's exposure to mass media. Table 2 shows that in both surveys a much higher proportion of births among women who reported watching television at least once a week took place in health facilities compared with women who had no exposure to television.

**Table 2. Percentage of women whose most recent live birth in the five years preceding the surveys (2000 and 2005 EDHS) occurred in a health facility, by selected characteristics**

Background characteristic	Percentage who gave birth at health facilities						95% CI for the percentage change
	2000 EDHS (%)	2000 EDHS (N)	P-value	2005 EDHS (%)	2005 EDHS (N)	P-value	
<b>Mother's age at delivery</b>			0.002			0.001	
<20	7.2	1,016		8.0	994		0.8 (-3.3,4.9)
20-34	5.7	5,310		6.8	4,919		1.1 (-0.7,2.9)
35-49	3.5	1,650		3.8	1,388		0.3 (-2.6,3.2)
<b>Place of residence</b>			0.000			0.000	
Rural	1.8	7,068		2.6	6,670		0.8 (-0.6,2.2)
Other urban	26.7	760		36.9	509		10.2 (-6.3,26.7)
Addis Ababa	67.6	148		80.3	129		12.7 (0.2,25.2)
<b>Religion</b>			0.000			0.000	
Orthodox/Catholic	7.0	4,114		8.8	3,336		1.8 (-0.9,4.5)
Protestant	4.0	1,232		5.8	1,404		1.8 (-2.1,5.7)
Muslim	3.9	2,337		3.6	2,378		-0.3 (-2.5,1.9)
Traditional/Others	1.4	293		3.0	183		1.6 (-4.1,7.3)
<b>Region</b>			0.000			0.000	
Oromiya	4.0	3,059		5.0	2,719		1.0 (-2.1,4.1)
Amhara	3.6	2,224		4.2	1,856		0.6 (-2.1,3.3)
SNNP	4.1	1,693		4.2	1,632		0.1 (-3.4,3.6)
Tigray	4.7	536		7.7	480		3.0 (-2.3,8.3)
Addis Ababa	67.6	148		80.3	129		12.7 (0.2,25.2)
Somali	6.6	85		6.5	68		-0.1 (-14.8,14.6)
Afar	5.4	85		4.6	288		-0.8 (-6.1,4.5)
Ben-Gumz	9.2	81		5.9	68		-3.3 (-10.2,3.6)
Dire Dawa	33.8	27		32.2	25		-1.6 (-16.9,13.7)
Gambela	23.2	22		16.9	23		-6.3 (-21.2,8.6)
Harari	30.5	16		36.8	15		6.3 (6.4,19)
<b>Ethnicity</b>			0.000			0.000	
Oromo	3.3	2,751		4.9	2,514		1.6 (-1.1,4.3)
Amhara	8.4	2,562		8.2	2,128		-0.2 (-3.7,3.3)
Tigraway	6.4	545		8.6	469		2.2 (-3.3,7.7)
Gurage	12.0	355		24.8	279		12.8 (-1.7,27.3)
Others	2.8	1,765		3.1	1,916		0.3 (-1.9,2.5)
<b>Maternal current marital status</b>			0.000			0.001	
Not married	11.3	785		11.2	535		-0.1 (-7.2,7.0)
Married	4.8	7,191		6.0	6,766		1.2 (-0.6,3.0)
<b>Maternal work status</b>			0.441			0.004	
Not working	5.8	2,778		5.5	5,020		-0.3 (-2.8,2.2)
Working	5.2	5,198		8.3	2,281		3.1 (0.6,5.6)

Cont'd...



Table 2. Cont'd

Background characteristic	Percentage who gave birth at health facilities						Percentage change	95% CI for the percentage change
	2000 EDHS (%)	2000 EDHS (N)	P-value	2005 EDHS (%)	2005 EDHS (N)	P-value		
<b>Maternal education status</b>			0.000			0.000		
No education	2.2	6,548		2.6	5,732		0.4	(-0.6,1.4)
Primary	9.9	1,003		10.0	1,202		0.1	(-5.2,5.4)
Secondary and Higher	44.3	425		54.2	367		9.9	(-5.0,24.8)
<b>Household wealth index</b>			0.000			0.000		
Poorest	0.9	2,938		1.0	2,432		0.1	(-1.1,1.3)
Middle household wealth	1.5	2,917		1.8	2,435		0.3	(-1.1,1.7)
Wealthiest	17.1	2,121		16.3	2,433		-0.8	(-6.1,4.5)
<b>Birth order</b>			0.000			0.000		
1	12.4	1,362		16.0	1,189		3.6	(-1.3,8.5)
2 to 3	5.5	2,371		7.8	2,089		2.3	(-0.8,5.4)
4 to 5	4.2	1,707		3.0	1,692		-1.2	(-3.6,1.2)
6+	2.5	2,536		2.6	2,330		0.1	(-1.5,1.7)
<b>ANC utilization</b>			0.000			0.000		
No ANC	1.6	5,837		1.9	5,250		0.3	(-0.7,1.3)
1 visit	2.3	478		5.3	336		3.0	(-2.1,8.1)
2 to 3 visits	9.6	830		9.4	828		-0.2	(-6.5,6.1)
4 or more visits	30.1	831		30.5	888		0.4	(-9.0,9.8)
<b>Frequency of watching TV</b>			0.000			0.000		
Never	3.3	7,497		3.3	6,612		0.0	(-1.4,1.4)
Less than once a week	29.7	350		22.7	476		-7.0	(-20.1,6.1)
At least once a week	60.9	130		67.1	213		6.2	(-15.0,27.4)
<b>Number of hurdles faced by women in accessing health care</b>			0.124			0.000		
Women specifying 0-3 factors as big problem	5.3	7,432		5.4	2,404		—	
Women specifying four to five/all factors as big problem	0.1	111		3.9	3,793		—	
<b>Total</b>	5.4	7,976 (A)		6.4	7,301(B)		1.0	

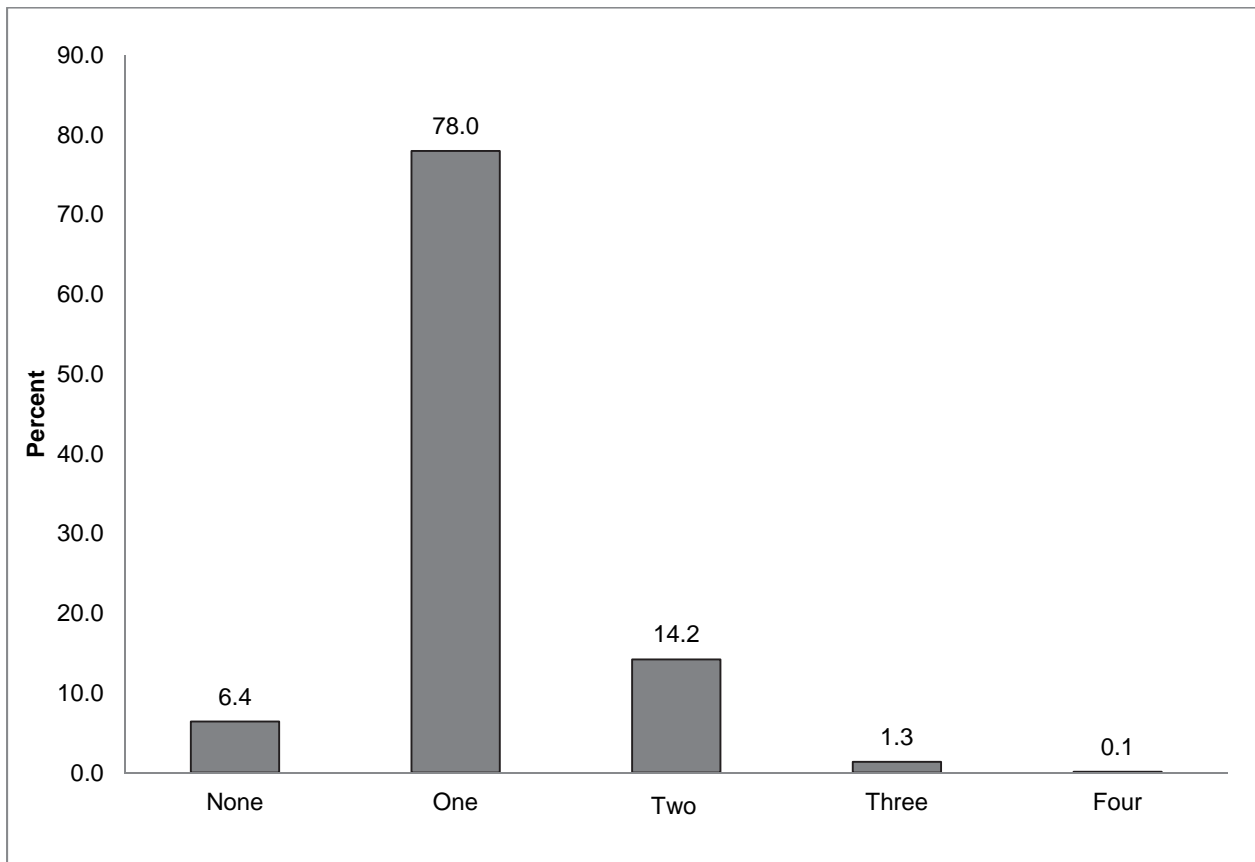
Note: For women with two or more live births in the five year period for both the surveys, data refer to the most recent birth.

(A) The total number excludes 2 missing cases for the variable place of delivery

(B) Number excludes 6 missing cases for the variable place of delivery

In the 2005 survey women who did not utilize health facilities for delivery were asked about their reason for not doing so. Almost 50 percent from rural areas and 32 percent from urban areas reported that it was “not necessary” to utilize health facilities for delivery care (Table 3). The second most frequently mentioned reason was “not customary” (30 percent of rural women and 7 percent of urban women). About 78 percent of women gave just one reason for not giving birth in a health facility, while 14 percent gave two reasons (see Figure 2).

**Figure 2. Percent distribution of number of reasons given by women for not giving birth in a health facility**



**Table 3. Percentage of women who gave specific reasons for not utilizing health facilities to deliver their most recent birth with at least one live birth in the last five year preceding the 2005 EDHS**

Reasons given	2005 EDHS (%)		
	Rural	Urban	Total
Not necessary	50.4	32.2	48.7
Not customary	30.1	7.2	28.1
Too far/No transportation	15.8	2.9	14.7
Cost too much	6.6	4.7	6.4
Husband/Family did not allow	0.9	0.1	0.8
Facility not open	0.5	0.9	0.6
Don't trust facility/Poor quality of service	0.2	0.5	0.2
No female provider	0.1	0.0	0.1
Others	11.0	11.7	11.0
Total	6,665	633	7,297

Note: Multiple responses were possible

### Results from Multivariate Analysis

Binary logistic regression model was utilized to show the association of skilled delivery care with women's background and intermediate variables. As Table 4 shows, in both surveys women in Addis Ababa and other urban areas were more likely than women in rural areas to utilize delivery care services. Religion was found to be statistically insignificant. Women residing in Somali region were six times more likely to utilize delivery care services in 2005 compared with the reference group (Oromiya).

Ethnicity of women with their most recent birth five years preceding the survey was also found to be a significant factor that determined place of delivery, for both the 2000 and 2005 surveys. Most notably, in the 2005 EDHS women from the Gurage ethnic group were significantly more likely than other ethnic groups to give birth in health institutions.

Education was also found to be a positive significant factor in determining institutional delivery care service utilization. Mothers with secondary and higher education were three times more likely than women with no education to utilize delivery care services, in both the survey years. Further, in the 2000 EDHS women from households ranking higher on the standard of

living index were 2.6 times more likely to utilize health facilities compared with women ranking lowest on the index. These odds increased to a high of 3.5 times in 2005.

Child's birth order was also a highly significant factor in affecting delivery care service utilization. As Table 4 shows, the odds of utilizing health facility delivery care decreased with an increase in birth order. Specifically, for the most recent birth in the five years the survey, a sixth or higher-order birth was 70 percent less likely to be delivered in a health institution compared with a first birth in the 2000 EDHS, and 83 percent less likely in 2005. Receiving ANC was also another significant factor associated with delivery in a health facility compared with delivery at home. As the number of antenatal visits increases, the likelihood of giving birth in a health facility rather than at home also increases. Similarly, women with more exposure to mass media, for example watching television at least once a week, were more likely to deliver in a health facility rather than at home, for both survey years.

Findings from confidence interval analysis of the difference between the B (Beta) values from the 2000 and 2005 survey logistic regression results (Table 5) indicate that none of the characteristics has a statistically significant difference. This finding shows that the effect of all variables on delivery in a health facility did not significantly differ between the two surveys.

**Table 4. Adjusted odds ratios and 95 percent confidence intervals (CI) for utilization of institutional delivery care services for the two surveys (2000 and 2005 EDHS)**

Background characteristic	2000 EDHS			2005 EDHS		
	AOR	P-value	95% CI	AOR	P-value	95% CI
<b>Mother's age at delivery</b>						
<20 (RC)	1.00			1.00		
20-34	1.20	0.49	(0.72,2.00)	1.54	0.08	(0.94,2.52)
35-49	1.83	0.14	(0.81,4.15)	2.41	0.08	(0.91,6.35)
<b>Place of residence</b>						
Rural	1.00			1.00		
Other urban	2.76	0.00	(1.62,4.70)	2.62	0.00	(1.51,4.52)
Addis Ababa	8.92	0.00	(4.75,16.75)	12.28	0.00	(6.12,26.66)
<b>Religion</b>						
Orthodox/Catholic (RC)	1.00			1.00		
Protestant	1.01	0.98	(0.50,2.05)	1.81	0.15	(0.81,4.06)
Muslim	1.01	1.00	(0.65,1.53)	0.73	0.23	(0.44,1.21)
Traditional/Others	1.14	0.84	(0.30,4.41)	2.56	0.26	(0.50,13.23)
<b>Region</b>						
Oromiya (RC)	1.00			1.00		
Amhara	0.80	0.49	(0.43,1.50)	1.21	0.61	(0.59,2.48)
SNNP	1.00	1.00	(0.47,2.10)	0.71	0.40	(0.32,1.57)
Tigray	0.53	0.26	(0.23,1.49)	2.74	0.15	(0.70,10.79)
Addis Ababa	1.00			1.00		
Somali	1.57	0.50	(0.43,5.73)	5.92	0.00	(1.95,17.99)
Afar	1.04	0.92	(0.49,2.23)	0.73	0.56	(0.25,2.12)
Ben-Gumz	2.80	0.00	(1.37,5.72)	1.77	0.08	(0.93,3.39)
Dire Dawa	2.31	0.03	(1.09,4.89)	3.14	0.00	(1.57,6.29)
Gambela	2.99	0.01	(1.26,7.07)	5.41	0.00	(2.29,12.81)
Harari	4.09	0.00	(2.02,8.28)	5.15	0.00	(2.70,9.83)
<b>Ethnicity</b>						
Oromo (RC)	1.00			1.00		
Amhara	2.70	0.00	(1.48,4.92)	0.80	0.51	(0.42,1.54)
Tigraway	1.90	0.18	(0.74,4.86)	0.39	0.12	(0.12,1.29)
Gurage	2.39	0.04	(1.05,5.43)	4.25	0.00	(1.96,9.22)
Others	1.65	0.31	(0.71,3.84)	0.55	0.13	(0.26,1.19)
<b>Maternal current marital status</b>						
Not married (RC)	1.00			1.00		
Married	0.80	0.42	(0.47,1.38)	0.86	0.63	(0.48,1.55)
<b>Maternal work status</b>						
Not working (RC)	1.00			1.00		
Working	0.89	0.51	(0.63,1.26)	0.99	0.97	(0.68,1.44)

Cont'd...

**Table 4. Cont'd**

<b>Background characteristic</b>	<b>2000 EDHS</b>			<b>2005 EDHS</b>		
	<b>AOR</b>	<b>P-value</b>	<b>95% CI</b>	<b>AOR</b>	<b>P-value</b>	<b>95% CI</b>
<b>Maternal education status</b>						
No education (RC)	1.00			1.00		
Primary	1.64	0.02	(1.07,2.53)	1.87	0.01	(1.14,3.06)
Secondary and higher	3.09	0.00	(1.98,4.80)	3.03	0.00	(1.78,5.17)
<b>Household wealth index</b>						
Poorest (RC)	1.00			1.00		
Middle household wealth	1.20	0.59	(0.61,2.37)	1.46	0.28	(0.74,2.89)
Wealthiest	2.59	0.01	(1.37,4.88)	3.50	0.00	(1.81,6.78)
<b>Birth order</b>						
1 (RC)	1.00			1.00		
2 to 3	0.34	0.00	(0.22,0.54)	0.28	0.00	(0.18,0.43)
4 to 5	0.36	0.00	(0.20,0.65)	0.17	0.00	(0.10,0.29)
6+	0.30	0.00	(0.15,0.60)	0.17	0.00	(0.08,0.33)
<b>ANC utilization</b>						
No ANC (RC)	1.00			1.00		
1 visit	1.13	0.76	(0.51,2.54)	2.15	0.04	(0.99,4.68)
2 to 3 visits	3.79	0.00	(2.19,6.57)	3.74	0.00	(2.37,5.92)
4 or more visits	6.72	0.00	(4.28,10.58)	4.07	0.00	(2.71,6.12)
<b>Frequency of watching TV</b>						
Never (RC)	1.00			1.00		
Less than once a week	1.25	0.31	(0.81,1.93)	1.47	0.14	(0.88,2.47)
At least once a week	2.79	0.02	(1.29,6.03)	2.67	0.00	(1.49,4.80)
<b>Number of hurdles faced by women in accessing health care</b>						
Women specifying 0-3 factors as big problem (RC)	—			1.00		
Women specifying four to five/all factors as big problem				0.82	0.34	(0.54,1.24)

**Table 5. Percentage distribution and odds ratios with 95 percent confidence intervals for the change in utilization of institutional delivery care services in the two surveys (2000 and 2005 EDHS), by selected variables and year of survey**

Characteristics	B (Beta Values)		95% CI for the change in B values
	2000 EDHS	2005 EDHS	
<b>Mother's age at delivery</b>			
<20 (RC)			
20-34	0.18	0.43	(-0.75,1.25)
35-49	0.61	0.88	(-1.51,2.05)
<b>Place of residence</b>			
Rural (RC)			
Other urban	1.01	0.96	(-1.13,1.03)
Addis Ababa	2.19	2.51	(-0.99,1.63)
<b>Religion</b>			
Orthodox/Catholic (RC)			
Protestant	0.01	0.59	(-0.93,2.09)
Muslim	0.01	-0.31	(-1.26,0.62)
Traditional/Others	0.13	0.94	(-2.19,3.81)
<b>Region</b>			
Oromiya (RC)			
Amhara	-0.22	0.19	(-0.94,1.76)
SNNP	0.00	-0.34	(-1.89,1.21)
Tigray	-0.54	1.01	(-0.76,3.86)
Addis Ababa			
Somali	0.45	1.78	(-1.08,3.74)
Afar	0.04	-0.31	(-2.17,1.47)
Ben-Gumz	1.03	0.57	(-1.81,0.89)
Dire Dawa	0.84	1.14	(-1.13,1.73)
Gambela	1.09	1.69	(-1.12,2.32)
Harari	1.41	1.64	(-1.12,1.58)
<b>Ethnicity</b>			
Oromo (RC)			
Amhara	0.99	-0.22	(-2.46,0.04)
Tigraway	0.64	-0.95	(-3.73,0.55)
Gurage	0.87	1.45	(-1.01,2.17)
Others	0.50	-0.59	(-2.70,0.52)
<b>Maternal current marital status</b>			
Not married (RC)			
Married	-0.22	-0.15	(-1.07,1.21)
<b>Maternal work status</b>			
Not working (RC)			
Working	-0.12	-0.01	(-0.62,0.84)

Cont'd...

**Table 5. Cont'd**

Characteristics	B (Beta Values)		95% CI for the change in B values
	2000 EDHS	2005 EDHS	
<b>Maternal education status</b>			
No education (RC)			
Primary	0.50	0.62	(-0.80,1.04)
Secondary and Higher	1.13	1.11	(-0.98,0.94)
<b>Household wealth index</b>			
Poorest (RC)			
Middle household wealth	0.19	0.38	(-1.18,1.56)
Wealthiest	0.95	1.25	(-0.99,1.59)
<b>Birth order</b>			
1 (RC)			
2 to 3	-1.07	-1.28	(-1.07,0.65)
4 to 5	-1.02	-1.76	(-1.86,0.38)
6+	-1.20	-1.80	(-1.95,0.75)
<b>ANC utilization</b>			
No ANC (RC)			
1 visit	0.13	0.77	(-0.93,2.21)
2 to 3 visits	1.33	1.32	(-1.01,0.99)
4 or more visits	1.91	1.40	(-1.37,0.35)
<b>Frequency of watching TV</b>			
Never (RC)			
Less than once a week	0.23	0.39	(-0.78,1.10)
At least once a week	1.03	0.98	(-1.40,1.30)
<b>Number of hurdles faced by women in accessing health care</b>			
Women specifying 0-3 factors as big problem (RC)			
Women specifying four to five/all factors as big problem		-0.20	



## DISCUSSION

This study analyzed data from the 2000 and 2005 EDHS. The data are nationally representative and allow comparison across variables. Results show that utilization of maternal health facility delivery cares services is low in Ethiopia, as other studies also have reported (Eyerusalem 2010, Geberehiwot 2009, Mekonnen 2003, Mesfin et al. 2004).

The result of this study shows that for women's most recent births in the five years preceding the 2000 and 2005 surveys, only 5.4 percent in 2000 and 6.4 percent in 2005 were delivered in a health facility. These percentages are low compared with other sub-Saharan African countries (Macro International 2007).

The low level of coverage by health facilities could be due to the fact that women do not believe it is necessary to have skilled care at delivery, or may be because they were not ill during their labor or were not aware of the seriousness of the complications that they might face. Hence, women especially in rural areas either try to deal with a problem themselves or go to traditional healers for service. Another reason could be that health facilities are too far away and that transportation is unavailable. Even if women could get transportation, its cost along with the accommodation cost that they might face to give birth in a distant health facility is often blamed for the low rate of utilization of delivery care services.

Overall, results of this study reveal a gross effect of several background and intermediate variables that influence women's decision to give birth in health facilities. The study verifies that health facility delivery care utilization is highly influenced by women's place of residence. Women residing in Addis Ababa and other urban areas are more likely to utilize institutional delivery care services than women in rural areas. This finding is similar to most of the studies conducted in the country (Eyerusalem 2010, Geberehiwot 2009, Mesfin et al. 2004, Stephenson et al. 2006). The result is also consistent with findings from other developing countries (Montagu et al. 2011, Stephenson et al. 2006). Health facilities are more accessible in urban areas than rural areas and health promotion programs are more urban-focused. In addition, rural women are more influenced by the prevailing cultural practices concerning delivery than urban women.

Regional variation is also an important factor determining the place of delivery. Compared with the reference category (Oromiya region), the probability of giving birth at health

institutions is higher among women in Dire Dawa, Gambela, and Harari for both the 2000 and 2005 surveys. The other interesting finding of this study is the association between delivery in a health facility and women's ethnicity. In particular, women from the Gurage ethnic group in Ethiopia are significantly more likely than other ethnic groups to give birth in health institutions. This could be because the Gurage ethnic groups are highly mobile, especially to urban areas, where health services are more accessible and available. More than other factors, however, this result reflects the influence of culture.

Educational status of women was found to be the most significant factor influencing place of delivery. Women with secondary or higher level of education are more likely to utilize health facility delivery care services. The study conducted in six African countries cited earlier concluded that secondary or higher education of women in the community leads to greater awareness of the need for care during childbirth (Stephenson et al. 2006). Also, in most traditional societies a higher level of female education may indicate greater female autonomy, so that women develop the confidence to utilize health facility services (Mekonnen and Mekonnen 2002).

The wealth index is useful for ranking the socioeconomic status of households. In line with this, this study found that low socioeconomic status of the mother is an important predictor of home delivery. This finding can be possibly explained by the fact that poor mothers are unlikely to afford the cost of transport and other medical costs. In Ethiopia, even though the service in a health post is given free of charge, it incurs costs when complicated delivery is referred to health centers. Similarly, other studies have also shown that the higher the wealth index the greater is the likelihood of giving birth in health facilities (Ethiopian Society of Population Studies 2008, Kesterton et al. 2010, Mekonnen 2003, Navaneetham and Dharmalingam 2000, Stephenson et al. 2006).

Media exposure—that is, frequency of watching television—is another important factor identified in this study influencing utilization of delivery care services. Women who watch television at least once a week are more likely to give birth in a health facility compared with those who never have watched television. As the data from 2000 and 2005 EDHS indicate, in Ethiopia women's exposure to television doubled from 4 percent to 8 percent between the 2000 and 2005 EDHS (Macro International 2007).

Consistent with other study findings, this study found that making one or more ANC visits is an important factor influencing delivery care service utilization. The importance of this factor appears to have increased from the 2000 to 2005 EDHS. In 2005 women with only one ANC visit were significantly more likely to utilize delivery care services compared with 2000. Analysis of DHS data from six African countries has shown that the characteristics that predispose women to seek pregnancy care also make them more likely to seek care during delivery (Stephenson et al. 2006). Other studies have shown similar findings (Eyerusalem 2010, Geberehiwot 2009, Mesfin et al. 2004, van Eijk et al. 2006).

The study showed that birth order is a significant determining factor of place of delivery. The higher the birth order the less likely women are to utilize institutional delivery care services. This finding is consistent with most other studies (Eyerusalem 2010, Geberehiwot 2009, Idris et al. 2006, Mesfin et al. 2004, Montagu et al. 2011, Navaneetham and Dharmalingam 2000, Stephenson et al. 2006). This may be possibly explained by the fact that women at higher birth orders may have had no difficulty during the previous births, or that as the number of children increases in the household women have less time and greater responsibilities that may interfere with going to a health facility for delivery.

## CONCLUSION

Even though institutional delivery care service utilization increased by one point percentage point from 2000 to 2005 in Ethiopia, it is still extremely even low compared with most sub-Saharan African countries. Especially in rural areas, where 86 percent of the population lives, availability of health services, especially maternal health services, is extremely difficult. Taking this finding into consideration, it is recommended that maternal health care programs should be expanded and promoted in rural areas, along with culturally appropriate campaigns, especially by incorporating it with the health extension program that the country is currently running.

The study identified several significant factors that determine utilization of institutional delivery care. These include maternal education, household wealth index, birth order, antenatal service utilization, and exposure to mass media. As the level of maternal education increases, the probability of giving birth at health institutions also rises. This finding is consistent with findings from other studies. In Ethiopia, fewer women than men have ever attended formal education. Therefore, improving women's educational opportunities is very important, which in turn will enhance use of delivery care services. This can be achieved as a long-term action but could also be achieved in the short term in the health education program by addressing more women with no education in order to improve mothers' attitudes toward delivery in health facilities. This also could be done through transmission of the health education program via mass media in local languages, which is more effective than print media in areas where most women cannot read. Improving the socioeconomic status of women by providing alternative income-generating activities and employment opportunities can also improve maternal health care service utilization.

To meet one of Millennium Development Goals related to reproductive and child health by 2015, it is important to increase the percentage of women utilizing maternal health care services, including ANC, which in turn is believed to be a way to utilize other maternal health care such as institutional delivery. Maternal health care utilization should be encouraged by making services more accessible, providing training for health care personnel, especially health extension workers in health posts, and adopting a strategy to make the services available whenever needed.

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