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# Prevalence and Determinants of Contraceptive Utilization among Women in the Reproductive Age Group in Ethiopia

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## Abstract

**Introduction** Despite the huge advantages of family planning programs, contraception use in Ethiopia remains low. Determining the magnitude and associated factors of contraceptive utilization helps to take action for further improvement. Therefore, this study aimed to assess the prevalence and identify determinants of using contraceptives among women of reproductive age in Ethiopia.

**Methods** The 2019 Ethiopian Mini Demographic and Health Survey 2019 (EMDHS 2019) dataset was utilized in this population-based investigation. In the current study, 8885 reproductive-age women were included. Binary logistic regression analysis was employed to examine significant factors associated with the utilization of contraceptive methods. The analysis was done using SPSS software version 20.

**Results** The prevalence of contraceptive utilization amongst women's reproductive age in Ethiopia was 37.6%. Of all contraceptive users, a large number of women, 57.0%, used injectable kinds of contraceptives followed by implants (24.3%). Participants aged 20–29 (AOR = 2.32, 95%CI: 1.79–3.01) and aged 30–39 years (AOR = 3.12, 95%CI: 2.58–3.78); from Addis Ababa (AOR = 3.27, 95%CI:2.42–4.43), Dire Dawa (AOR = 2.96, 95%CI:2.28–3.84), and urban residence (AOR = 2.49, 95%CI:2.13–2.91); who had secondary education level 1.391(AOR = 1.14–1.70), diploma and above (AOR = 1.39, 95%CI:1.12–1.72); being in rich wealth index (AOR = 1.260, 95%CI:1.06–1.50); having five or more children (AOR = 1.37, 95%CI:1.17–1.61); and who had knowledge about contraceptives (AOR = 1.88, 95%CI:1.42–2.48) and being married (AOR = 5.82, 95%CI: 4.60–7.36) had higher odds of utilizing contraceptives, while women aged 40–49 years (AOR = 0.93, 95%CI: 0.89–0.96) and from residential region of Oromia (AOR = 0.516, 95%CI: 0.40–0.67), Somalia (AOR = 0.48, 95%CI: 0.38–0.62) and Benishangul (AOR = 0.53, 95%CI: 0.40–0.70) had lower odds of using contraception.

**Conclusions** The study concluded that the use of contraceptives remained very low (found below the national target) in Ethiopia. Factors like age, educational level, number of children, and region of the women, religion, wealth index, and marital status are determinant factors associated with contraceptive use among reproductive-age women in Ethiopia. For a more successful intervention approach that encourages the use of contraceptive methods, these variables should be considered.

**Keywords** Contraceptive · Reproductive-age women · EMDHS2019 · Ethiopia

## Introduction

Globally, about 842 million people are using contraceptive methods, while 270 million have an unmet need [1]. The World Health Organization indicates that 75% of sexually active women are at risk of unintended pregnancy because they do not use contraceptives, with one in four pregnancies being unplanned [2]. In developing nations, from the annual 121 million unplanned pregnancies, 61% ended medical abortion. In countries that restrict abortion, the percentage of unwanted pregnancies that result in abortion has increased from 36% in 1990–2004 to 50% by 2015–2019 [3].

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In Africa, particularly in sub-Saharan Africa (SSA), research evidence consistently reports the low prevalence of use of modern contraception, which translates to the high incidence of unintended pregnancies, unsafe abortions, and maternal deaths [4–6]. Although recent statistics show that contraceptive use among young women with SSA has improved along with global trends [7, 8], young women in these age groups use contraceptives disproportionately, especially condoms. [8]. Given the heterogeneous nature of the SSA region, there are sub-regional differences in contraceptive use among young women. Between 2005 and 2015, the reported use of modern contraceptives among women of reproductive age (i.e., 15–49) in southern Africa (i.e., Botswana, Lesotho, Namibia, South Africa, and Swaziland) was highest (54.3%), followed by North Africa (i.e., Algeria, Egypt, Libya, Morocco, Sudan, and Tunisia). The moderate to lowest trends are recorded in the Eastern (27.2%), Western (15%), and Central African countries (12%) [9].

Some studies realized that if couples could space their pregnancies by at least two years, up to 35% of maternal deaths and up to 13% of child mortalities could be averted, whilst 25% of under-five mortalities could be averted if birth intervals were at least three years [5]. Also, other findings showed that the estimated percentage of maternal deaths averted by the use of contraception in the Democratic Republic of Congo is 15.2% and, similarly, 18.2% in Malawi [10]. In developing countries, an estimated 35% of births are unintended and some 200 million couples reportedly express a desire to delay pregnancy or cease fertility. However, they often do not use contraception [11].

Ethiopia has experienced a steady increase in contraceptive use since 2000 [12]. The contraceptive use rate has increased from 6% in 2000 to 36% in 2016. While the contraceptive use rate has increased six-fold, the total fertility rate has slightly declined from 5.5 children in 2000 to 4.6 children per woman in 2016, a decrease of 16% [12]. In Ethiopia, the prevalence rate of contraceptive use among women of reproductive age was 41%, according to 2019 EMDHS estimates. However, this steady increase in contraceptive use did not result in a proportional decline in total fertility rates, unintended pregnancy, maternal and child mortality, or population growth in Ethiopia.

The factors that determine contraceptive utilization are numerous and complex. Several studies have shown that most women's contraceptive use is linked to socio-demographic, cultural, socio-economic, geographical, and family planning characteristics [13–16]. Contraceptive use in Ethiopia has been the subject of numerous studies in the literature. Many of them, however, focus solely on modern contraceptive methods used in family planning [17–20], ignoring traditional approaches. As a result, the current study tackles this issue by combining all contraceptive methods used by women of reproductive age across the country.

Given Ethiopia's current low contraceptive utilization, meeting the MDGs will be a significant issue. As a result, identifying the prevalence and determinant factors that influence contraceptive use in the study area will provide more information to program managers for program design, proper execution, and evaluation of their contribution to family planning. Generally, this study answered the following basic research questions: (i) What are the prevalence of contraceptive among women of reproductive age? (ii) Which predictors have a statistically significant effect in determining the status of women's contraceptive practice? Based on these considerations, therefore, the following hypotheses were formulated: age of women, place of residence, educational status of women, number of living children, region of respondents, knowledge about any contraceptive methods, respondents' wealth index, and marital status would significantly predict the utilization of contraceptive methods. Therefore, the purpose of this study was to examine the prevalence and determinants of contraceptive utilization among women in the reproductive age group in Ethiopia by using the Ethiopian Mini demographic and health survey data set.

## Data and Methods

### Study Area

Ethiopia is a country on the horn of Africa, the largest and most populous in the region. The capital city is Addis Ababa, located almost in the center of the country. Ethiopia with a federal system of government comprises 10 regions (Tigray, Amhara, Oromia, SNNPR, Sidama, Gambela, Benshangul Gumuz, Harar, Afar, and Somalia) and two chartered cities (Addis Ababa and Dire Dawa) in 2020. In this analysis, the Sidama region was under the South Nations and Nationalities Peoples region.

### Source of Data

The 2019 Ethiopia Mini Demographic and Health Survey (EMDHS) is the second Mini Demographic and Health Survey conducted in Ethiopia. The first Ethiopia Mini DHS, or EMDHS, was conducted in 2014. The Ethiopian Public Health Institute (EPHI) implemented the survey at the request of the Ministry of Health (MoH). The 2019 EMDHS was a population-based cross-sectional study conducted from March 21, 2019, to June 28, 2019.

### Sample Procedure

The sample frame for the 2019 EMDHS is a composite of all census enumeration areas (EAs) produced for the 2019 Ethiopian Population and Housing Census (EPHC) by the

Central Statistical Agency (CSA). A total of 305 EAs (93 in urban areas and 212 in rural areas) were selected in the first stage, with probability proportional to EA size (based on the 2019 EPHC frame) and independent selection in each sampling stratum. From January to April 2019, a household listing operation was conducted in all chosen EAs. The generated household lists were used as a sample frame for the second stage's household selection. Some of the EAs chosen for the 2019 EMDHS have more than 300 households. Each big EA selected for the 2019 EMDHS was split to make household listing easier. In the second step of selection, a set number of 30 households per cluster were chosen at random from the newly produced household listing with an equal probability all women aged 15–49 who were either permanent residents or guests who stayed in the selected houses the night before the survey were eligible to be questioned. A total of 9150 houses were chosen for the sample, with 8663 successfully interviewed. In the questioned homes, 9012 eligible women were selected for individual interviews were completed, providing a response rate of 99%. From this, women eligible for utilization of contraceptives was 8885 women. This is shown in Fig. 1.

## Exclusion Criteria

In the current study, women who were pregnant and sexually inactive at the time of the survey were excluded. In addition, the respondents whose information was not filled out or who had incomplete information were excluded from the analysis.

## Data Quality Control

Data collectors were trained to assure data quality. Regional coordinators, field supervisors, and CAPI (computer-assisted personal interview) supervisors were also educated in data quality control and fieldwork coordination. The investigators of the research oversaw the data gathering daily. A protocol that governs the design, execution, and administration of the survey was created and sent to data collectors. Data collectors were briefed and urged to conduct interviews in quiet, comfortable settings at convenient times. Furthermore, research participants were urged to submit honest answers by describing the aim and significance of the study and ensuring the anonymity of the data they would contribute. Daily, completed questionnaires were verified for completeness and uniformity.

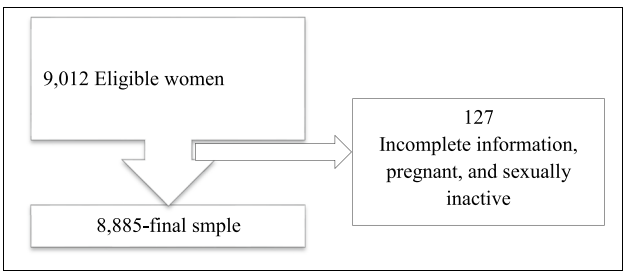


**Fig. 1** Sampling procedure

## Study Variables

### Response Variables

Contraceptive methods include the pill, IUD, injection, male condom, female condom, female sterilization, male sterilization, periodic abstinence, withdrawal, implants/Norplant, lactational amenorrhea (LAM), and the standard day's approach. In the survey, women were asked if they utilized any of these methods. In the current study, a woman is considered a current contraceptive user if she uses any of the contraceptive methods and a non-user if she does not use any technique , *i.e*

$$y_i = \begin{cases} 1, if the i^{th} women aged 15-49 using any of contraceptive method \\ 0, otherwise \end{cases}$$

### Independent Variables

Independent variables considered in the study were women's age (15–19, 20–29, 30–39, and 40–49) based on a previous study [21], region (Tigray, Amhara, Oromia, SNNPR, Gambela, Benshangul Gumuz, Harar, Afar, and Somalia, and two chartered cities (Addis Ababa and Dire Dawa)), current marital status (single, married, divorced, widowed), women educational level (no education, primary, secondary, and higher), region (orthodox, Muslim, protestant, and others), place of residence (rural, urban), household wealth status (poor, middle, rich), number of living children (no child, 1–2, 3–4, ≥ 5), and knowledge of any contraceptives methods (no, yes).

## Operational Definition of Terms

### Contraceptive Prevalence Rate

Women who utilize contraceptive methods as a proportion of the total women aged 15–49 and eligible for contraception.

### Knowledge About Contraceptives

The extent to which a person understands contraceptive methods, including any specific kinds and sources of contraception. To assess contraceptive knowledge, the 2019

EMDHS questionnaire asked all reproductive-age women who participated in the survey to have information on different contraceptive methods, where a person can get a contraceptive, and the importance and side effects of contraceptives. If they answered at least 80% correctly, it was considered as good knowledge (coded as "Yes") in this study, and No, otherwise.

### Statistical Analysis

The collected data was entered and analyzed with SPSS version 20. The data were summarized using descriptive statistics, and the results were presented using frequencies, tables, and percentages. Bivariate logistic regression was used to select candidate variables for multivariate logistic regression. A $p$ value of less than 0.2 was utilized as a cut-off point in the bivariate logistic regression. The variance inflation factor (VIF) was used to check multi-collinearities between candidate variables before fitting the final model. VIF values more than 10 are commonly thought to indicate multi-collinearity, although in weaker models, such as logistic regression, values greater than 2.5 may be cause for concern [22]. As a result, we examined variables with VIF values less than 2.5 for this study. Multivariate logistic regression was used to identify determinants of contraceptive utilization among reproductive-aged (15–49) women in Ethiopia. Adjusted odds ratios (AOR) with corresponding 95%CI were calculated to assess the relationship between independent variables considered in the model and the utilization of contraceptives. Finally, Hosmer and Lemeshow's test used the adequacy of the fitted model. In this study, on the final model, a $p$ value of less than 0.05 was assumed to be a statistically significant value.

## Results

This study aimed to assess the prevalence and determinants of contraceptive utilization among reproductive-age women in Ethiopia using the EMDHS 2019 data set. A total of 8885 women of reproductive age (15–49 years) were our study subjects. Based on the current study results, the overall prevalence of contraceptive utilization in Ethiopia was 37.6% (*Table 1*).

**Table 1** Socio-demographic characteristics of reproductive age women using 2019 EMDHS

| Variables | Categories | *e* | Percent |
|---|---|---|---|
| Type of place of residence | Urban | 3559 | 40.1% |
| | Rural | 5326 | 59.9% |
| Respondent's current age | 15–19 | 1958 | 22.0% |
| | 20–29 | 3506 | 39.5% |
| | 30–39 | 2355 | 26.5% |
| | 40–49 | 1066 | 12.0% |
| Region | Tigray | 686 | 7.7% |
| | Afar | 556 | 6.3% |
| | Amhara | 948 | 10.7% |
| | Oromia | 1040 | 11.7% |
| | Somali | 460 | 5.2% |
| | Benishangul | 723 | 8.1% |
| | SNNPR | 960 | 10.8% |
| | Gambela | 502 | 5.6% |
| | Harari | 1418 | 16.0% |
| | Addis Ababa | 832 | 9.4% |
| | Dire Dawa | 760 | 8.6% |
| Highest educational level | No education | 3498 | 39.4% |
| | Primary | 3535 | 39.8% |
| | Secondary | 1106 | 12.4% |
| | Higher | 746 | 8.4% |
| Number of a living child | No child | 2960 | 33.3% |
| | 1–2 child | 2688 | 30.3% |
| | 3–4 child | 1616 | 18.2% |
| | Five or more | 1621 | 18.2% |
| Respondents wealth index | Poor | 2756 | 31.0% |
| | Middle | 1213 | 13.7% |
| | Rich | 4916 | 55.3% |
| current marital status | Single | 2193 | 24.7% |
| | Married | 5905 | 66.5% |
| | Widowed | 170 | 1.9% |
| | Divorced | 617 | 6.9% |
| Religion | Orthodox | 3945 | 44.4% |
| | Catholic | 61 | 0.7% |
| | Protestant | 1589 | 17.9% |
| | Muslim | 3214 | 36.2% |
| | Other | 76 | 0.90% |
| Knowledge of any contraceptive methods | No | 486 | 5.5% |
| | Yes | 8399 | 94.5% |
| Contraceptive use | No | 5546 | 62.4% |
| | Yes | 3339 | 37.6% |

Out of 3339 contraceptive users, a large number of women in 1904(57%) used injectable types of contraceptives, followed by implants in 811 (24.3%). (*Fig. 2*)

### Participants' Sociodemographic and Economic Characteristics

Of all the 8885 study participants, more than half of 5326 (59.9%) were rural residents, while 3559 (40.1%) were from urban areas. Regarding the age of participants, a large percentage, about 3506 (39.5%) of participants, were in the age group between 20 and 29 years, followed by 2355 (26.5%) of participants were in the age group between 30 and 39 years. Regarding regional distributions, the largest percentage of respondents were from the Harar (15.9%), Oromia region (11.7%), and SNNPR (Southern Nations, Nationalities, and

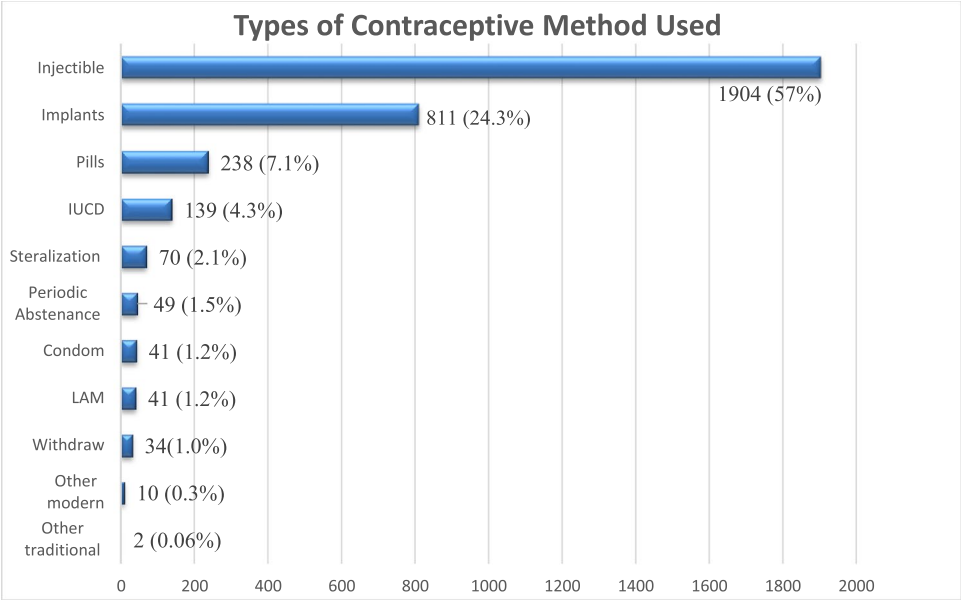


**Fig. 2** Types of contraceptives used

Peoples' Region) (10.8%). Out of the total, 3458 (38.9%) of the respondents have no formal education of which only 31.2% utilize contraceptive methods.However, mothers who had secondary and higher education level were 1106 and 746, of which 57.5% and 57.2% utilized contraceptives, respectively. Furthermore, the descriptive results showed that the number of living children was 33.3% (no child), 30.3% (1–2), 18.2% (3–4), and 18.2% (5 or more). Out of the total studied women, more than half, 4916 (55.3%), were categorized as rich, whereas 2756 (31.1%) were categorized as poor in wealth status. The current marital status of women was shown to be that more than half of 5905 (66.5%) were married. A large percentage (94.5%) of participants knew about contraceptive methods. Regarding the religion of women, the majority of 3945 (44.4%) were Orthodox, followed by 3214 (36.2%) Muslim followers (*Table 1*).

## Factors Associated with Contraceptive Utilization

In multivariate logistic regression analysis, age of women, place of residence, educational status of women, number of living children, region of respondents, knowledge about any contraceptive methods, respondents' wealth index, and marital status were significantly related to the utilization of contraceptive methods (*Table 2*).

Women in the age group of 20–29 years were 2.321 (AOR = 2.321, 95%CI: 1.79–3.01) times more likely to use contraceptives as compared to those in the age group of 15–19. Again, women in the age group of 25–29 were 3.121 (AOR = 3.121, 95%CI: 2.58–3.78) times more likely to use contraceptives as compared to those in the age group of 15–19. However, women in the age group of 40 or more were 34% 0.926 (AOR = 0.926, 95%CI: 0.89–0.96) times less likely to use contraceptives as compared to those in the age group of 15–20.

Women with secondary education were 1.391 times more likely to use contraceptives (AOR = 1.391, 95% C.I 1.14–1.70) as compared to women with no formal education. Again women with higher education were 1.393 times more likely to use contraceptives (AOR = 1.393, 95% C.I 1.12–1.72) as compared to women with no formal education. Women with urban residence were 2.492 times more likely to utilize contraceptives (AOR = 2.492, 95% C.I 2.13–2.91) compared to those women with rural residence. Women having five or more children (AOR = 1.372, 95% CI 1.17–1.61) were 1.372 times more likely to use contraceptives compared to women with no children. Women having a rich wealth index were 1.260 (AOR = 1.260, 95% C.I 1.06–1.50) times more likely to use contraceptives compared to women having poor wealth index.

Women having knowledge about contraceptive methods (AOR = 1.878, 95% C.I 1.42–2.48) were 1.878 times more likely to use contraceptives compared to women having no knowledge about contraceptive methods. Married women were 5.836 times more likely to use contraceptive methods as compared to single women (AOR = 5.819, 95% C.I 4.60–7.36). The reason might be a desire to limit the number of children they have. Women from Oromia, Somalia, Benishangul, Addis Ababa, and Dire Dawa differed significantly from the Tigray reference group. Oromia, Somalia, and Gambela were having odds ratios of 0.516, 0.487, and 0.851, respectively. This indicates that the odds of using contraceptives for these regions were less likely as compared to Tigray. Women from Addis Abeba were 3.273

**Table 2** Multivariate logistic regression model result for factors associated with contraceptive utilization of reproductive age women in Ethiopia, based on 2019 EMDHS

| | | Contraceptive use | | AOR(95%CI) |
|---|---|---|---|---|
| | | No (%) | Yes (%) | |
| Respondent's current age | 15–19 | 1636(83.6) | 322(16.4) | |
| | 20–29 | 1672(47.7) | 1834(52.3) | 2.32(1.79, 3.01)* |
| | 30–39 | 1046(44.4) | 1309(55.6) | 3.12(2.58, 3.78)* |
| | 40–49 | 767(72.0) | 299(28.0) | 0.93(0.89, 0.96)* |
| Region | Tigray | 503(73.3) | 183(26.7) | |
| | Afar | 469(84.4) | 87(15.6) | 1.09(0.83, 1.45) |
| | Amhara | 629(66.4) | 319(33.6) | 1.32(0.90, 1.95) |
| | Oromia | 740(71.2) | 300(28.8) | 0.52(0.40, 0.67)* |
| | Somali | 223(48.5) | 237(51.5) | 0.49(0.38, 0.62)* |
| | Benishangul | 451(62.4) | 272(37.6) | 0.53(0.40, 0.70)* |
| | SNNPR | 545(56.8) | 415(43.2) | 0.81(0.63, 1.04) |
| | Gambela | 332(66.1) | 170(33.9) | 0.85(0.66, 1.10) |
| | Harari | 711(50.1) | 707(49.9) | 0.84(0.67, 1.04) |
| | Addis Ababa | 341(41.0) | 491(59.0) | 3.27(2.42, 4.43)* |
| | Dire Dawa | 304(40.0) | 456(60.0) | 2.96(2.28, 3.84)* |
| Place of residence | Rural | 3495(65.6) | 1831(34.4) | |
| | Urban | 1508(42.4) | 2051(57.6) | 2.49(2.13, 2.91)* |
| Highest educational level | No education | 2407(68.8) | 1091(31.2) | |
| | Primary | 2240(63.4) | 1295(36.6) | 1.21(0.96, 1.52) |
| | Secondary | 470(42.5) | 636(57.5) | 1.39(1.14, 1.70)* |
| | Diploma and above | 319(42.7) | 427(57.3) | 1.39(1.12, 1.72)* |
| Respondents wealth index | Poor | 1912(69.4) | 844(30.6) | |
| | Middle | 780(64.3) | 433(35.7) | 1.14(0.98, 1.33) |
| | Rich | 2062(41.9) | 2854(58.1) | 1.26(1.06, 1.50)* |
| Number of a living child | No child | 2462(83.2) | 498(16.8) | |
| | 1–2 child | 1287(47.9) | 1401(52.1) | 2.74(0.29, 0.46) |
| | 3–4 child | 815(50.4) | 801(49.6) | 1.00(0.84, 1.20) |
| | Five or more | 639(39.4) | 982(60.6) | 1.372(1.17, 1.61)* |
| Religion | Orthodox | 2316(58.7) | 1629(41.3) | |
| | Catholic | 40(65.6) | 21(34.4) | 1.84(0.78, 2.39) |
| | Protestant | 945(59.5) | 644(40.5) | 1.41(0.62, 3.17) |
| | Muslim | 2190(68.1) | 1024(31.9) | 1.53(0.87, 2.67) |
| | Other | 55(72.4) | 21(27.6) | 0.89(0.51, 1.56) |
| Knowledge of any contraceptive methods | No | 373(76.7) | 113(23.3) | |
| | Yes | 3226(38.4) | 5173(61.6) | 1.88(1.42, 2.48)* |
| Current marital status | Single | 1920(87.6) | 273(12.4) | |
| | Married | 2952(49.5) | 2953(50.5) | 5.82(4.60, 7.36)* |
| | Widowed | 156(91.8) | 14(8.2) | 1.45(0.88, 2.38) |
| | Divorced | 518(84.0) | 99(16.0) | 0.59(0.32, 1.10) |

Nagelkerke's R Square = 0.815; Hosmer and Lemeshow Test (p value = 0.094)

*p-value < 0.05, statistically significant, AOR: adjusted odds ratio

(AOR = 3.273, 95% C.I:2.42–4.43) and Dire Dawa were 2.962 (AOR = 2.962, 95% C.I:2.28–3.84) times more likely than Tigray (*Table 2*).

## Discussion

This study was conducted to assess the prevalence and determinants of contraceptive utilization among women in the reproductive age group in Ethiopia.

The current study's results showed that the overall contraceptive use rate was 37.6%. This finding is in line with

studies in Ofra district, northern Ethiopia (37.1%) [23], Mojo Town (38.3%) [24], and Tigray in northern Ethiopia (35.6%) [25]. However, it is higher than the four emerging regions in Ethiopia (Afar, Benshangul Gumuz, Gambela, and Somali Regions) (22.2%) [26], 2016 EDHS report of 20.42% [27], and Humerain Ethiopia (27.1%) [28]. Furthermore, the current result is also higher than the report of 20 African countries (26%) [4], 17 sub-Saharan African countries (17%) [29], southern Nigeria (21.4%) [30], Ghana (21.53%) [31], Ethiopia Afar (7.5%) [32], the 2015 African Continental Report on the United Nations Millennium Development Goals (MDGs) (33.4%) [33], and the United Nations Report on the MDGs 2015 of Somalia, Eritrea, and South Sudan of 23.7%, 20%, and 6.8%, respectively [33]. This disparity might be because, globally, including in Ethiopia, knowledge of the use of contraception, the opportunity to get contraceptives, and understanding their benefits has grown over the past year. However, it is lower than in Addis Ababa (56.3%) and Lusaka, Zambia (59.2%) [34] [35]; North Shewa Zone (46.9%) [36]; Edagahamus City, Tigray, Ethiopia (58.5%) [37]; Benin City, Nigeria (64.5%) [38]; and Holeta City (73%) [39]. This disparity could be related to the participant's residence, varying ages, different religious beliefs, and regional differences.

According to the current study results, age of women, education level, place of residence, region, information about any contraceptive methods, wealth index, number of living children, and marital status are factors related to Ethiopia's current use of modern contraceptive methods.

In this study, participants in the middle-aged group (20–40 years old) were more likely to use contraception than women aged 15–20 and 40–49 years. The contraceptive use rate of women in the 31–40-year-old age group is 2.32 times higher than that of 41–49-year-old women and 3.121 times higher than the 15–20-year-old group. This is consistent with studies conducted in different places in Ethiopia [21, 40, 41]. This finding is also supported by the 2014 EMDHS results. According to a Bangladeshi study, women between the ages of 40 and 49 are less likely to use contraception [42]. Although it may seem obvious, many premenopausal women over the age of 40 do not use contraception [43]. This might be because reproductive-age women in low-income nations become more economically stable as they get older and they are less likely to want to use contraception to have additional children.

The current study is also supported by previous studies reported elsewhere [44–46]. This might be because the majority of women in this age group are working and have a large family, so they wish to restrict births or unwanted pregnancy while also keeping their employment. Furthermore, women in this age range are more likely to be students, which may make it easier for them to acquire information from the media or their studies. However, the present study contradicts an Ethiopian study that found that women aged 35–49 were more likely to utilize contraception than those aged 15–24 [26, 47]. This suggests that most women begin taking contraception after they reach their intended number of children. As women get older, they are less likely to be influenced by their husbands, allowing them to use more contraception than younger women.

Moreover, the current study showed that residence was significantly associated with contraceptive usage among Ethiopian women of reproductive age. Urban women of childbearing age are 2.492 times more likely to use contraceptives than rural women. This may be because it is difficult for rural women to obtain reproductive health services and medical care information, including the use of family planning services [30]. This finding is consistent with the results of previous studies in Ethiopia, where women living in urban areas are more likely to use modern contraceptive methods than women living in rural areas [48] and Rwanda [49]. This is also supported by studies from Afghanistan, Nigeria, and Bangladesh [42, 50, 51]. This can be due to different reasons. Compared to rural women, urban women have higher levels of education, higher income, better access to health services, and better means of communication, which have had a positive impact on the use of contraceptives. Rural women also need more children to help them on excursions, which harms the use of modern contraceptive methods [52–55]. However, secondary data analysis of the Ghana Demographic and Health Surveys from 2003 to 2014 revealed that rural resident women were more likely to use contraceptive methods than urban resident women, contradicting the findings of the current study [56]. The disparity might be attributed to rural women's lack of awareness, availability, and accessibility to contraception.

The number of children is also independently related to the use of contraceptive methods. This study revealed that women with five or more children are more likely to use contraception than women without children. The possible reason may be that women who have more than five children can meet their needs for more children. This finding is similar to previous reports from Zambia, Burkina Faso, and Uganda, which reported that as the number of living children increases, the use of modern contraceptives also increases [36, 57]. This finding is consistent with the secondary data analysis results of the Afghanistan Demographic and Health Survey in 2012 and 2015, in which women with more than 6 children may use modern contraceptive methods [51, 58]. This may be because women with fewer children may need to have more children to achieve the ideal family size [41]. However, the current results are inconsistent with the results of a 2010cross-sectional study in the Debre Birhan district of the Northern Shoa in Ethiopia. Compared to women without children, women with more than five children are less likely to use contraception [36]. This difference may be due to the

different number of study participants participating in the study; the current study uses a relatively large sample size, which may better reflect actual demographic parameters than any other small sample size study. With an increase in the number of live children, the usage of contraception increases. This finding was in line with similar studies by [49, 53, 59–61]. This is unsurprising because a woman who has a large family tends to have fewer children. A small family, according to literature, enables investment in each kid, such as paying for their education and health care.

Educational level was found to be an important predictor of contraceptive use. In this study, women with secondary education were 1.391 times more likely to use contraception than women without formal education, and those who had a diploma or above were 1.93 times more likely to use contraception than women without formal education. This is supported by research from the vast majority of developing countries [52]. In this study, only 31.2% of women with no formal education reported currently using some method, compared to 57.5% of women with secondary and 57.3% of diplomas and above. This can be explained by the notion that women who are more educated have better access to health information, have greater autonomy in decision-making, and are more capable of using quality health services [4, 41].

Studies have shown that there are significant differences in contraceptive use in different regions. Women from Tigray, Afar, Amhara, Oromia, Somalia, and Gambela were significantly different from the Dire Dawa (reference group). The corresponding odds ratio is less than one, indicating that compared to the Dre Dawa city government, these areas are less likely to use contraception. However, compared to Dire Dawa, Somali women were more likely to use contraception. This finding is consistent with the 2013 Nigerian Demographic and Health Survey (NDHS) [27, 50, 62] reviewed by independent researchers and reported that there is a regional difference in utilization of contraception.

Compared with women who are unfamiliar with contraception, women who are familiar with contraception are 1.88 times more likely to use contraception. The possible reason may be that women who know about modern contraceptives (birth control methods) can use them, but women who do not know about birth control methods think they are harmful or do not even understand their use. Several studies report a lack of knowledge about the reasons for not using contraceptives, including the desire to have multiple children and fear of contraceptive side effects [63–66].

Married women are5.836 times more likely to use contraception than single women. The reason may be that they want to limit the number of children they have. This is consistent with the 2010 South Wollo regional study [66]. Their results showed that most of the interviewees were married women, and they were 2.70 times more likely to use contraceptives than single women. This could be because married women may engage in sexual intercourse regularly since they live with their partners.

Furthermore, our research shows that wealthy women are more likely than poor women to use contraception. Compared to women with a low wealth index, women with a higher wealth index are 1.260 times more likely to use contraceptives. This could be because their ability to purchase contraceptives is inextricably linked to their income. Our results confirm other studies that have found that wealthy women are more likely to use contraception than low-income women [67, 68]. This study shows that the majority of contraceptive users (57%) use injectable contraceptive methods. Most previous studies have considered this main method [36, 40, 52, 69]. This finding is consistent with previous research in Ethiopia [70]. The convenience of not having to take it daily and availability could be the reason. Next to the injectable method, widely used contraceptive methods were implants and pills. This finding is a similar report to that of EDHS 2019 and Gondar City [71].

## Strength and limitations of the study

The use of standardized data collecting techniques and large sample size from a nationally representative survey was the study's strengths. Furthermore, the study relied on an up-to-date data collection, EMDHS 2019, which is representative of the entire country. However, this study was not done without limitations. Causal effects could not be evaluated because the study was based on a retrospective cross-sectional investigation. Furthermore, the data is restricted to women exclusively and does not include male participants.

## Conclusion

The result of the current study shows the use of contraceptives in Ethiopia remained very low, which is found to be below the national target. Factors such as age, educational level, the number of children, and region of the woman, religion, wealth index, and marital status were determined to be determinant factors associated with contraceptive utilization. For a more successful intervention approach that encourages the use of contraceptive methods, these variables should be considered. Furthermore, healthcare professionals and concerned bodies should work to improve the utilization of contraceptives among reproductive-age women.

**Abbreviations** ECP: Emergency contraceptive pill; EDHS: Ethiopian Demographic and Health Survey; IUCD: Intra uterine contraceptive device; LAM: Lactational amenorrhea method; MDG: Millennium development goal; SDM: Standard day method; SNNPR: South Nations Nationality and Peoples Region; WHO: World Health Organization

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**Authors' Contributions** Both authors designed the study, participated in the data extraction, performed analysis, interpreted results, and drafted and revised the manuscript. Finally, all authors read and approved the manuscript.

**Data Availability** The datasets used in this study are available from the corresponding author on reasonable request.

## Declarations

**Ethics Approval and Consent to Participate** Ethical clearance for this study was obtained from 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 communicable disease control (CDC). The author requested access to the data from the demographic health survey program team and access was granted to use the data for this study.

**Consent for Publication** Not applicable.

**Competing Interest** The authors declare no competing interests.

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