Factors Associated with Non-Use of modern Contraceptives among sexually active women in Ethiopia: A multi-level mixed effect analysis

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Abstract

Background: Appropriate contraceptive use prevents unintended pregnancy, protects the health of mother and child, and promotes women's well-being. Use of modern Family planning in Ethiopia was still very low. The purpose of this study was to assess the factors that are associated with non-use of modern family planning services among women of reproductive age.

Method: A nationally representative 2016 EDHS women data were used for analysis. Descriptive and multilevel multivariable binary logistic regression models were used to summarize descriptive data and measure statistical association between the dependent and the individual and community level variable, respectively. Adjusted odds ratio and confidence interval were respectively used to measure association and its statistical significance.

Result: Among women in the reproductive age group 79.49% did not use a modern contraceptive method. Of this, 65.9 %, were from rural areas. Women age between 25-34 years (AOR=0.54, 95% CI: 0.5-0.61) and age between 34-49 year (AOR=0.62, 95% CI: 0.55-0.71), Women with a primary level of education (AOR=0.8, 95% CI: 0.68-0.87), husband's education level was secondary and above were 0.83(AOR = 0.83, 95% CI: 0.72-0.96), middle income women (AOR=0.66, 95% CI: 0.58-0.76) , rich women (AOR=0.74,95%CI:0.65-0.85), women delivered at the health facility were lower by 0.84 (AOR = 0.84, 95%CI: 0.73-0.98), watched family planning related information from TV (AOR=0.74, 95% CI: 0.65-0.85) had 1-2 and 3 or more children in the previous five years (AOR = 0.21, 95% CI: 0.19-0.23) and (AOR = 0.4, 95% CI: 0.28-0.56), respectively, are individual-level factors that are less likely to not use contraception were identified. Furthermore, Muslim women (AOR=1.4, 95% CI: 1.23-1.62), women living in rural area (AOR=3.43; 95% CI: 2.72-4.32), and ANC visit 1.3(1.07-1.5) were more likely to not use contraception. Further, Women in Afar, Somali, Gambela, Harari, and Dire Dawa were less likely to use modern contraception methods than women in Tigray, but Amhara region had a lower rate of non-use.

Conclusion: Family planning interventions should target younger women, women living in rural areas, the poor, and Muslim women. Moreover, initiatives to empower women associated to family planning programs would be beneficial in increasing contraceptive uptake among sexually active women in Ethiopia.

Background

Contraception is used by many women in developing countries to prevent unplanned and unwanted pregnancies. Africa's population is expected to account for 21% of global population by 2050, up from 9% in 1950 (1,2). It is now increasing faster than any other major continent. Ethiopia's population rose at an annual rate of 2.6 percent in 2007, resulting in a total population of 73.9 million, according to the 2007 Population and Housing Census data (3).As a result of the high fertility rate, poor health conditions in general and a lack of access to medical care, pregnancy risks are higher in Africa than anyplace else (4).

The Family Health of the health service is primarily responsible for meeting the goals of the FP program, and various government and non-governmental organizations are also assisting Family Health in meeting the targets set by the government at the national and international levels. The primary goal of the FP program is to increase access to high-quality health care, including FP services, without causing financial hardship (5).

World leaders committed to the Millennium Development Goals (MDGs) in 2000 at a UN summit to decrease poverty, enhance health, and promote economic development. In areas of reproductive health, which are critical for attaining the MDGs for child and maternal health, Sub-Saharan Africa is particularly poor. This brief looks at reproductive health accomplishments and failures in Sub-Saharan Africa, concentrating on differences in family planning use and family size, maternal mortality, and HIV/AIDS in major sub-Saharan areas (2,4,6,7).

Despite its demonstrated impact on maternal and child health and general development, family planning has slowly declined as an international priority in recent years. Family planning has a direct, positive influence on lowering maternal mortality and limiting mother-to-child transmission of HIV, in addition to reducing fertility (births per woman)(8). To attain these health benefits, women and couples must have access to a wide selection of contraceptive techniques throughout their reproductive lives, allowing them to have as many children as they want, when they want them(9,10).

In Sub-Saharan Africa, 23% of married women use family planning, with 18% using a modern approach and 5% using a traditional one. However, a larger amount of women 25% report having a "unmet need," which means they would like to stop having children or delay their next delivery, but are not adopting any kind of family planning(11). Unintended pregnancies and dangerous abortions can both be avoided with proper family planning. Despite their value, modern contraceptives are not universally available or used. In comparison to women in developing countries, developed-country women have better access to and use of modern contraceptives (12–14).

In Ethiopia, a common healthcare challenge is the use of contemporary contraception. Despite the fact that women are using contemporary contraception at a higher rate than ever before, there are still obstacles. Within the country, there are many differences in the use of contemporary contraceptives. In comparison to Addis Ababa, the Somali area has the lowest rate (1.4 %) of contemporary contraception use (50.1 %)(3).

Appropriate contraceptive use prevents unintended pregnancy, protects the health of mother and child, and promotes women's well-being. In 1966, the Ethiopian Family Guidance Association established a family planning service. Due to social and political constraints, the FP service at this time was primarily focused on raising awareness. In 1993, Ethiopia established a national population policy to balance the rate of population growth with national development and the rational use of natural resources(15–17).

Ethiopia launched the health extension program in 2003 in order to increase the use of contraception and other maternal services. One of the 16 packages in this program is family planning (18). Contraception

use increased from 8% in 2000 to 36% in 2016. However, 24 percent of reproductive-age women who want to postpone or avoid pregnancy were not using a contraceptive (19). Women's occupation, awareness of FP, discussion with husband, support from husband, age of women, parity, and household wealth status were found to be factors associated with contraceptive use(20).

Even though, the existence of numerous individual studies on identifying factors of modern contraceptive utilization among women in reproductive age group, there is no single study that includes all regions in Ethiopia in terms of the prevalence and associated factors on non-use of modern FP among women in reproductive age group and the explanatory variables (the individual level and community level variables) (20-30). Although, those studies were carried out using a standard regression model that took only individual-level factors into account, leaving out the community (cluster) effect. For this purpose, the result of an ordinary logistic regression model may be applicable in making incorrect conclusion. The variability in the determinants of non-use of modern contraceptive could be attributed to heterogeneity in the study's enumeration area. Due to this reason we proposed a multilevel binary logistic regression model for non-use of modern contraceptive (32–34). As a result, the purpose of this study was to assess the factors that are associated with non-use of modern contraceptive services among women of reproductive age. As a result, this study will attempt to fill this gap, which may aid planners and policymakers in developing effective strategies to reduce the overwhelming complications of unintended pregnancy while also improving the national and regional socioeconomic status.

Materials And Methods

Study design and setting

For analysis, data from the 2016 Ethiopian Demographic and Health Surveys were used. The EDHS 2016 survey was designed to provide estimates of key indicators for the entire country, for urban and rural areas separately, and for each of the nine regions and two administrative cities (Tigray, Afar, Amhara, Oromia, Somali, Benishangul-Gumuz, SNNPR, Gambela and Harari). Each region was divided into urban and rural areas, resulting in 21 different sample strata. In each stratum, samples of Enumeration Areas (EAs) were chosen in two stages. Based on the 2007 PHC, an independent selection was implemented in each sampling stratum, involving a total of 645 EAs (202 in urban and 443 in rural) areas with probability proportional to EA size in the first stage. The second stage involved selecting a fixed number of 28 households per cluster using an equal probability systematic selection from the newly created household listings(3).

Source of data

The dataset used in this study was obtained from the MEASURE DHS database, which can be found at <http://dhsprogram.com/data/> after receiving approval from the DHS program office for the 2016 Ethiopian Demographic and Health Survey, the fourth comprehensive survey.

Study variables

Dependent variable

The dependent variable is current non-use of modern contraception among women of reproductive age. Women were classified as "non-users" if they did not use any modern contraceptive method or used Folkloric and Traditional methods, and "users" if they used any modern contraceptive method.

Independent variables

Previous research and the variable's availability in the 2016 EDHS dataset were used to determine the independent variables for non-use of modern contraceptive methods. Variables were divided into two categories: individual level variables and community level variables associated for a multilevel logistic approach.

Individual-level variables

Age of women at the time of survey, husband age, educational level of women, educational level of husband, women occupation, wealth index, husband's occupation, marital status, religion, health care delivery, Accessing Health Care, desire for more children, births in the last 5 years, hearing of family planning messages through radio, Watched family planning on TV last few months, Read family planning in newspaper/magazine last few months, and ANC visit were included as individual-level variables.

Community –level variables

Region and place of residence were regarded as community-level variables obtained directly from EDHS, but the remaining variables were not obtained directly from EDHS.

Data management and analysis

SPSS software version 23 was used to extract and decode data, and STATA version 14 was used to analyze the decoded data. To describe the study respondents, descriptive statistics such as frequencies, and percentages were used. A multilevel study design does not consider individual observations to be independent of one another. The women in this study are nested with Enumeration Areas (EAs). The standard regression model is inapplicable in this situation. As a result, a multilevel logistic regression model was used to identify the associated predictors of modern contraceptive non-use among sexually active women in Ethiopian.

Four consecutive models were fitted in the multilevel analysis (35–37). The first is the null model (Model I), which is fitted without any explanatory variable at the individual and community levels to detect the existence of a possible contextual effect. The second model fit by incorporating all individual-level data variables (model II). This step evaluates the contribution of each individual-level explanatory variable, the significance of each predictor, and the changes in the first- and second-level variance terms. The third model was created by incorporating all community-level variables (Model III). This model allows us to

examine whether the explanatory variables at the community level explain the between-group variation in the dependent variable.

Model building

We fit four models: the null model (no explanatory variables), model I (individual-level variables only), model II (community-level variables only), and model III (individual-level and community-level variables both). Since the models were nested, model comparison and fitness were based on the Intra-class Correlation Coefficient (ICC), Likelihood Ratio (LR) test, Median Odds Ratio (MOR), and deviance (-2LLR), Akaike's Information Criteria (AIC), and Bayesian Information Criteria (BIC) values. As a result, model III (individual + community) was the best fit for this study(38)(39).

Parameter estimation method

Fixed effect estimates in the multilevel multivariable logistic regression model measure the relationship between non-use of modern contraceptive method and individual and community level factors. To select eligible variables for multivariable analysis, bivariate analysis was performed. Variables with P-values ≤ 0.2 were eligible and chosen for the multivariable analysis(40). In the multivariable analysis, the Adjusted Odds Ratio (AOR) with 95 percent CI was reported, and variables with a p-value ≤ 0.05 were considered a significant factor influencing non-use of modern contraceptive method. When selecting two clusters at random, non-use of contraceptive use was found in both. The random effect measures variation of non-use of modern contraceptive method across clusters expressed by Intra-class Correlation Coefficient (ICC) which measures the degree of heterogeneity of non-use of modern contraceptive method between clusters, Percentage Change in Variance (PCV) indicating the proportion of the total observed individual variation of non-use of modern contraceptive method that is attributable to between cluster variations, and Median Odds Ratio (MOR) which shows the median value of the odds ratio between the cluster at high non-use of modern contraceptive utilization and cluster at low non-use of modern contraceptive utilization, when randomly select out two clusters(37).

Result

Background characteristics of women of reproductive age group

A total of 15683 women in the reproductive age group were included in this study.

Only 3217 (20.51%) of the 15683 women in the reproductive age group were used a modern contraceptive method, while the remaining 12466 (79.49%) did not used a modern contraceptive method. The majority of women (40.81%) are between the ages of 15 and 24, 44.16% have not used a modern contraceptive method, while more than two-thirds of their husbands (76.02%) are between the ages of 34 and 59. The highest number of women were included from Oromia, 1892 (12.06%), of which 11.99% did not utilize modern contraception, while the lowest number of women were included from Harari, 906 (5.78%). Over three out of every five women, 10335 (65.9 %), were from rural areas, with 67.23% not using

modern contraception. The majority, 11405(72.27%), of women, were married, of this 73.3% of women were not use modern contraceptive. In terms of education, 7033 women (44.84 %) had no formal education, while 33.24 % had an elementary level education. Similarly, 52.27 % of their husbands had a secondary or higher degree of education. In terms of economic status, 42.84 % were classified as poor, while 39% were classified as wealthy. About 41.47% of women followed as Christian and More than two out of three women, 13202(84.1%) had an ANC visit and with 84.087%, of women are not using modern contraceptive method. The majority, 11342(84.18%), of sexually active women, responded that they had no facing serious problems in accessing health care services and majority,11288(71.98%), of them are delivered in health institution.

After two years, 34.44 % desired additional children, whereas 27.18 % wanted no more children. Only one out of every four women (25.47 %) and one out of every four males (26.07 %) had heard about family planning in the previous few months. Similarly, less than 10 percent of women (6.43%) have heard of FP in the last few months from newspapers/magazines. More than half of women (51.3 %) were unemployed at the time. Similarly, nearly 90% of the Women partners were currently employed (Table 1).

Table 1: Socio-economic, demographic, maternal, and obstetric characteristic of sexual active women in Ethiopia

Variables	Categories	Use of modern contraceptive, %		Total (N=15683, %)
		Use any modern method (N=3217, 20.51%)	Currently non-use (N=12466, 79.49%)	
Region	Tigray	12.25	10.33	1682, 10.72
	Afar	2.52	8.4	1128, 7.19
	Amhara	18.28	9.07	1719, 10.96
	Oromia	12.34	11.99	1892, 12.06
	Somalia	0.5	11.03	13.91, 8.87
	Benishangul	7.65	7.06	1126, 7.18
	SNNPR	15.36	10.87	1849, 11.79
	Gambela	6.87	6.53	1035, 6.6
	Harari	5.63	5.82	906, 5.78
	Addis Abeba	12.43	11.42	1824, 11.63
	Dire Dawa	6.19	7.48	1131, 7.21
Residence	Urban	39.26	32.77	5348, 34.1
	Rural	60.74	67.23	10335, 65.9
Women age (years)	15-24	27.85	44.16	6401, 40.81
	25-34	45.48	29.06	5086, 32.43
	35-49	26.67	26.78	4196, 26.76
Partner age(years)	15-24	2.74	3.49	523, 3.33
	25-34	20.39	20.7	3237, 20.64
	35-59	76.87	75.81	11923,

				76.02
Marital status	Never married	29.59	26.68	4278, 27.28
	Married	70.49	73.32	11405, 72.27
Women education	No education	41.37	45.74	7033, 44.84
	Primary	35.87	32.56	5213, 33.24
	Secondary and above	22.75	21.7	3437, 21.92
Partner education	No education	25.09	29.07	4431, 28.25
	Primary	18	19.85	3054, 19.47
	Secondary and above	56.92	51.07	8198, 52.27
Women occupation	Had work	49.33	48.54	7638,48.7
	Had no work	50.67	51.46	8045, 51.3
Partner occupation	Had work	93.57	93.57	14675, 93.7
	Had no work	6.43	6.43	1008, 6.43
Wealth index	Poor	30.99	45.89	6718, 42.84
	Middle	23.97	16.66	2848, 18.16
	Rich	45.04	37.45	6117, 39
Religion	Christians	42.28	41.26	6504, 41.47
	Muslim	20.89	17.18	2814, 17.94
	Other	36.84	41.55	6365, 40.59
Births in last five years	No birth	34.35	59.24	8490, 54.17
	1-2	64.13	37.23	6704, 42.75
	3 and more	1.52	3.53	489,

				3.12
Health facility delivery	No	25.24	28.74	4395, 28.02
	Yes	74.76	71.26	11288, 71.98
Accessing Health Care	Big problem	24.9	28.4	4341, 27.68
	No problem	75.1	71.6	11342, 72.32
Desire for more children	Wants within 2 years	20.21	18.91	3007, 19.17
	Wants after 2+ years	34.88	34.33	5401,34.44
	Unsure timing/ undecided	18.81	19.31	3012, 19.21
	Wants no more/ Sterilized/infecund	26.11	27.46	4263, 27.18
Watched family planning on TV last few months	No	69.26	75.47	11594, 73.93
	Yes	30.74	24.87	4089, 26.07
Heard family planning on radio last few months	No	70.87	75.47	11688, 74.53
	Yes	29.13	24.53	3995, 25.47
Read family planning in newspaper/magazine last few months	No	92.14	93.94	14675, 93.57
	Yes	7.86	6.06	1008, 6.43
ANC visit	No	15.45	15.92	2481, 15.82
	Yes	84.55	84.08	13202, 84.18

Multivariable multilevel logistic regression analysis

Random effect measures of variation: The results of random effects indicated that there was a statistically significant variation in the non-use of modern contraceptives across the clusters. A two-level mixed-effect binary logistic regression model was used to analyze the effect of women's individual

characteristics and community-level factors in determining women's non-using of modern contraceptives. Furthermore, the ICC value was 25.4%, indicates that about 25.4% of the total variability of no use of modern contraceptive utilization in Ethiopia were attributed to community-level factors, whereas the individual variation explained the remaining 74.6% of the total variability. After adjusting for individual-level and community-level factors, there is a significant variation in the use of modern contraceptives across communities or clusters.

The proportional change in variance (PCV) in this model was 37.5%, which showed that both community and individual level variables (Table 2) explained 37.5% of community variance observed in the null model. About 37.5% of women with non-use modern contraceptive in clusters was explained in the full model. Besides, MOR was 2.214; it showed that if we randomly select two women from different clusters, a woman from a cluster with high non-use of modern contraceptives was 2.214 times more likely to non-use of modern contraceptives than women from the cluster with use of modern contraceptive. This showed that the existence of significant heterogeneity in non-use of modern contraceptives across different communities.

AIC, BIC, and deviance were checked (Table 2), and the multilevel logistic regression model III was chosen because of the smallest value of AIC, BIC, and smallest deviance since the models were nested.

Individual and community level Factors associated with non-modern contraceptive utilization among sexually active women in Ethiopia

Table 2 shows the adjusted odds ratios (AOR) derived from a multivariable multilevel logistic regression assessing the likelihood of contraception non-use. Thus, in the multilevel multivariable analysis, maternal age, maternal education, husband education, wealth index, religion, birth in the previous five years, health facility delivery, hearing about FP on TV, Antenatal care utilization, region, and place of residence were significant predictors of non-use of modern contraception in Ethiopia. As a result, women age between 25-34 years (AOR=0.54, 95% CI: 0.5-0.61) and age between 34-49 year (AOR=0.62, 95% CI: 0.55-0.71) were less likely to not use modern contraceptives than women age between 15-24 years. Women with a primary level of education (AOR=0.8, 95% CI: 0.68-0.87) were more likely than women with no level of education not to use family planning methods. Similarly, the odds of not use modern contraceptive method among women whose husband's education level was secondary and above were 0.83(AOR = 0.83, 95% CI: 0.72-0.96) times lower as compared to women whose husband's had no formal education.

Likewise, women with poor wealth status were more likely to not use contraception compared to middle wealth status and rich women (AOR=0.66, 95% CI: 0.58-0.76) and (AOR=0.74,95% CI:0.65-0.85),respectively. When compared to Christian followers, Muslim women (AOR=1.4, 95% CI: 1.23-1.62) were more likely to not use contraception. The odds of not using a modern contraceptive method among women who had 1-2 and 3 or more children in the previous five years (AOR = 0.21, 95% CI: 0.19-0.23) and (AOR = 0.4, 95 percent CI: 0.28-0.56) were lower when compared to women who had no births in the previous five years, respectively. The odds of not use modern contraceptive method among women delivered at the health facility were lower by 0.84 (AOR = 0.84, 95%CI: 0.73-0.0.98) times as compared to

women deliver at home. Exposure to mass media such as radio, TV, and newspapers appeared to influence the use of modern contraception method. Women of reproductive age who had watched family planning related information from TV were less likely to not use contraception method (AOR=0.74, 95% CI: 0.65-0.85). Women living in Afar (AOR =6.7; 95%CI: 4.3-10.6), Somali (AOR =47; 95% CI: 24.9-88.9), Gambela (AOR=1.8;95% CI:1.25-2.73),Harari (AOR = 2.25; 95%CI: 1.5-3.4), Addis Ababa (AOR=2.13;95% CI:1.44-3.15) and Dire Dawa (AOR =2.67; 95%CI: 1.8-4.02); regional state were more likely to not use modern contraceptive as compared to women living in Tigray region. However, Women living in Amhara (AOR=0.5; 95%CI: 0.4-0.7) were less likely to not use modern contraceptive as compared to women living in the Tigray region. The odds of not use modern contraceptive method among women living in rural area were 3.43(AOR=3.43; 95% CI: 2.72-4.32) times higher as compared to urban women (Table 2).

Table 2: Multilevel logistic regression analysis of both individual and community-level factors associated with non-contraceptive utilization in Ethiopia

Individual and community level variables	Models			
	Null model	Model I	Model II	Model III
	AOR(95%CI)	AOR(95%CI)	AOR(95%CI)	AOR(95%CI)
Maternal age (years)				
15-24		1		1
25-34		0.5(0.45,0.57)***		0.54(0.5,0.61)***
35-49		0.58(0.51,0.65)***		0.62(0.6,0.71)***
Partner age(years)				
15-24		1		1
25-34		0.75(0.56,0.99)*		0.76(0.6,1.01)
35-59		0.77(0.58,1.02)		0.79(0.6,1.04)
Marital status				
Never married		1		1
Married		1.002(0.87,1.16)		0.997(0.86,1.15)
Maternal education				
No education		1		1
Primary		0.69(0.61,0.78)***		0.8(0.68,0.87)***
Secondary and above		0.71(0.61,0.83)***		0.9(0.75,1.03)
Partner education				
No education		1		1
Primary		0.9(0.78,1.04)		0.9(0.78,1.04)
Secondary and above		0.84(0.73,0.97)*		0.83(0.72,0.96)**
Maternal occupation				
Had no work		1		1
Had work		1.02(0.93,1.13)		1.03(0.93,1.13)
Partner occupation				
Had no work		1		1

Had work	1.13(0.93,1.38)	1.14(0.94,1.39)
Wealth index		
Poor	1	1
Middle	0.6(0.52,0.69)***	0.7(0.58,0.76)***
Rich	0.68(0.6,0.78)***	0.74(0.65,0.85)***
Religion		
Christians	1	1
Muslim	1.38(1.2,1.6)***	1.4 (1.23,1.62)***
Other	1.1(0.95,1.22)	1.07(0.95,1.2)
Births in last five years		
No birth	1	1
1-2	0.2(0.19,0.24)***	0.21(0.19,0.23)***
3 and more	0.5(0.34,0.7)***	0.4(0.28,0.56)***
Health facility delivery		
No	1	1
Yes	0.85(0.74,0.99)*	0.84(0.73,0.98)*
Accessing Health Care		
Big problem	1	1
No-big problem	0.902(0.81,1.02)	0.91(0.82,1.02)
Desire for more children		
Wants within 2 years	1	1
Wants after 2+ years	1.08(0.95,1.23)	1.09(0.95,1.24)
Unsure timing/ undecided	1.15(0.98,1.35)	1.15(0.98,1.35)
Wants no more/ Sterilized/infecund	1.09(0.95,1.25)	1.1(0.96,1.3)
Watched family planning on TV last few months		
No	1	1
Yes	0.75(0.66,0.86)***	0.74(0.65,0.85)***
Heard family planning on radio last few months		

No	1	1		
Yes	0.9(0.8,1.01)	0.91(0.8,1.02)		
Read family planning in newspaper/magazine last few months				
No	1	1		
Yes	0.91(0.75,1.1)	0.9(0.75,1.09)		
ANC visit				
No	1	1		
Yes	1.24(1.05,1.46)*	1.3(1.07,1.5)*		
Community level variable				
Region				
Tigray	1	1		
Afar	5.6(3.73,8.3)***	6.7(4.3,10.6)***		
Amhara	0.53(0.4,0.7)***	0.5(0.4,0.7)***		
Oromia	1.2(0.83,1.5)	1.3(0.94,1.83)		
Somalia	34.9(19.4,62.7)***	47(24.9,88.4)***		
Benishangul	1.1(0.8,1.6)	1.12(0.8,1.63)		
SNNPR	0.8(0.6,1.05)	0.9(0.63,1.23)		
Gambela	1.53(1.08,2.15)*	1.8(1.25,2.73)*		
Harari	1.8(1.23,2.5)**	2.25(1.5,3.4)***		
Addis Ababa	1.98(1.4,2.8)***	2.13(1.44,3.15)***		
Dire Dawa	2.3(1.6,3.3)***	2.67(1.8,4.02)***		
Residence				
Urban	1	1		
Rural	2.3(1.9,2.8)***	3.43(2.72,4.32)***		
Random effects				
Community variance(SE)	1.12(0.103)	1.44(0.14)	0.5(0.05)	0.7(0.07)
ICC (%)	25.4	30.4	13.15	17.38
PVC (%)	1	-28.6	55.4	37.5
MOR	2.733	3.13	1.96	2.214

-2*LL(DIC)	14972.4	13461.57	14517.62	13003.5
AIC	14976.34	13517.57	14543.62	13081.49
BIC	14991.67	13732.06	14643.2	13380.25

NB:

*= significant at P-value < 0.05.

** = significant at P-value < 0.01.

***= significant at P-value < 0.001

Discussion

The ability of girls and women to control their fertility, to choose whether and when to have children, and how many children to have, is at the heart of women's empowerment, gender equality, and progress for all. As a result, the aim of this study was to determine the prevalence of non-use of modern contraceptive method and associated factors among Ethiopian women of reproductive age.

The findings of this study revealed that 79.49% of sexually active women did not use a modern contraceptive method, which is consistent with findings from studies in Ethiopia (79.5%)(23,30) and Ghana (78.5%) (41). Furthermore, as women's ages increased, their use of FP decreased. The women's age had a significant impact on their refusal to use modern contraceptive methods. This finding was consistent with the findings of a Nepal(42), Afghanistan(43), Nigeria(44), and Malawi(45) study, which discovered that as women's ages increase, so does their likelihood of using modern contraception. Studies conducted in China (41), and Ethiopia(23,31,42)found results that differed from this one. The low contraceptive prevalence among women aged 15-24 years is most likely due to the fact that the majority of these women engage in unsafe sex, are newly married, and marriage is based on the institution of producing children. Access to modern FP services is likely to be difficult for a young mother. Another possible explanation is that the former group included women who had either finished child bearing or wanted to space their children, as opposed to the latter group, which included women who had not yet begun child bearing. Additional possible reason could be that youths were less likely to use family planning services because of societal beliefs that they should not have premarital sex.

This study revealed that an increasing educational level of respondents; whose husbands were more likely to use a modern contraceptive method. This suggests that female education most likely has a positive effect on use of modern FP. This result was consistent with previous studies (32,33,43,44). This could be explained by the fact that educated women have better access to health care information, have greater autonomy to make decisions, and have a greater ability to use quality health care services. Moreover, educated individuals might be busy by the nature of their work and have no time to take care of their child, and they plan to use contraceptive methods to decrease the burden of being pregnant and child care.

There is a significant association between women wealth status and non-use of modern contraceptive method. The result of the current study was in line with the studies conducted in Nepal(45), Ethiopia(23,31,42), Rwanda(46,47), Burkina Faso(48), and Nigeria (49). This might be due to the fact that women from rich households might be more educated and have occupations, as supported by this study, to extend their business agendas and further. Moreover, in our community, most rich women had one or two children throughout their lifetime, and this indicates that they are more likely to utilize modern contraceptive methods.

Religion, according to the study's findings, is strongly associated with women's non-use of modern contraception. Muslims women were more likely to not use contraception compared Christian women. This finding is consistent with the findings of (23,45,50). This could be due to the Muslim community's strong belief in a holy book that prohibits family planning (51). This result's attribute necessitates additional research.

Women, who had given birth to a child in the last 5 years were less likely to non-use modern contraceptive than those women who had not given birth. This result is in agreement with other studies(23,42,45,52). The odds of not use modern contraceptive method among women delivered at the health facility were lower by 0.84 times as compared to women deliver at home. The attitude of non-use of modern contraception methods appeared to be influenced by exposure to mass media such as radio, TV, and newspapers. This could be because women who have had media exposure are more aware of modern contraceptives and how to use them. Our findings show a link between exposure to mass media such as radio, television, and newspapers and contraceptive non-use. In the Nepal(45) and Ethiopia(13,23,31,53), a similar result was seen. This finding was backed up by studies conducted in Nepal(45), Burkina Faso(48), Ethiopia(21,23,48,53), and Nigeria(49,54). The possible explanation is that women who give birth in a health facility may receive guidance and counseling about the benefits of modern contraceptive use from health professionals, and the practice of individual health education has slightly increased the uptake of FP methods. As a result, mass media probably appropriate for disseminating information, increasing awareness and encouraging women to use modern contraception.

Women in urban may have more confidence in their decision-making abilities, autonomy, access to contraception methods, and even higher living standards than women in rural areas (27). Studies conducted in Ethiopia(23, 31, 53), Nepal(45), and Nigeria(54), respectively, have shown that women who live in rural areas were more likely to not use modern contraceptives method than those who live in urban areas. This suggests that other factors that promote contraceptive use and are more prevalent in urban areas exist. These include the education and wealth of women. Moreover, the non-use of modern contraception methods varied by region. Women in Afar, Somali, Gambela, Harari, and Dire Dawa were less likely to use modern contraception methods than women in Tigray, but Amhara region had a lower rate of non-use. This result was confirmed the studies .The possible reason for this regional disparity is that there are differences in the implementation of family planning services across regions. Contraceptive methods are inaccessible, resulting in Ethiopia's highest under-five mortality rate (23,31,50,55). This

implies that having access to contraceptive methods will reduce child and infant mortality and add to the health complications of mothers.

Conclusion

In the current study, the magnitude of non-use of modern contraceptive utilization among sexually active women in Ethiopia is unexpectedly high. Among individual-level factors, aged women, educated women, educated husbands, women who had at least one birth in the previous five years, hospital delivery, and watching TV were negatively associated with non-use of modern contraceptive, but poor women, Muslim women, and having ANC visit were positively associated with non-use of contraceptive. In Ethiopia, community-level factors such as place of residence and region were significantly associated with non-use of modern contraceptives. As a result, the government and other stakeholders must provide educational opportunities, raise awareness about the use of modern contraceptives, and provide valuable counseling services to those who may be avoiding modern contraceptive methods.

Abbreviations

AIC: Akaike's information criterion; AOR: Adjusted odds ratio; CI: Confidence intervals; DIC: Deviance information criterion; EAs: Enumeration areas; EDHS: Ethiopian demographic and health survey; FP: Family Planning; ICC: Intra-cluster correlation; MOR: Median odds ratio; PCV: Proportional change in variance; SNNPR: Southern Nations, Nationalities, and People Region

Declarations

Ethics approval and consent to participate

This study is a secondary data analysis of the EDHS, which is publicly available. Approval to use the data was sought from MEASURE DHS/ICF International, and permission was granted for its use. The original DHS data were collected in conformity with international and national ethical guidelines. Ethical clearance was provided by the Ethiopian Public Health Institute (EPHI) (formerly the Ethiopian Health and Nutrition Research Institute (EHNRI) Review Board, the National Research Ethics Review Committee (NRERC) at the Ministry of Science and Technology, the Institutional Review Board of ICF International, and the United States Centers for Disease Control and Prevention (CDC). Written consent was obtained from mothers/caregivers and data were recorded anonymously at the time of data collection during the EDHS 2016

Consent for publication

Not applicable.

Availability of data and materials

The survey datasets used in this study was based on a publicly available data set that is freely available online with no participant's identity from <http://www.dhsprogram.com/data/available-datasets.cfm>. Approval was sought from MEASURE DHS/ICF International and permission was granted for its use.

Competing Interests

The authors declare that no competing interests exist.

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Authors' Contributions

SS carried out the data extraction, performed the data analysis and interpretation, and drafted the manuscript. SM, KD and HB performed the data analysis and interpretation, and drafted the manuscript, and also conducted the writing and revision of the manuscript. All authors read and approved the final manuscript.

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