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Determinants of Modern Contraceptive Use among Women of Reproductive Age in Ethiopia: Evidence from the 2019 Ethiopia Mini Demographic and Health Survey

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Abstract

Background

Modern contraceptive use remains low in Ethiopia and unmet need persists. This study identified socioeconomic and demographic factors associated with modern contraceptive use among women of reproductive age in Ethiopia.

Methods

We analyzed data on 8,885 women aged 15–49 years from the 2019 Ethiopia Mini Demographic and Health Survey (EMDHS). Pearson chi-square tests assessed bivariate associations, and binary logistic regression estimated adjusted odds ratios (AOR) with 95% confidence intervals (CI).

Results

Overall, 23.1% (2,061) of women used a modern method. Compared with women aged 15–19 years, the odds of use were higher in every older group, peaking at ages 25–29 (AOR 5.79; 95% CI 4.15–8.06). Married women had higher odds than divorced women (AOR 4.51; 3.27–6.22), whereas widowed women had lower odds (0.34; 0.14–0.81). Lower odds were found among women with no living child (0.26; 0.20–0.33) compared with those with two or more, poor women (0.51; 0.43–0.60) compared with rich women, and women with no education (0.68; 0.56–0.82) compared with those with secondary education. Odds were lowest in Somali (0.15) and Afar (0.57) relative to Dire Dawa, and religion was significant overall. Place of residence was not significant.

Conclusions

Modern contraceptive use is low and unequal across age, marital status, parity, wealth, education, religion and region. Programmes should prioritise young, poor and less-educated women and the low-use regions. The estimates come from unweighted single-level models of cross-sectional data and show associations only.

1. Introduction

Modern contraceptive methods are scientifically effective means of controlling fertility (UN, 2015; EPHI and ICF, 2019; Boah et al., 2022; Gobena and Kassie, 2024). They include barrier methods (male and female condoms, diaphragms, cervical caps and sponges), hormonal methods (oral pills, injectables, transdermal patches, vaginal rings and implants) and intrauterine devices (Almalik et al., 2018; Ahissou et al., 2022). Hormonal methods contain either estrogen and progestin or progestin only, and they are a

safe and reliable way to prevent pregnancy for most women (Lunani et al., 2018; Mankelkl and Kinfe, 2023).

Globally, an estimated 1.9 billion women aged 15–49 years were of reproductive age in 2019, of whom 1.1 billion needed family planning. Of these, 842 million used contraception and 270 million had an unmet need (Starbird et al., 2016; Kantorová et al., 2020; Hardee and Jordan, 2021). In 2017, modern methods were used by 58% of married or in-union women of reproductive age worldwide and accounted for 92% of all contraceptive use (Rusatira et al., 2020; Aprillia et al., 2023). The World Health Organization estimated that 214 million women of reproductive age had an unmet need for contraception, owing to low-quality services, cultural opposition, limited access and fear of side effects (WHO, 2017; Gahungu et al., 2021).

In Africa, an estimated 139 million women of reproductive age want to avoid pregnancy, and 58 million of them have an unmet need for modern methods (Riley, 2020). Fertility is highest in sub-Saharan Africa, at an average of 5.3 children per woman (Afolabi et al., 2021; Corker et al., 2022; Teshale et al., 2022). Ethiopia is one of the countries with high population growth, currently 2.6% a year, and its total fertility rate remains high (Cleland and Machiyama, 2017). Of the 27 million women aged 15–49 years in Ethiopia, 44% (about 11.7 million) want to avoid pregnancy. Of these, 61% (7.2 million) use modern methods and 39% (4.5 million) have an unmet need; 4.4 million of the latter use no method and 143,000 use traditional methods of low effectiveness (Guttmacher Institute, 2018). The Ethiopian government has made family planning a goal of its health strategy, yet the prevalence of modern contraceptive use remains low, fertility high and unmet need substantial.

Many studies have examined the determinants of modern contraceptive use in Ethiopia. Oumer et al. (2020) found that 41.2% of women in Gondar City used modern methods and that age 20–29 years, higher education, a desire for up to six children, no history of child death, good knowledge and a positive attitude were associated with use. Merera et al. (2021) reported that age, education, number of children, region, religion, wealth index and marital status were associated with contraceptive use among Ethiopian women of reproductive age. Meselu et al. (2022) showed that modern contraceptive use among married women rose from 6.2% in 2000 to 35.2% in 2016, with age 25–29 years, having two children, belonging to the richest wealth group, employment and secondary or higher education as key predictors. Beyene et al. (2023) found that Muslim women and women in female-headed households were less likely to use modern methods, whereas women with higher education, middle or high wealth and one or more children were more likely to use them. Gobena and Kassie (2024) identified age, education, religion, wealth, knowledge of contraception, numbers of living and deceased children, family size and region as significant factors, and Asratie et al. (2024) linked higher education, wealth and media exposure to joint decision-making on contraceptive use among married women. Other studies add to this evidence (Tukue et al., 2020; Debelew and Habte, 2021; Belachew et al., 2023a; Terefe et al., 2023; Mankelkl and Kinfe, 2023; Hailegebreal et al., 2023).

Use remains considerably low in Ethiopia, particularly among rural women, who face limited availability of services, cultural and social norms and little information on contraceptive methods, their benefits and how to obtain them. Traditional beliefs, economic constraints and logistical barriers to health care add to these problems and contribute to continuing high rates of unintended pregnancy (Bogale et al., 2011; Endriyas et al., 2017; Gebre and Edossa, 2020; Fantaye and Damtew, 2024; Shumet et al., 2024).

Most recent national analyses of the 2019 EMDHS use multilevel models, and several restrict the sample to married women (Shagaro et al., 2022; Mankelkl and Kinfe, 2023; Terefe et al., 2023; Hailegebreal et al., 2023). This study complements them by analysing all women aged 15–49 years, including unmarried, widowed and divorced women, with a single-level logistic model that reports every reference category and adjusted odds ratio with its confidence interval. It aims to identify the socioeconomic and demographic factors associated with modern contraceptive use among women of reproductive age in Ethiopia and to provide up-to-date evidence for policymakers and programme managers working on family planning.

2. Materials and methods

2.1. Data source and design

This study is a secondary analysis of the 2019 Ethiopia Mini Demographic and Health Survey (EMDHS), a population-based cross-sectional survey conducted from 21 March to 28 June 2019. It was implemented by the Ethiopian Public Health Institute (EPHI) at the request of the Ministry of Health and is the second Mini DHS in the country, after the 2014 survey (EPHI and ICF, 2019). Its main objective was to provide up-to-date estimates of key demographic and health indicators. The data were obtained from the DHS Program.

2.2. Sampling and sample size

The survey sample was stratified and selected in two stages. In the first stage, 305 enumeration areas (EAs) were selected with probability proportional to size from a frame of all EAs created for the 2019 Population and Housing Census by the Central Statistical Agency. In the second stage, 30 households per EA were selected by equal-probability systematic sampling from a newly created household listing. All women aged 15–49 years who were permanent residents of the selected households, or visitors who slept there the night before the survey, were eligible for interview (EPHI and ICF, 2019). A total of 9,150 households were selected and 8,663 were successfully interviewed. In these households 9,012 eligible women were identified, and 8,885 completed the individual interview, a response rate of 99% (EPHI and ICF, 2019).

2.3. Study population

The analysis covers the 8,885 women aged 15–49 years who were interviewed in the nine regional states and two city administrations of Ethiopia. The survey collected information on background characteristics, fertility, marriage, fertility preferences, awareness and use of family planning methods,

child feeding, nutrition, mortality, HIV awareness, female genital mutilation, domestic violence, and anthropometry (EPHI and ICF, 2019).

2.4. Variables

The outcome variable is current use of a modern contraceptive method, as reported by the woman. A woman was classed as a modern method user (coded 1) if she was currently using the pill, an intrauterine device (IUD), condoms, injectables or another modern method as defined by Hubacher and Trussell (2015); otherwise she was coded 0 (not using a modern method).

The explanatory variables were chosen from the literature on determinants of modern contraceptive use globally and in Ethiopia. They comprise demographic variables (age, number of living children, place of residence, region and marital status) and socioeconomic variables (wealth index, religion and women's education). Categories, coding and reference groups are shown in Table 1.

Table 1
Explanatory variables, categories and reference groups used in the analysis

Variable	Categories	Reference category
Age of woman (years)	15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49	15–19
Region	Tigray, Afar, Amhara, Oromia, Somali, Benishangul-Gumuz, SNNPR, Gambela, Harari, Addis Ababa, Dire Dawa	Dire Dawa [confirm]
Place of residence	Rural, urban	Urban
Religion	Orthodox, Catholic, Protestant, Muslim, Traditional, Other	Other [confirm]
Wealth index	Poor, middle, rich	Rich
Marital status	Unmarried, married, widowed, divorced	Divorced
Education	No education, primary, secondary	Secondary
Number of living children	None, one, two or more	Two or more

2.5. Statistical analysis

Frequencies and percentages described the sample. Associations between each explanatory variable and modern contraceptive use were tested with Pearson's chi-square test at the 5% level. All variables significant in the bivariate analysis were entered together into a binary logistic regression model using the 'enter' method in SPSS 26 version. For woman i the model is

$$logit\left(p\right) = ln[\,p / (1 - p)\,] = \beta + \beta x + \ldots + \beta x$$

1

where p_i is the probability that woman i uses a modern method. The odds ratio for a predictor is exp(β), and the adjusted odds ratio (AOR) is the odds ratio holding the other variables in the model constant (Hosmer et al., 2013). Parameters were estimated by maximum likelihood using the Newton–Raphson (iteratively reweighted least squares) algorithm (Agresti, 2012). The significance of individual coefficients was assessed with the Wald statistic.

Overall model fit was assessed with the likelihood-ratio (omnibus) test, $G = -2(LL_0 - LL_1)$, where LL_0 and LL_1 are the log-likelihoods of the intercept-only and full models; this statistic follows a chi-square distribution with degrees of freedom equal to the number of added parameters. Fit was also assessed with the Hosmer–Lemeshow test, in which a non-significant result indicates no evidence of poor fit, and with the Cox and Snell and Nagelkerke pseudo-R^2 measures. The Cox and Snell measure is $R^2_{CS} = 1 - exp[(2/n)(LL_0 - LL_1)]$, and the Nagelkerke measure rescales it to a maximum of 1: $R^2_N = R^2_{CS} / [1 - exp((2/n)LL_0)]$. Predictive accuracy was summarised with a classification table at a cut-off of 0.5. Influential observations were examined with Cook's distance, DFBETA and leverage values (Hosmer et al., 2013; Agresti, 2012). Multicollinearity among predictors was checked.

3. Results

3.1. Characteristics of the women and modern contraceptive use

A total of 8,885 women aged 15–49 years were included. Of these, 23.1% (2,061) used a modern contraceptive method and 76.9% (6,824) did not (Table 2). The unweighted prevalence is lower than the national weighted estimate of 28.1% reported by the survey (EPHI and ICF, 2021), which is expected because the survey over-samples smaller regions (see Section 4.3).

Use was highest among women aged 25–29 years (32.4%) and 30–34 years (32.6%) and lowest among those aged 15–19 years, 92.2% of whom did not use a modern method (Fig. 1). By region, use was highest in Amhara (33.6%) and SNNPR (31.1%) and lowest in Somali (2.3%) and Afar (9.8%). Use was similar in urban (23.6%) and rural (23.0%) areas. By religion, use was highest among Orthodox (29.6%) and Protestant (27.2%) women and lowest among Traditional (15.0%) and Muslim (15.5%) women. Use was 20.9% among women with no education, 25.1% among those with primary education and 24.3% among those with secondary education. By wealth group, use was 16.5% among poor, 29.0% among middle and 26.8% among rich women. By marital status, use was highest among married women (33.4%), compared with 5.0% among unmarried, 11.3% among divorced and 2.6% among widowed women. By number of living children, use was 7.2% among women with none, 38.5% among those with one and 30.0% among those with two or more.

Table 2
Socioeconomic and demographic characteristics of women of reproductive age by modern contraceptive use (N = 8,885)

Variable	Category	No, n (%)	Yes, n (%)	Total
Age (years)	15–19	1,936 (92.2)	164 (7.8)	2,100
	20–24	1,143 (72.4)	435 (27.6)	1,578
	25–29	1,184 (67.6)	568 (32.4)	1,752
	30–34	786 (67.4)	380 (32.6)	1,166
	35–39	732 (70.6)	305 (29.4)	1,037
	40–44	564 (79.0)	150 (21.0)	714
	45–49	479 (89.0)	59 (11.0)	538
Region	Tigray	550 (75.0)	183 (25.0)	733
	Afar	578 (90.2)	63 (9.8)	641
	Amhara	629 (66.4)	319 (33.6)	948
	Oromia	764 (72.6)	288 (27.4)	1,052
	Somali	625 (97.7)	15 (2.3)	640
	Benishangul-Gumuz	545 (73.0)	202 (27.0)	747
	SNNPR	695 (68.9)	313 (31.1)	1,008
	Gambela	547 (75.7)	176 (24.3)	723
	Harari	611 (80.1)	152 (19.9)	763
	Addis Ababa	613 (74.9)	205 (25.1)	818
	Dire Dawa	667 (82.1)	145 (17.9)	812
Residence	Urban	2,254 (76.4)	697 (23.6)	2,951
	Rural	4,570 (77.0)	1,364 (23.0)	5,934
Religion	Orthodox	2,376 (70.4)	998 (29.6)	3,374
	Catholic	58 (74.4)	20 (25.6)	78
	Protestant	1,246 (72.8)	465 (27.2)	1,711
	Muslim	3,073 (84.5)	562 (15.5)	3,635
	Traditional	51 (85.0)	9 (15.0)	60
	Other	20 (74.1)	7 (25.9)	27

Variable	Category	No, n (%)	Yes, n (%)	Total
Living children	None	2,888 (92.8)	225 (7.2)	3,113
	One	740 (61.5)	464 (38.5)	1,204
	Two or more	3,196 (70.0)	1,372 (30.0)	4,568
Education	No education	2,881 (79.1)	759 (20.9)	3,640
	Primary	2,504 (74.9)	841 (25.1)	3,345
	Secondary	1,439 (75.7)	461 (24.3)	1,900
Wealth index	Poor	2,815 (83.5)	557 (16.5)	3,372
	Middle	900 (71.0)	368 (29.0)	1,268
	Rich	3,109 (73.2)	1,136 (26.8)	4,245
Marital status	Unmarried	2,490 (95.0)	131 (5.0)	2,621
	Married	3,737 (66.6)	1,876 (33.4)	5,613
	Widowed	221 (97.4)	6 (2.6)	227
	Divorced	376 (88.7)	48 (11.3)	424
Total		6,824 (76.9)	2,061 (23.1)	8,885

Row percentages were recomputed from the counts. Corrections to the submitted table include rural residence (23.0% using; 77.0% not using, previously 24.2% and 77.8%) and rounding in several rows.

3.2. Bivariate analysis

Pearson's chi-square tests showed that modern contraceptive use was significantly associated with age ($\chi^2 = 506.98$, df = 6), region ($\chi^2 = 351.08$, df = 10), religion ($\chi^2 = 217.10$, df = 5), wealth index ($\chi^2 = 138.84$, df = 2), marital status ($\chi^2 = 904.07$, df = 3), number of living children ($\chi^2 = 724.55$, df = 2) and education ($\chi^2 = 19.55$, df = 2), all with $p < 0.001$. Place of residence was not associated with use ($\chi^2 = 0.44$, df = 1, $p = 0.506$) (Table 3). All eight variables were nevertheless carried into the multivariable model.

Table 3
Bivariate association between modern contraceptive use and explanatory variables (Pearson chi-square test)

Variable	df	Pearson χ^2	p-value
Age	6	506.977	< 0.001
Region	10	351.083	< 0.001
Place of residence	1	0.443	0.506
Religion	5	217.102	< 0.001
Wealth index	2	138.837	< 0.001
Marital status	3	904.073	< 0.001
Number of living children	2	724.545	< 0.001
Education	2	19.554	< 0.001

The chi-square values were recomputed from the counts in Table 2 and agree with the values reported in the submitted file.

3.3. Factors associated with modern contraceptive use

Table 4 shows the adjusted odds ratios. Place of residence was the only variable with no significant association. Holding the other variables constant, the following associations were found (Fig. 2).

Age

Compared with women aged 15–19 years, the odds of modern contraceptive use were 3.85 times higher among women aged 20–24 (AOR = 3.85; 95% CI 2.63–5.63), 5.79 times higher at 25–29 (4.15–8.06), 4.61 times higher at 30–34 (3.39–6.29), 4.31 times higher at 35–39 (3.15–5.90), 3.55 times higher at 40–44 (2.58–4.88) and 2.30 times higher at 45–49 years (1.63–3.23).

Region

Using Dire Dawa as the reference, the odds of use were significantly higher in SNNPR (AOR = 1.95; 1.46–2.62), Amhara (1.94; 1.46–2.58), Oromia (1.75; 1.33–2.29) and Benishangul-Gumuz (1.63; 1.22–2.17), and significantly lower in Afar (0.57; 0.40–0.80) and Somali (0.15; 0.09–0.27). Differences for Tigray, Gambela, Harari and Addis Ababa were not significant.

Marital status

Married women had 4.51 times the odds of use of divorced women (3.27–6.22), widowed women had 66% lower odds (AOR = 0.34; 0.14–0.81), and unmarried women did not differ significantly from divorced women (0.75; 0.51–1.10).

Number of living children

Women with no living child had 74% lower odds of use than women with two or more children (AOR = 0.26; 0.20–0.33), whereas women with one child did not differ significantly from those with two or more (0.98; 0.83–1.17).

Wealth

Compared with rich women, the odds of use were 49% lower among poor women (AOR = 0.51; 0.43–0.60) and 23% lower among middle-wealth women (0.77; 0.64–0.92).

Education

Women with no education had 32% lower odds of use than women with secondary education (AOR = 0.68; 0.56–0.82), and women with primary education did not differ significantly from those with secondary education (1.08; 0.92–1.28).

Religion

Religion was significant overall (Wald $\chi^2 = 74.22$, df = 5, $p < 0.001$). Because the reference group (Other religion, n = 27) is very small, the contrasts with it are imprecise and none is individually significant (Table 4). The coefficients imply lower odds among Muslim women than among Orthodox women ($\exp[-0.449 - 0.247] \approx 0.50$) and among Protestant women (≈ 0.64) **Place of residence.** Rural women did not differ significantly from urban women (AOR = 1.05; 0.88–1.25).

Table 4
Binary logistic regression of modern contraceptive use among women aged 15–49 years (N = 8,885)

Variable	β	SE	Wald	df	p	AOR	95% CI
Age (ref: 15–19)			144.375	6	< 0.001		
20–24	1.348	0.194	48.235	1	< 0.001	3.850	2.632–5.632
25–29	1.755	0.169	107.711	1	< 0.001	5.785	4.153–8.059
30–34	1.529	0.158	93.683	1	< 0.001	4.614	3.385–6.288
35–39	1.461	0.160	83.000	1	< 0.001	4.311	3.148–5.903
40–44	1.267	0.162	61.007	1	< 0.001	3.550	2.583–4.879
45–49	0.832	0.175	22.688	1	< 0.001	2.297	1.631–3.234
Region (ref: Dire Dawa)			158.710	10	< 0.001		
Tigray	0.037	0.156	0.056	1	0.813	1.038	0.765–1.408
Afar	−0.568	0.178	10.208	1	0.001	0.567	0.400–0.803
Amhara	0.663	0.146	20.631	1	< 0.001	1.940	1.458–2.582
Oromia	0.558	0.138	16.231	1	< 0.001	1.747	1.332–2.292
Somali	−1.868	0.288	42.162	1	< 0.001	0.154	0.088–0.271
Benishangul-Gumuz	0.488	0.146	11.108	1	0.001	1.629	1.223–2.171
SNNPR	0.669	0.150	20.017	1	< 0.001	1.952	1.456–2.617
Gambela	0.234	0.156	2.253	1	0.133	1.264	0.931–1.716
Harari	−0.107	0.143	0.552	1	0.457	0.899	0.679–1.191
Addis Ababa	0.234	0.144	2.626	1	0.105	1.263	0.952–1.676

Variable	β	SE	Wald	df	p	AOR	95% CI
Residence (ref: urban)							
Rural	0.051	0.089	0.330	1	0.566	1.053	0.884–1.254
Religion (ref: Other)			74.222	5	< 0.001		
Orthodox	0.247	0.509	0.236	1	0.627	1.280	0.472–3.470
Catholic	0.189	0.586	0.104	1	0.747	1.208	0.383–3.810
Protestant	−0.202	0.506	0.159	1	0.690	0.818	0.303–2.203
Muslim	−0.449	0.510	0.775	1	0.379	0.638	0.235–1.734
Traditional	−0.832	0.631	1.741	1	0.187	0.435	0.126–1.498
Living children (ref: two or more)			151.637	2	< 0.001		
None	−1.353	0.120	126.242	1	< 0.001	0.259	0.204–0.327
One	−0.016	0.088	0.033	1	0.857	0.984	0.829–1.169
Education (ref: secondary)			40.804	2	< 0.001		
No education	−0.385	0.095	16.309	1	< 0.001	0.680	0.564–0.820
Primary	0.081	0.085	0.910	1	0.340	1.084	0.918–1.279
Wealth index (ref: rich)			69.595	2	< 0.001		
Poor	−0.678	0.082	67.523	1	< 0.001	0.508	0.432–0.597
Middle	−0.264	0.093	8.096	1	0.004	0.768	0.640–0.921
Marital status (ref: divorced)			320.550	3	< 0.001		
Unmarried	−0.288	0.197	2.142	1	0.143	0.750	0.510–1.103

Variable	β	SE	Wald	df	p	AOR	95% CI
Married	1.505	0.164	83.994	1	< 0.001	4.506	3.266–6.218
Widowed	−1.091	0.450	5.888	1	0.015	0.336	0.139–0.811
Constant	−3.053	0.565	29.154	1	< 0.001	0.047	

AOR, adjusted odds ratio; CI, confidence interval; ref, reference category. The model chi-square, pseudo-R^2 and fit statistics are in Table 5.

3.4. Model fit and predictive performance

The omnibus test showed that the model with predictors fitted significantly better than the intercept-only model (χ^2 = 2,204.39, df = 31, $p < 0.001$). The − 2 log-likelihood fell from 9,624.92 for the intercept-only model to 7,420.53 for the full model, a reduction of 2,204.39. The Cox and Snell and Nagelkerke pseudo-R^2 values were 0.220 and 0.332, so the predictors explain roughly 22% to 33% of the variation in modern contraceptive use on these approximate measures. The Hosmer–Lemeshow test was not significant (χ^2 = 5.62, df = 8, p = 0.689), which gives no evidence of poor fit (Table 5).

Table 5
Model fit statistics

Statistic	Value
Omnibus test (model χ^2)	2,204.389, df = 31, $p < 0.001$
−2 log-likelihood, intercept only	9,624.917
−2 log-likelihood, full model	7,420.528
Cox and Snell R^2	0.220
Nagelkerke R^2	0.332
Hosmer–Lemeshow test	χ^2 = 5.624, df = 8, p = 0.689

The submitted text gave the reduction in −2LL as 2,204.582; the correct difference is 9,624.917 − 7,420.528 = 2,204.389, which equals the omnibus chi-square.

With a cut-off of 0.5, the model correctly classified 92.0% of non-users and 36.1% of users, and 79.1% of all women (Table 6). The low sensitivity reflects the low prevalence of use, so the model is better at identifying non-users than users.

Table 6
Classification table (cut-off = 0.5)

Observed	Predicted: not using	Predicted: using	Percentage correct
Not using a modern method	6,281	543	92.0
Using a modern method	1,317	744	36.1
Overall			79.1

No outliers or influential observations were detected. Absolute standardised residuals were below 3, Cook's distance and leverage values were below 1, and DFBETA values were below 1 (maximum 0.108), so no observation had undue influence on the estimated coefficients (Hosmer et al., 2013; Agresti, 2012).

4. Discussion

The 2019 EMDHS reported that the national weighted prevalence of modern contraceptive use among women had risen to 28.1%, from 9.7% in 2005, 18.7% in 2011 and 24.9% in 2016 (EPHI and ICF, 2021). Even so, the contraceptive acceptance rate in 2020 was 69% against the Health Sector Transformation Plan target of 85% (EPHI, 2022). This study identified age, marital status, number of living children, wealth, education, religion and region as factors associated with modern contraceptive use.

Age

Women of every older age group had higher odds of using a modern method than women aged 15–19 years, with odds highest at ages 25–29 (AOR = 5.79) and declining at older ages. This pattern is similar to that reported by Kraft et al. (2022) for sub-Saharan Africa. The low use among adolescents may reflect that many are unmarried, nulliparous and not yet seeking to space or limit births, and it points to a service gap for young women.

Region

Use differed significantly across regions after adjustment. The odds were lowest in Somali and Afar and higher in Amhara, SNNPR, Oromia and Benishangul-Gumuz than in Dire Dawa. These regional differences agree with those found by Beyene et al. (2023), and they may reflect differences in service availability, settlement patterns, development level and social norms, although the data do not allow these explanations to be tested.

Marital status

Married women had far higher odds of use than divorced women, and widowed women had lower odds. Unmarried women had low crude use (5.0%) but did not differ significantly from divorced women after

adjustment. Contraceptive use is concentrated within marriage, so programmes that reach only married women will miss sexually active unmarried and adolescent women.

Number of living children

Women with no living child had markedly lower odds of use than women with two or more children, whereas women with one child did not differ from them. This is consistent with studies showing that use rises with the number of children (Shagaro et al., 2022; Namasivayam et al., 2020; Gobena and Kassie, 2024). Women with children may want to space or limit further births, whereas women without children may still be aiming to have them.

Wealth

Poor and middle-wealth women had lower odds of use than rich women. This is consistent with earlier findings (Beyene et al., 2023; Gobena and Kassie, 2024; Gebrerufael and Hagos, 2024; Wasiyhun and Geda, 2024). Wealthier households may have better access to education, media, health care and information about contraception, which may make their women more aware of modern methods and more likely to use them.

Education

Women with no education had lower odds of use than women with secondary education, but women with primary education did not differ significantly from them. This is in line with studies from Ethiopia in which education is a positive factor in modern contraceptive use (Oumer et al., 2020; Tiruneh et al., 2023; Negash et al., 2023; Woldeamanuel et al., 2023; Gobena and Kassie, 2024). Women with more formal education may understand better both the benefits and the possible side effects of contraceptives.

Religion

Religion was significantly associated with use overall, with lower use among Muslim and Traditional women in the crude data (15.5% and 15.0%, against 29.6% among Orthodox women). Beyene et al. (2023) found that Muslim women were 47% less likely than Orthodox women to use modern methods, and other Ethiopian studies agree (Shagaro et al., 2022; Belachew et al., 2023b; Gobena and Kassie, 2024). Because of the small reference group, our model cannot give precise contrasts between religions, which should be re-estimated with Orthodox as the reference category.

Place of residence

Residence was not associated with use, either crudely or after adjustment. This contrasts with Gobena and Kassie (2024), who reported lower use in rural areas. The absence of a rural–urban difference here may reflect adjustment for education, wealth and region, which differ strongly between rural and urban areas, but this was not tested.

4.1. Policy implications

The findings support the following actions.

- Prioritise adolescent and young women (15–19 years), unmarried women and women with no living child with youth-friendly, confidential family planning information and services.
- Strengthen family planning services and outreach in the low-use regions, particularly Somali and Afar, with approaches adapted to local settlement patterns and social norms.
- Expand access among poor and uneducated women through free or subsidised methods, community-based distribution, and girls' and women's education, which governments already pursue as a means of increasing acceptance of family planning (Gobena and Kassie, 2024).
- Work with community and religious leaders, within local cultural norms, to build acceptance of family planning, particularly in communities with low use among Muslim and Traditional women.
- Monitor widowed and divorced women, whose odds of use differ from those of married women, so that services reach all women who need them.

4.2. Strengths and limitations

The study used nationally representative survey data with a 99% response rate, covered all women aged 15–49 years including unmarried women, and reported full reference categories and confidence intervals. Several limitations should be considered. First, the data are cross-sectional, so the associations cannot be interpreted as causal, and some factors, such as wealth and number of children, may be both causes and consequences of contraceptive use. Second, the analysis did not use the survey sampling weights or account for stratification and clustering of the EMDHS design. Estimates of prevalence are therefore not nationally representative (the unweighted prevalence of 23.1% differs from the weighted national estimate of 28.1%), standard errors may be understated, and the findings should be confirmed with survey-weighted or multilevel models. Third, the sample includes women who are not sexually active, pregnant or never married, which lowers prevalence and may distort associations; an analysis of married or sexually active women would give a more direct view of need. Fourth, the survey did not include some potentially important variables, such as women's autonomy, knowledge, partner attitudes, access to health facilities and exposure to media, and the model did not test interactions, such as between age and marital status. Fifth, the small reference group for religion limits the precision of the religion contrasts.

5. Conclusions

Modern contraceptive use among women of reproductive age in Ethiopia is low, at 23.1% in this sample. Use differs by age, marital status, number of living children, wealth, education, religion and region. It is lower among adolescents, women with no living child, poor and uneducated women, and women in Somali and Afar, and higher among married women and women aged 25–29 years. Place of residence

was not associated with use. Programmes should target these groups and regions. Future work should use survey-weighted or multilevel models, and should examine married and sexually active women separately.

Declarations

Ethics approval and consent to participate

This study, entitled “Determinants of Modern Contraceptive Use among Women of Reproductive Age in Ethiopia: Evidence from the 2019 Ethiopia Mini Demographic and Health Survey,” is based on secondary analysis of data from the 2019 Ethiopia Mini Demographic and Health Survey (EMDHS). The survey was conducted under the ethical oversight and procedures established by the responsible Ethiopian authorities. The present study involved no direct contact with participants, no additional data collection, and no clinical intervention. The analysis used existing survey data obtained for research purposes. Ethical approval requirements for secondary data analysis should be interpreted in accordance with the policies of the relevant institutional ethics committee and the conditions governing access to the survey data.

Consent for publication:

Not applicable.

Declaration of competing interest.

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement.

Tadsual Asfaw Dessie: Conceptualization, Methodology, Writing – original draft. Shimels Niguse Kebadie: Formal analysis, Data curation, Writing – review & editing.

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Author Contribution

Both T.A.D. and S.K.N. wrote the main manuscript text, prepared figures, and reviewed the manuscript

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Data Availability

Data availability. The 2019 EMDHS data are publicly available from the DHS Program (https://dhsprogram.com) on registration and approval of a data request.

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Figures

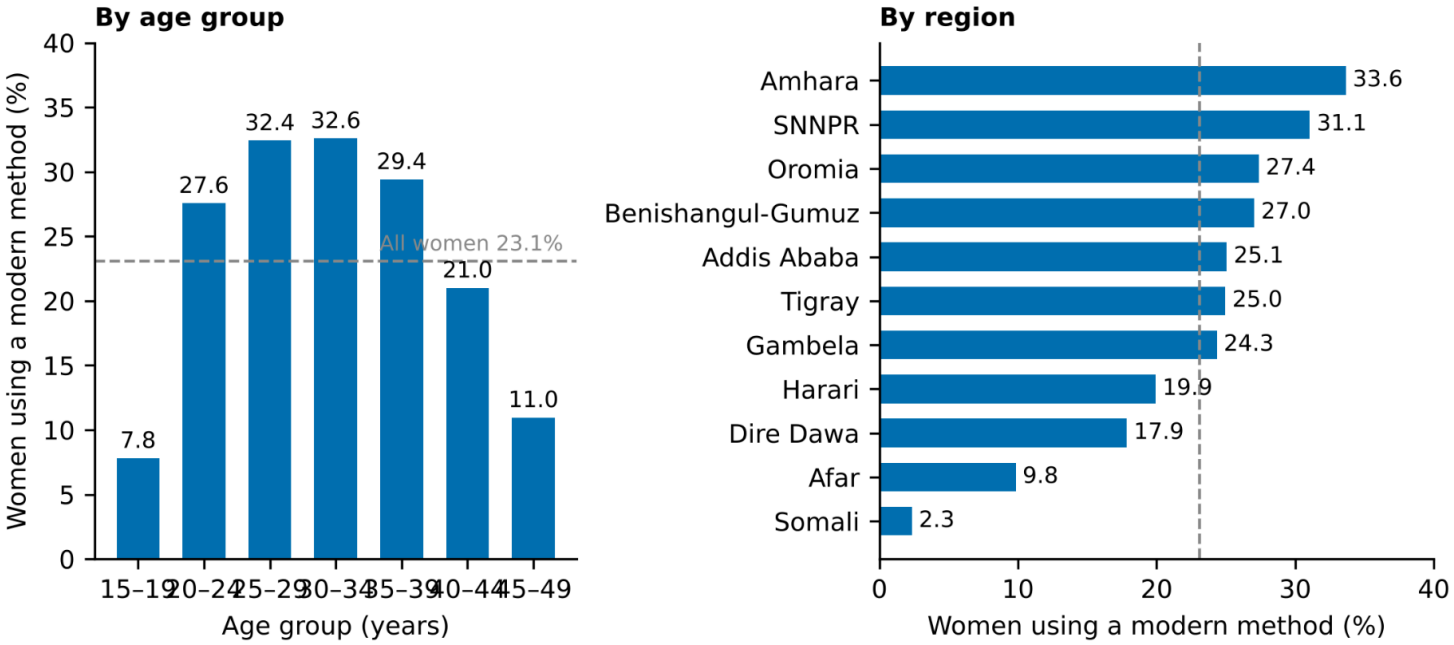
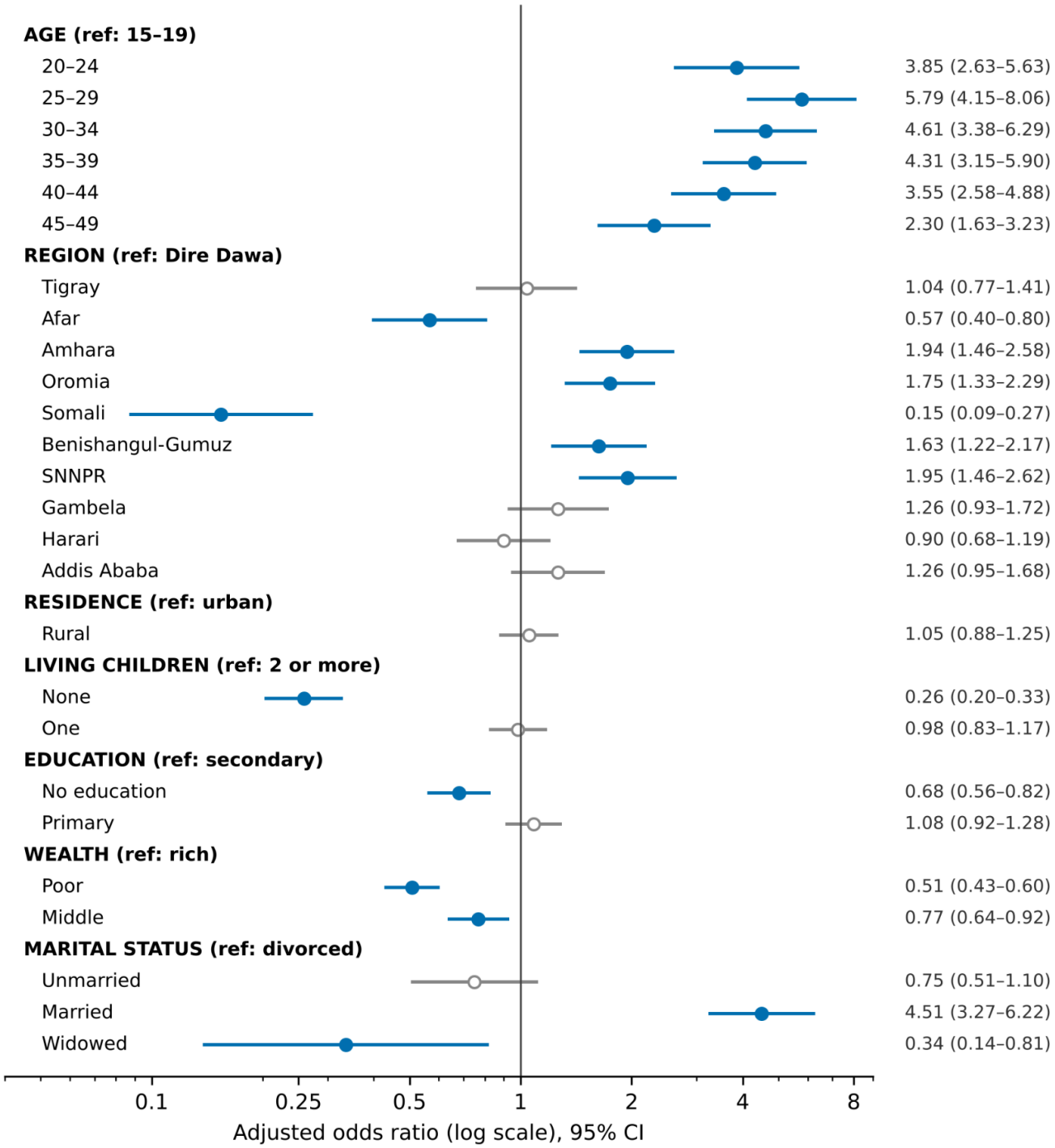


Figure 1

Prevalence of current modern contraceptive use by age group and region, EMDHS 2019 (unweighted; N = 8,885). The dashed line marks the overall prevalence (23.1%).



Blue: 95% CI excludes 1. Religion not shown (reference group very small).

Figure 2

Adjusted odds ratios (95% CI) of modern contraceptive use from the binary logistic model