Magnitude and associated factors of unmet need for family planning among rural women in Ethiopia: a multilevel cross-sectional analysis

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ABSTRACT

Objective This study was aimed to assess the magnitude and associated factors of unmet need for family planning among rural women in Ethiopia.

Design Cross-sectional study.

Setting Ethiopia.

Participants Reproductive age group women.

Primary outcome Unmet need for family planning.

Methods This study drew data from Ethiopian Demographic and Health Survey, which was conducted from 18 January to 27 June 2016. A total of 8327 rural reproductive-aged (15-49 years) women were included. A two-level multivariable logistic regression model was carried out to identify individual and community-level factors associated with unmet need for family planning. Adjusted OR (AOR) with a 95% CI was used to assess the strength of association between independent and dependent variables.

Results The overall unmet need for family planning among rural women was 24.08% (95% CI 23.17 to 25.01), of which 14.79% was for spacing and 9.29% for limiting. Number of children (AOR=1.15; 95% CI 1.07 to 1.24) and working status of women (AOR=1.18; 95% CI 1.02 to 1.37) were significantly associated with unmet need for family planning. However, women with primary education (AOR=0.87; 95% CI 0.74 to 0.94), women married at age 18 or later (AOR=0.82; 95% CI 0.70 to 0.96), women from households with high wealth index (AOR=0.77; 95% CI 0.64 to 0.94), women who deem distance to a health facility as not a big problem (AOR=0.85; 95% CI 0.73 to 0.99), women from communities with a high percentage of educated women (AOR=0.73; 95% CI 0.59 to 0.89) and women who live in communities with high media exposure (AOR=0.81, 95% CI 0.68 to 0.98) were significantly associated with a lower odds of unmet needs for family planning.

Conclusion Unmet need for family planning among reproductive-aged women in rural Ethiopia was high. Number of children, working status of women, women’s education, age at first marriage, household wealth, distance to a health facility, community women’s education and community media exposure were significantly associated with unmet needs for family planning. Therefore, to reduce unmet need for family planning, public health policymakers should consider both individual and community-level factors when designing FP programmes and emphasis should be given to high-risk populations.

Strengths and limitations of this study

- This study used nationally representative data, which were collected with standardised and validated data collection tools.
- This study used an advanced model that accounts for the correlated nature of the Ethiopian Demographic and Health Survey (EDHS) data in the determination of estimates.
- The cross-sectional nature of the survey does not show the temporal or causal relationship between independent variables and outcome variable.
- Additionally, due to the use of secondary data, essential factors such as knowledge and attitudes about family planning (FP) methods, fear of side effects, health worker training on FP and men’s perspectives on contraceptive use were not available in the EDHS; therefore, these factors were not included in our analysis.

BACKGROUND

Improving family planning (FP) access is fundamental for sustainable development goal (SDG) achievement. It is linked to human rights, gender equality and women’s empowerment and has an impact on maternal, newborn, child and adolescent health.1 Additionally, it has a role in enhancing broad socioeconomic development, improving environmental preservation and reducing poverty.1,2 Despite being sexually active and expressing intention to avoid pregnancy, 49.9% of women in low and middle-income countries (LMICs) who do not use any contraceptive methods prefer to space or limit the number of their children.3 This indicates an unsatisfied demand for FP, which is commonly referred to as unmet need for FP. It refers to the percentage of fecund women who are married or living in union and, thus, presumed to be sexually active but are not using any FP methods, who either want to space (when the woman would have wished to delay the birth of her next child by...
at least 2 years) or to limit births (women who do not want any more children).4

Although the Ethiopian government incorporated FP as one of the essential health services provided at the community level by health extension workers, FP utilisation is low.5 In the country, the overall utilisation of FP methods among women was 36% (35% were using a modern method and 1% were using a traditional method).4

Unmet need for FP is a major public health concern in developing countries, particularly in sub-Saharan Africa.6–8 In developing countries, 225 million women had unmet need for modern FP methods in 2014, and 230 million women experienced unmet need for modern FP methods in 2019.6–7 The prevalence of unmet need for FP among reproductive age group women was 18.3% (15.1% for spacing and 3.2% for limiting) in Burkina Faso,9 21.0% (12.6% for spacing and 8.4% for limiting) in Malawi,10 46.6% (31.1% for spacing and 15.5% for limiting) in Cameroon11 and 38.9% (27.5% for spacing and 12.2% for limiting) in Ghana.12 In Ethiopia, the magnitude of overall unmet need for FP varied from 16.2% to 34.6%13–18 with 10.3% to 15.8 for spacing and 6.0 to 9.8 for limiting.14–18 According to the Ethiopian Demographic and Health Survey (EDHS), overall unmet need for FP declined from 37% in 2000 to 22% by 2016.19 There was a significant disparity in unmet need by region of residence that varied from 19.1% to 28.0% in rural areas and 7.2% to 15.0% in urban areas.4–19 Despite Ethiopia introducing an ambitious community health programme, relying on Health Extension Workers to address limited access to health services including FP in rural areas, women in rural areas have higher unmet need for FP compared with women in urban areas.18–20 Therefore, this study investigated factors associated with unmet need for FP among reproductive-aged women in rural Ethiopia.

Unmet need for FP also associated with household-level and community-level factors.10–35 Although these previous studies in Ethiopia have assessed individual-level factors, community-level factors remained insufficiently explored. Additionally, unmet need remains high in rural areas, yet there is a scarcity of information on the factors explaining its patterning in rural Ethiopia. Therefore, understanding the factors for unmet need for FP among women residing in rural households will help public health practitioners working in FP programmes to target the identify, implement and evaluate evidence-based interventions to tackle the unmet need and expand contraception use by considering the effects of community characteristics.

**METHODS**

**Study design, period and setting**

This study was a cross-sectional study conducted using secondary data collected in the 2016 EDHS. The EDHS drew nationally representative samples for the Ethiopian population, which was collected from 18 January 2016 to 27 June 2016. It is the fourth Demographic and Health Survey conducted in Ethiopia that includes data collected from nine regions and two administrative cities.
A detailed explanation of methodological strategies used in the EDHS has been outlined elsewhere. Data source and extraction

The study used secondary data from the EDHS 2016. The EDHS is a nationally representative survey using a two-stage cluster sampling method. In the first stage, 645 clusters (202 urban areas and 443 rural areas) were randomly selected from the sampling frame (ie, the 2007 Ethiopian population and housing census) and household listing. The second stage involved a systematic selection of 18008 households from the selected clusters, of which 17067 were occupied. Of the occupied cluster, 16650 were successfully interviewed. The information we used was related to women of reproductive ages (15–49 years). A total of 15683 eligible women were identified for the survey. Women who had never had sex, were not sexually active or were infecund were excluded from this study. A total of a weighted sample of 8327 women of reproductive age were included for analysis.

Variables of study

Outcome variable

The main outcome variable was the unmet need for FP, where it composed of both unmet need for spacing and limiting form of unmet need. It refers to the proportion of women who desire to either delay the next pregnancy or limit future pregnancies but are not using any method of contraception. It was a binary variable, women with unmet need for spacing or limiting were recoded as ‘unmet need’, while those using FP methods for spacing or limiting or with no unmet need were recorded as ‘no unmet need’.

Independent variables

Based on the literature, independent variables included in the analysis are broadly categorised as individual and community-level factors that are associated with unmet need for FP.

Individual-level factors considered in the analysis were age, women’s level of education (no education, primary, secondary and higher), religion (recoded as Muslim, Orthodox, Protestant and others), education level of husband (categorised as no education, primary and secondary/higher), marital status (categorised as ever married and never married), working status (not working/working), exposure to the media (categorised as ‘no’ if there is no media exposure at all and ‘yes’ if there is media exposure to either radio, magazine/newspaper, internet or television), wealth index (poorest and poorer quintile). Community media exposure was defined as the proportion of women exposed to at least one type of media, such as radio, newspaper, television or internet. Community-level factors, namely, community wealth, community women’s educational level, community husbands educational level and community media exposure were constructed by aggregating individual-level variables into community-level variables. Each aggregated community variable was divided into low and high based on the median value because they were not normally distributed.

Statistical analysis

All statistical analyses were performed using Stata V.14.0. Sample weighting was done before doing any statistical analysis, to adjust for the nonproportional allocation of the sample to different regions and their urban and rural areas as well as to adjust for the nonresponse rates. Sample-based nonresponse adjustments distributed the base weights of the nonrespondents to the respondents, so that the sum of the adjusted weights over the responding units equals the sum of the base weights for responding units and nonresponding units. Descriptive statistics using frequency and percentage were used to get an overview of the selected variables. Multilevel logistic regression models were used to estimate the effects of unmet need for FP factors at the two specified levels. It allows for the estimation of valid SEs by adjusting for the intracluster correlation of the outcome variable.

Four models were fitted. First, model I, the empty or unconditional model, without covariates was analysed. This model was used to estimate the random intercept at cluster level and the variation in the odds of unmet need for FP experience between communities. Second, model II was constructed by adding individual-level factors. Third, model III was constructed by adding community-level factors. Finally, model IV including both individual-level and community-level factors was constructed. Then, the appropriate model was selected using deviance and the model with the lowest deviance was fitted to estimate the association between independent factors and unmet need for FP. In addition, the measure of variance (random effects), which is the measure of residual errors at the
individual level and community variation, was reported in terms of the intraclass correlation coefficient (ICC) and proportional change in variance (PCV).

First, bivariable multilevel logistic regression models were fitted and all variables with a p value <0.20 at bivariable analysis were entered into the multivariable analysis. Then multivariable multilevel logistic regression model was performed to control for possible confounders. In multivariable multilevel logistic regression models, ORs together with 95% CI were calculated, and statistical significance was declared at p value <0.05.

**Ethical consideration**
The data were accessed from the Demographic Health Survey Programme at http://www.dhsprogram.com. Ethical approval was not needed because the study used publicly available data. However, permission to use the data for the study was obtained from the Demographic Health Survey programme. Informed consent was obtained at the beginning of each interview by the EDHS data collectors.

**Patient and public involvement statement**
In this study, patients and the public were not involved in the study design or planning of the study. Furthermore, as we used secondary analysis, EDHS data patients were not consulted to interpret the results and were not invited to contribute to the writing or editing of this document for readability or accuracy.

**RESULTS**
In this study, a total weighted sample of 8327 women in reproductive age was included. The mean age of the study participants was 29.08±7.71 years. Most of them were Orthodox (n=3262, 39.2%), had ever been married (n=8158, 98.0%), married before 18 years of age (n=6193, 75.9%), desired to have five or more children (n=4511, 54.2) and were not exposed to media (n=6729, 80.2%). Regarding educational status, nearly two-thirds (n=5449, 65.4%) of women and nearly half of their parents (n=3801, 50.3%) had no formal education (table 1).

**Magnitude of unmet for FP**
In this study, overall unmet need for FP among rural women was 24.08% (95% CI 23.17 to 25.01) of which 14.79% (95% CI 14.04 to 15.57) was for spacing and 9.29% (95% CI 8.68 to 9.93) for limiting (figure 1).

Factors associated with unmet need for FP.

**Random effect model**
As presented in table 2, in the null model, about 9.6% of the total variance in the unmet need for FP was at the community level and may be attributable to other unobserved community factors (ICC=0.096). In the final model (model IV), as indicated by the PCV, 17.2% of the variation in unmet need for FP across communities was explained by both individual and community-level factors. Additionally, the final model indicates that

| Table 1: Background characteristics of respondents in Ethiopia, EDHS 2016 |
|--------------------------|----------|----------|
| Variables                | Frequency| Per cent |
| Marital status           |          |          |
| Ever married             | 8158     | 98.0     |
| Never married            | 169      | 2.0      |
| Education of respondent  |          |          |
| No education             | 5449     | 65.4     |
| Primary                  | 2497     | 30.0     |
| Secondary                | 301      | 3.6      |
| Higher                   | 80       | 1.0      |
| Educational status of husband |       |          |
| No education             | 3801     | 50.3     |
| Primary                  | 3016     | 39.9     |
| Secondary/above          | 736      | 9.8      |
| Wealth index             |          |          |
| Low                      | 3863     | 46.4     |
| Middle                   | 2005     | 24.1     |
| High                     | 2459     | 29.5     |
| Religion                 |          |          |
| Orthodox                 | 3262     | 39.2     |
| Protestant               | 1824     | 21.9     |
| Muslim                   | 3011     | 36.1     |
| Others                   | 230      | 2.8      |
| Working status           |          |          |
| No                       | 6067     | 72.9     |
| Yes                      | 2260     | 27.1     |
| Media exposure           |          |          |
| No                       | 6729     | 80.2     |
| Yes                      | 1598     | 19.8     |
| Knowledge of ovulatory cycle |      |          |
| Knowledgeable            | 1681     | 20.2     |
| Not knowledgeable        | 6646     | 79.8     |
| Desired number of children|        |          |
| <5                       | 3816     | 45.8     |
| ≥5                       | 4511     | 54.2     |
| Age at marriage          |          |          |
| <18 years                | 6193     | 75.9     |
| ≥18 years                | 1964     | 24.1     |
| Prior pregnancy termination|       |          |
| No                       | 7560     | 90.8     |
| Yes                      | 767      | 9.2      |
| Child death              |          |          |
| No                       | 7175     | 95.7     |
| Yes                      | 372      | 4.3      |
| Distance from health facility |     |          |
| Big problem              | 5106     | 61.3     |

Continued
the lowest Median Odds Ratio (MOR) value (1.67) that showed the effects of community heterogeneity. This means if we randomly select women from different clusters, women at the cluster with higher risk of unmet need for FP had 1.67 times higher odds of unmet need for FP as compared with those women at cluster with the lowest risk of unmet for FP. Besides, model fitness was checked using deviance and model IV with the lowest deviance (deviance=6125.343) was used to identify significantly associated factors with unmet need for FP. Therefore, all interpretations and conclusions of results were thus based on model IV.

**Fixed effect model**

After adjusting for possible confounders, age, women’s education level, wealth of household, number of children, age at first marriage, working status, distance from the health facility, community husband education level and community media exposure were significantly associated with unmet need for FP in Ethiopia. As age of women increases the odds of unmet need for FP increases, adjusted OR ((AOR)=1.05; 95% CI 1.04 to 1.06). The odds of unmet need for FP among women who attend primary education was 13% (AOR=0.87; 95% CI 0.74 to 0.94) lower as compared with women with no formal education. As the number of children increases, the odds of unmet need for FP increases (AOR=1.15; 95% CI 1.07 to 1.24). Women who had been working within the 12 months preceding the survey had higher odds of having unmet need for FP (AOR=1.18; 95% CI 1.02 to 1.37) compared with women who do not work. Women married at age 18 or later had 18% (AOR=0.82; 95% CI 0.70 to 0.96) lower odds of unmet need for FP as compared with marital age less than 18. Additionally, considering the wealth index, the odds of unmet need for FP among women from high wealth class was 23% (AOR=0.77; 95% CI 0.64 to 0.94) lower as compared with women from the poorest/least class.

Among community factors, the odds of unmet for FP among women reporting distance to a health facility as not the big problem were decreased by 15% (AOR=0.85; 95% CI 0.73 to 0.99) compared with their defined counterparts. Moreover, women from communities with a high percentage of educated women (AOR=0.73; 95% CI 0.59 to 0.89) were less likely to have unmet need for FP compared with women from communities with a low percentage of educated women. Similarly, this study further reveals that women who live in communities with high media exposure were associated with decreased odds of unmet need for FP compared with women in low-media exposure communities (AOR=0.81, 95% CI 0.68 to 0.98) (table 2).

**Table 1** Continued

| Variables                          | Frequency | Per cent |
|------------------------------------|-----------|----------|
| Not big problem                    | 3221      | 38.7     |
| Visited by field worker            | 5859      | 70.4     |
| No                                 | 2468      | 29.6     |
| Visited health facility last 12 months | 6068      | 72.9     |
| No                                 | 2259      | 27.1     |
| Yes                                |           |          |

EDHS, Ethiopian Demographic and Health Survey.

**Figure 1** Magnitude of unmet need for family planning among rural women in Ethiopia.

**DISCUSSION**

This study was conducted to investigate the magnitude and factors for unmet need in FP among rural women in the reproductive age group. This study contributes to the literature on unmet need for FP by focusing on rural women, who have high unmet need for FP. Few studies of unmet need in rural areas have looked at this population. Identifying specific factors associated with unmet need for FP in a rural area has, therefore, been brought further to the fore of national FP awareness and improving access to reproductive health services, as this is critical for achieving the fifth SDG goal. Additionally, this study extended factors associated with unmet need for FP by considering community-level factors that may shape the level of unmet need for FP in Ethiopia. This provides information on a wider range of factors to be targeted by FP policymakers in the country.

The current study revealed that 24.08% (95% CI 23.17 to 25.01) of rural women in reproductive age in Ethiopia had total unmet need for FP. The result is lower than a study conducted in Ethiopia,13 15–17 46 Ghana,47 and Cameroon.11 This discrepancy could be explained by the fact that the previous studies conducted in Ethiopia13 15–17 were small-scale surveys compared with the EDHS, which is a nationally representative survey and covered more women in the region. It could be due to the differences in studied populations and background characteristics differences among participants. For example, assessing unmet need of long-acting and permanent FP methods13 and among young married women15 in Ethiopia and unmet need among HIV-positive women in Ghana47.
| Variables                                      | Model 1 (AOR with 95% CI) | Model 2 (AOR with 95% CI) | Model 3 (AOR with 95% CI) | Model 4 (AOR with 95% CI) |
|-----------------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Age                                           | 1.05 (1.04 to 1.06)       | 1.05 (1.04 to 1.06)*      |                           |                           |
| Level of women’s education                     |                           |                           |                           |                           |
| No education                                   | 1                         |                           |                           |                           |
| Primary                                       | 0.91 (0.80 to 0.98)       | 0.87 (0.74 to 0.94)*      |                           |                           |
| Secondary                                     | 1.08 (0.71 to 1.61)       | 1.09 (0.73 to 1.64)       |                           |                           |
| Higher                                        | 0.90 (0.39 to 2.09)       | 0.91 (0.39 to 2.11)       |                           |                           |
| Working status of respondents                 |                           |                           |                           |                           |
| Not working                                    | 1                         |                           |                           |                           |
| working                                       | 1.21 (1.04 to 1.40)       | 1.18 (1.02 to 1.37)*      |                           |                           |
| Type of media exposed                          |                           |                           |                           |                           |
| No                                            | 1                         |                           |                           |                           |
| Yes                                           | 0.87 (0.72 to 1.05)       | 0.84 (0.69 to 1.02)       |                           |                           |
| Husbands’ education                           |                           |                           |                           |                           |
| No education                                   | 1                         |                           |                           |                           |
| Primary                                       | 1.28 (1.08 to 1.52)       | 1.23 (0.97 to 1.33)       |                           |                           |
| Secondary/above                                | 1.13 (0.88 to 1.44)       | 1.07 (0.84 to 1.38)       |                           |                           |
| Wealth Index                                   |                           |                           |                           |                           |
| Low                                           | 1                         |                           |                           |                           |
| Middle                                        | 0.94 (0.78 to 1.12)       | 0.93 (0.77 to 1.11)       |                           |                           |
| High                                          | 0.77 (0.64 to 0.94)       | 0.77 (0.64 to 0.94)*      |                           |                           |
| Age at marriage                                |                           |                           |                           |                           |
| <18                                           | 1                         |                           |                           |                           |
| ≥18                                           | 0.82 (0.70 to 0.96)       | 0.82 (0.70 to 0.96)*      |                           |                           |
| Religion                                       |                           |                           |                           |                           |
| Orthodox                                      | 1                         |                           |                           |                           |
| Protestant                                    | 1.08 (0.86 to 1.36)       | 1.01 (0.79 to 1.2)        |                           |                           |
| Muslim                                        | 1.14 (0.94 to 1.38)       | 1.13 (0.93 to 1.38)       |                           |                           |
| Others                                        | 1.64 (1.05 to 2.56)       | 1.60 (1.03 to 2.50)       |                           |                           |
| Child death                                    |                           |                           |                           |                           |
| No                                            | 1                         |                           |                           |                           |
| Yes                                           | 1.19 (0.84 to 1.69)       | 1.18 (0.84 to 1.68)       |                           |                           |
| Pregnancy termination                          |                           |                           |                           |                           |
| No                                            | 1                         |                           |                           |                           |
| Yes                                           | 0.94 (0.75 to 1.17)       | 0.94 (0.75 to 1.17)       |                           |                           |
| Number of alive children                       | 1.16 (1.07 to 1.25)       | 1.15 (1.07 to 1.24)*      |                           |                           |
| Desired number of children                     |                           |                           |                           |                           |
| <5                                            | 1                         |                           |                           |                           |
| ≥5                                            | 0.97 (0.84 to 1.13)       | 0.99 (0.86 to 1.15)       |                           |                           |
| Distance from health facility                  |                           |                           |                           |                           |
| Big problem                                   | 1                         |                           |                           |                           |
| Not big problem                               | 0.86 (0.76 to 0.98)       | 0.85 (0.73 to 0.99)       |                           |                           |
| Community women’s education                    |                           |                           |                           |                           |
| Low                                           | 1                         |                           |                           |                           |
| Continued
versus assessing unmet need for FP among reproductive age group women in our study. In terms of background characteristic differences among participants, the proportion of women who were married in this study was 98.0%, and in the Cameroon study, it was 61.1%. In this regard, the previous study implies that married women had 59% lower odds of unmet need for FP compared with never married women. Therefore, having large proportions of women who are married in our study may reduce the odds of unmet need for FP.

However, the magnitude of unmet need for FP in this study was higher than studies conducted in Ethiopia, Burkina Faso, Malawi, Cameroon and Nigeria. This variation might be attributed to the differences in study population and study setting. The current study exclusively includes rural women. In most parts of Ethiopia, rural residents have usually low health services coverage and decreased awareness of FP due to low education, low socioeconomic status, and have limited access to FP services, this may lead to a higher prevalence of unmet need in rural areas. Therefore, this provides information on rural residents to be targeted by FP policymakers in the country because the high unmet need for FP further exposes women to unintended pregnancies and unsafe abortion, which raises the risk of maternal and child death. Another possible explanation for the difference in the prevalence of unmet need could be the difference in the educational level of study participants. For instance, a previous study done in Ethiopia reported that 41.6% of women have no formal education, which was lower than that of this study (65.4%). Moreover, a study conducted in Sudan reveals that 51.1% of women had secondary education, which was higher than that of the current study (3.6%). Previous literature documented that educational level has a negative relationship with unmet need for FP. This might explain why women with higher educational levels had lower odds of unmet need for FP. Therefore, expansion of women’s education, which is currently poor as found in the current study, is recommended to increase awareness and to reduce unmet need for FP among women in rural areas. Besides, empowering illiterate women to know about and use FP and its promotion of men and couples through increasing outreach in the form of household visits by a community health worker may reduce unmet need for FP in rural areas.

A higher proportion was observed for unmet need for spacing in comparison with that for limiting (14.79% vs 9.28%). This finding is in line with other studies conducted in different parts of Ethiopia and Cameroon, where unmet need for spacing contributed to a higher proportion of the total unmet need.

In this study, age of women was statistically significant that as age of women increased, the magnitude of unmet need also increased. Similarly, a study conducted in Ethiopia and Malawi reveals that unmet need for FP was higher among older women than younger women. This could be because older women near to menopause may be perceived as low risk for pregnancy and younger women may have better awareness of FP due to recently attending school. Moreover, this association may be explained by the fact that older women tend to have higher numbers of children than younger women.

| Variables                          | Model 1 (AOR with 95% CI) | Model 2 (AOR with 95% CI) | Model 3 (AOR with 95% CI) | Model 4 (AOR with 95% CI) |
|-----------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Community husbands’ education     |                           |                           |                           |                           |
| Low                               | 1                         | 1                         | 1                         | 1                         |
| High                              | 1.17 (0.97 to 1.14)       | 1.15 (0.94 to 1.41)       |                           |                           |
| Community wealth                  |                           |                           |                           |                           |
| Low                               | 1                         | 1                         | 1                         | 1                         |
| High                              | 0.83 (0.61 to 1.12)       | 0.90 (0.66 to 1.24)       |                           |                           |
| Community media exposure          |                           |                           |                           |                           |
| Low                               | 1                         | 1                         | 1                         | 1                         |
| High                              | 0.89 (0.75 to 1.06)       | 0.81 (0.68 to 0.98)*      |                           |                           |

Random effects and model comparison

| Community level variance (SE)     | 0.35 (0.056)              | 0.32 (0.059)              | 0.30 (0.053)              | 0.29 (0.057)              |
| ICC (%)                           | 9.6                       | 8.7                       | 8.4                       | 8.1                       |
| Deviance (−2LL)                   | 7121.163                  | 6140.094                  | 7078.809                  | 6125.343                  |
| PCV (%)                           | Ref                       | 8.6                       | 14.3                      | 17.2                      |
| MOR                               | 1.75                      | 1.71                      | 1.68                      | 1.67                      |

*P value <0.05.

AOR, adjusted OR; EDHS, Ethiopian Demographic and Health Survey; FP, family planning; ICC, intraclass correlation coefficient; LL, log likelihood; MOR, Median Odds Ratio; PCV, proportional change in variance.
In this study, women’s education is another important variable that significantly associated with unmet need for FP, that is, women with primary education were less likely to report having an unmet need for FP as compared with women without education. This is congruent with the study conducted in Ethiopia,13 30 37 Nigeria,35 Malawi,10 Burundi,32 and other LMICs.34 This might be due to women who attained education being more exposed to FP through media and other modes of exposure, which improves access to FP alternatives and helps them to understand the health benefits of the FP to reduce fertility, maternal and child morbidity and mortality. It suggests that educated women are more likely to gain FP services because they are more empowered in decision-making regarding contraceptive use.31 Furthermore, the educational status of women is directly related to economic and social empowerment, which increased exposure to resources such as access to media and utilisation of desired healthcare delivery services. Our study contradicts the finding of studies conducted in Ethiopia,18 24 Burundi,32 Nigeria33 and Nepal,37 which have reported that educated women have higher odds of unmet need for FP. These findings indicate that the need to take the context into account when assessing factors associated with unmet need for FP.

A lower proportion of unmet need for FP was observed among women in the high wealth quantile. Results of this study show that women who were in the high wealth quintile were 23% less likely to have unmet need for FP than women who belong to the low quintile; this is in line with the results of other studies conducted in Ethiopia,18 24 Burundi,32 Nigeria33 and Pakistan.25 This may be due to our result reveals women in the high wealth category were most of them attend higher education but those in the low wealth category were most of them are not educated. Additionally, most of the women in the high wealth category are exposed to media (54.0%) as compared with women in the low wealth category (23.7%). Education and mass media exposure could probably give women a better chance to understand the uses of FP and the negative effects of FP methods thereby increased their consistent use.

The current study found that women who had been working within the 12 months preceding the survey had higher odds of having unmet need for FP. This finding is supported by the study conducted in Malawi.10 The possible explanation for this association might be because women who were working can have a good income so they may be able to afford private health facilities compared with their counterparts.52 Moreover, women who were working would have a great deal of trust and decision-making ability on health services including FP.52 53

Consistent with previous studies,9 14 15 31–35 our study indicates that unmet need for FP is positively associated with having more children. Even though women with many children may actually want to either delay the birth of their next child or limit births, they are not empowered to use FP by the sociocultural setting in rural areas.54 55 Therefore, it is important to address sociocultural barriers to reproductive health services in rural areas by strengthening the traditional governance structure, forming volunteer groups and committees, promoting male involvement in reproductive health services and engaging religious and clan leaders in reproductive health services.56

We also identified that as the first marital age increased, the level of unmet need decreased. Women married at age 18 or later had lower odds of unmet need for FP compared with women who married before age 18. This finding is similar to study conducted in Gonji Kolela District, Ethiopia,57 but it disagrees with another study done in Southern Nations, Nationalities and Peoples Region, Ethiopia.54 Women who marry at age 18 or later were able to plan and decide their family size because they had more exposure to FP methods. In addition to increased unmet need for FP, child marriage (marriage before their 18th birthday) is associated with early childbearing, low economic status of women, termination of education, negative psychological impact, higher rates of divorce, a number of poor social and physical outcomes for young women and their offspring, complications of pregnancy and an increased risk of both maternal and child mortalities.58 59 This implies policymakers should strive to create awareness and enforce the legal age for marriage so as to increase the marital age above 18 years to reduce unmet need for FP. However, studies on marital age have resulted in conflicting findings in Ethiopia. Some studies reported that marital age is negatively associated with unmet need for FP,46 57 while one study reported that marital age is positively associated with unmet need for FP.54 In this regard, a systematic meta-analysis conducted in Ethiopia revealed that the odds of unmet need for FP were 2.3 times higher among women with age at first marriage <18years than women marriage at 18years and above.60

Similar to a study conducted in Malawi,10 this study found that unmet need for FP was greater among women who cited the distance to a health facility as a problem. This finding suggests improving geographical access to health facilities decreases unmet need for FP. This could be explained by women who live closest to health facility being more likely to receive appropriate maternal healthcare services.61–63 Previous studies revealed that women who received maternal healthcare services (antenatal and postnatal care) were more likely to use contraception than women who did not receive any maternal healthcare services.64 65

Furthermore, the current study reveals that community-level factors were also associated with the unmet need for FP. Unmet need for FP was found to be lower among women from communities with a high percentage of educated women. This is consistent with a study conducted in Malawi.10 The result of our study further reveals that women who live in communities with high media exposure had decreased odds of unmet need for FP compared with women in low-media exposure communities. This
might be due to educated women having higher odds of understanding health messages and experiencing demand for FP services. Additionally, educated women and women from wealthier households are more likely to be empowered to make decisions on their own, which may subsequently increase accessing information and affording private health facilities to access FP services. Mass media is an important tool for mobilising communities to use FP services. Therefore, women from communities with a high percentage of exposure to media and educated women may learn from others about the benefit of using FP services and where these may be accessed.

This study builds literature on both individual and community-level factors associated with unmet need for FP among rural women using EDHS. This has implications for both interventions at the individual and community level. Therefore, we hope that this study will help policymakers to make wise decisions to reduce unmet need for FP, and it could be used as a baseline measure for future FP intervention studies.

Strengths and limitations

The main strength of this study was it used a large population-based data with a large sample size, which is representative of the entire population of rural Ethiopia. Also, using large sample size allows us to more precisely estimate unmet need for FP and the effect size for associated risk factors. Furthermore, multilevel logistic regression was applied for this study to identify the contextual factors in the occurrence of unmet need for FP among rural women of reproductive age. Despite the study’s strengths, it has limitations. Due to the cross-sectional nature of the EDHS data, it does not show a temporal relationship between independent variables and outcome variable. Additionally, due to the use of secondary data, essential factors such as knowledge and attitude of FP methods, fear of side effects, health worker training on FP and men’s perspectives on contraceptive use were not available in the EDHS; therefore, it was not possible to incorporate these variables in the analysis.

Conclusion

This study has shown that unmet need for FP among reproductive-aged women in rural Ethiopia was high. Number of children and working status of women were significantly associated with higher odds of unmet needs for FP. However, women with primary education, women married at age 18 or later, being higher wealth, distance to a health facility not the big problem, women from communities with a high percentage of educated women and women who live in communities with high media exposure were significantly associated with a lower odds of unmet needs for FP. Therefore, there is the need to implement consistently effective FP policies among rural women in Ethiopia. Moreover, public health policies and interventions that will strengthen women’s education improve the existing strategies to increase the marital age of women, improve media exposure of women on FP issues and increase the wealth status of households should be designed and implemented to reduce unmet need for FP in rural parts of country.

Acknowledgements

We would like to acknowledge Major Demographic Health and Survey (DHS) program, which granted us the permission to use DHS data.

Contributors

AZA: developed the concept, reviewed literature, carried out the statistical analysis, interpreted the results and prepared the manuscript. CDA: reviewed literature, involved in analysis, interpretation and prepared the manuscript. Both the authors read and approved the manuscript.

Funding

The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests

None declared.

Patient consent for publication

Not required.

Provenance and peer review

Not commissioned; externally peer reviewed.

Data availability statement

The datasets used and/or analysed during the current study is available in a public, open access repository which is accessible online http://www.dhsprogram.com.

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