Prevalence and determinants of modern contraceptive utilization among Women in the Reproductive Age Group in Edaga-hamus Town, Eastern zone, Tigray Region, Ethiopia, June 2017.

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| Keywords:          | prevalence; modern contraceptive; Utilization |

**Abstract:**

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Result: The prevalence of modern contraceptive utilization in Edaga hamus was 58.5%. The study showed Age (AOR= 0.406, 95%, Cl: (0.000,0.398)), Educational status (AOR=0.901, 95% Cl (1.340,4.107)), Number of children wanted(AOR=10.802,95%(4.027,28.975)), Feeling of husband towards MC (AOR=0.186, 95% CI (0.056,0.617) were factors associated with utilization of modern contraceptive.

Conclusion and Recommendation: The level of modern contraceptive utilization is associated with demographic and socio-psychological factors like age, educational status of women and husband, reproductive factors and attitude factors. Therefore, enhance information, education and communication activities regarding modern contraceptive services using through print and mass media, market places as well as newsletters and posters in addition to health institutions.

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| Question                  | Response |
|---------------------------|----------|
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Ethical clearance was obtained from the Ethical Review Board of ADU, College of Medicine and Health Sciences and it is also got granted from the Health office of Adigrat hospital. Verbal and written consents were obtained after explaining their full right to refuse, withdraw any time, without any explaining or giving reasons. Information's obtained from individuals’ participants was kept secure and confidential. Names and other identifying data of respondents were made by using code throughout the study process to obtain confidentiality. Finally, data were collected according to the standard questionnaire prepared.
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Prevalence and determinants of modern contraceptive utilization among Women in the Reproductive Age Group in Edaga-hamus Town, Eastern zone, Tigray Region, Ethiopia, June 2017.

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Abstract

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### Introduction

According to WHO world statistics report, trends of MMR is reduced from 385 to 216 globally, 538 to 176 in South Asia, 987 to 546 in sub-Saharan Africa and 1250 to 353 in Ethiopia from 1990 to 2015 (1). In developing regions the overall MMR is 239, which is nearly 20 times higher than that of developed regions. Sub-Saharan Africa takes a very high MMR (2). Ethiopian Ministry of health has taken different types of initiative to decrease maternal morbidity and mortality, like accessing Modern family planning service at health facilities throughout the country since 1980. According to the United Nations, official population estimates and projections in 2050 the world population will be in the range of 7.3 billion to 10.7 billion persons. About 96% of the total annual population increase occurs in less developed regions (3,4). Around the world, about 222 million women have an unmet need for FP and 645 million women have their needs met through the use of a modern contraceptive method, nine children under age 5 die in Africa which resulted in the death of 4.8 million children annually (5). Sub Saharan Africa faces the most serious population and reproductive health challenges including the highest maternal mortality, population growth rate, total fertility rate and much unmet need for family planning in the world. Ethiopia is considered to be one of the most populous countries in Africa; only less than 23% of women in the reproductive age group are currently using contraception, which is still low to affect fertility following Nigeria and Egypt (6). The current population of Ethiopia was estimated to be 82,949,541 million with a growth rate of 2.6%. Total fertility rate (TFR) - estimated to be 7.7 children per woman in 1999 but 4 in 2016 (3,7). The 1990 nationwide population-based family and fertility survey revealed that the overall contraceptive prevalence rate was 4.8 among currently married and non-pregnant women of reproductive age (8). Modern contraceptive prevalence rate was found to be 27.3% (urban 49.5%, rural 22.5%) (7). There is variation in contraceptive prevalence rates across the country’s regions in Addis Ababa(56.3%)(8), Debre Birhan district (46.9%) (9). Factors found to be
associated with the utilization of contraceptives vary. These include educational level, socio-cultural beliefs and practices, level of knowledge, myths, fear of side effects, partner's objection, convenience, fertility intentions, accessibility, providers' skill and competence, and other factors in the service area. These factors go a long way to influence the type of contraceptive one decides to use and use\textsuperscript{10}. Therefore this study was aimed at determining the prevalence and associated factors of modern contraceptive utilization among married women of the reproductive age group in Edagahamus town.

**Methodology**

**Study setting**

A community-based cross-sectional study was conducted from April 23 May 10, 2017, at Edagahamus city, Tigray regional state of Ethiopia. Edagahamus is founded in the eastern zone of Tigray, wereda Saesie Tsaida Amba; which is located 885 Km north of the Ethiopian capital city of Addis Ababa, 105 Km east of the Tigray capital city Mekelle and around 20 Km near to Adigrat. Edagahamus is divided into four kebeles and the total population was 21,993; from those 10,031 were male and 11,962 were female. There is only one health center in Edagahamus and 3 private clinics.

**Participants**

All women of reproductive age who reside in Edagahamus were taken as the study population. All women in the reproductive age group (15-49) are included, while women who were not mentally competent or who had any psychiatric disorders and critically ill during data collection were excluded.

**Sample Size Determination**

A sample size of 383 was determined by using sample size formula from the single population proportion. With the assumption of a margin of error 5%, confidence interval 95%, 10% expected non-response rate and 32.5% prevalence of modern contraceptive in Tigray region\textsuperscript{11}.

**Sampling Procedure**

The probability sampling technique was employed. Edagahamus is divided into four kebeles then, the sample size was allocated to each selected kebeles proportionally
based on their expected number of women in reproductive age in each kebeles. The study participant was selected by systematic random sampling method for the households every 8th household.

**Study Variables**

**Dependent Variables**
Modern contraceptive utilization

**Independent Variables**
Socio-demographic and economic variables, Reproductive history, Socio-psychological factors, Source of information and Knowledge, attitude and practice of modern contraceptive

**Operational Definition**

**Utilization:** use of any modern contraceptive method to space the child and to protect unwanted pregnancy. **Current use:** - A woman who is using a modern contraceptive method at the time of the study. **Ever user:** - A woman who has practiced modern contraceptive methods sometime in the past but not using at the time of this study.

**Data collection tools and techniques**
Data was collected by using an interviewer-administered and structured questionnaire adapted from different similar research with modification according to the context of the study area. The questionnaire includes socio-demographic, economic status, Reproductive history, Socio-psychological factors, Source of information and Knowledge, attitude and practice of modern contraceptive

**Data quality assurance and control**
Five health professional data collectors and two supervisors were recruited from the Health Center and they were given training for one day. The supervisors followed the process of data collection daily, checked the data completeness consistency and communicate with principal investigator daily.

**Data Processing and Analysis**
data was coded, cleaned, recorded and entered Epi info 7 and finally export to SPSS version 22.00 for analysis. Simple descriptive summary statistics were done. Tables, statements, charts, and graphs were used to present the result of the analyzed data. Associations between independent and dependent variables were analyzed first using bivariate logistic regression analysis. Variables that had p<0.2 on bivariate analysis were entered multivariable logistic regression analysis. The statistical
association between the different independent variables about dependent was measured using OR, AOR, 95% CI and P-values <0.05 was considered statistically significant.

Results

Socio-demographic characteristics
A total of 383 Reproductive age group women participated in a response rate of 100%. Out of the total participated women 64 (16.7%) were with an age range of 15-19 years. Nearly half 163 (42.6%) participants were housewives. (Table1, figure1, figure2, figure3).

Table 1 Socio-economic and demographic characteristics of women in the reproductive age group in Edaga hamus town, eastern zone, April 23-May 10 2017.

| Socio-demographic and economic factors | Frequency | Percent (%) |
|----------------------------------------|-----------|-------------|
| **Age**                                |           |             |
| 15-19                                  | 55        | 14.4        |
| 20-24                                  | 96        | 25.1        |
| 25-29                                  | 80        | 20.9        |
| 30-34                                  | 83        | 21.7        |
| 35-39                                  | 23        | 6.0         |
| 40-44                                  | 34        | 8.9         |
| 45-49                                  | 12        | 3.1         |
| **Ethnicity**                          |           |             |
| Tigray                                 | 344       | 89.9        |
| Afar                                   | 35        | 9.1         |
| Amhara                                 | 4         | 1           |
| **Religion**                           |           |             |
| Orthodox                               | 329       | 85.9        |
| Muslim                                 | 48        | 12.5        |
| Protestant                             | 3         | 0.8         |
| Catholic                               | 3         | 0.8         |
| **Occupational status**                |           |             |
| Housewife                              | 163       | 42.6        |
| Merchant                               | 129       | 33.7        |
| Governmental employee                  | 28        | 7.3         |
| Student                                | 40        | 10.4        |
| Farmer                                 | 2         | 0.5         |
| daily labor                            | 21        | 5.5         |

Reproductive related and socio-psychological variables
Some of the respondents (74.4%) reported that they had pregnancy while 98 (25.6%) had no pregnancy. Among them, 96.1% of these pregnancies were wanted and 3.9% of women were unwanted. Most of the respondents (46.5%) had 1-2 number of live births, 81 (28.9%) had 3-4 live birth and 70 (24.6%) had 5 and above live birth. Regarding socio-psychological questions, 177 (30.54%) of women respond it could be that too many children can improve family income, but 266 (69.5%) of women said that too many children cannot improve family income. (Table 2).

Table 2 Some reproductive characteristics of the study of women in reproductive age in Edaga hamus town, eastern zone, April 23-May 10, 2017

| Reproductive factor                          | Frequency | Percent (%) |
|----------------------------------------------|-----------|-------------|
| **Having any pregnancy before**             |           |             |
| Yes                                          | 285       | 74.4        |
| No                                           | 98        | 25.6        |
| **Were pregnancy wanted**                    |           |             |
| Yes                                          | 274       | 96.1        |
| No                                           | 11        | 3.9         |
| **No. of live births**                       |           |             |
| 1-2                                          | 132       | 46.5        |
| 3-4                                          | 81        | 28.9        |
| 5 and above                                  | 70        | 24.6        |
| **No. Of living children**                   |           |             |
| 1-2                                          | 130       | 46.1        |
| 3-4                                          | 90        | 31.9        |
| 5 and above                                  | 62        | 22          |
| **History of abortion**                      |           |             |
| Yes                                          | 74        | 26          |
| No                                           | 211       | 74          |
| **Type of abortion**                         |           |             |
| Induced                                      | 11        | 14.9        |
| Spontaneous                                  | 63        | 85.1        |
| **Respondents age at first pregnancy:**      |           |             |
| <18                                          | 113       | 39.6        |
| 18 and above                                 | 172       | 60.4        |
| **Children desired to you have**             |           |             |
| 1-3                                          | 34        | 8.9         |
| 4-5                                          | 212       | 55.4        |
| 6 and above                                  | 137       | 35.8        |
| **Having too many children help to improve the income of the family** | | |

Table 2 Some reproductive characteristics of the study of women in reproductive age in Edaga hamus town, eastern zone, April 23-May 10, 2017
|                                    | Yes | No  |   |
|------------------------------------|-----|-----|---|
| Having too many children guarantee generational continuity | 173 | 210 | 45.2 |
| Should child mortality have compensated by too much birth | 128 | 255 | 33.4 |
| Is it a sin to practice MC method | 138 | 245 | 36 |
| Does child spacing help to the health of the mother and child | 342 | 41 | 89.3 |
| MC has side effect will be it dangerous to the mother | 188 | 191 | 49.1 |
| Does contraceptive use decrease sexual satisfaction | 69 | 272 | 18 |
| Does contraceptive cause infertility in women | 136 | 221 | 35.5 |
| Should men share responsible for FP use | 282 | 101 | 73.6 |

Knowledge, attitude, and practice of modern contraceptive

All participants (100%) had information heard about modern contraceptives. Health professional was the most common source of information were 220(57.4%) mothers heard or counseled about modern contraceptive. Regarding the attitude and practice of modern contraceptive 224(58.5%) of the respondents had used MC. While 159 (41.5%) of them did not use any method of modern contraceptives. Among non-users the reason included where fear of side effect (4.4%), disagreement with the husband (2.5%),
religious reason (3.2%), community reason (0.6%) and other (89.3%) (separation). In our study among the participants, 254 (66.3%) of the participants were respond that yes for cultural acceptance of the practice of modern contraceptives by the community and 129 (33.7%) of them respond no for cultural acceptance. (Table 3) (figure4, figure5, figure6).

Table 3 Knowledge towards modern contraception use among, women of the reproductive age group in Edaga hamus town, eastern zone April 23-May 10, 2017.

| Variables                                | Frequency | Percent (%) |
|------------------------------------------|-----------|-------------|
| Have you heard about contraceptive       |           |             |
| Yes                                      | 383       | 100         |
| No                                       | 0         | 0.0         |
| **Source of information**                |           |             |
| Radio                                    | 199       | 52%         |
| Television                               | 183       | 47.8%       |
| Newspaper                                | 48        | 12.5        |
| Health institution                       | 220       | 57.4        |
| Friend (neighborhood)                    | 176       | 46%         |
| Types of contraceptive you know         |           |             |
| Pill                                     | 345       | 90.1%       |
| Injectable                                | 364       | 95%         |
| Implant                                  | 261       | 68.1%       |
| IUCD                                     | 173       |             |
| Condom                                   | 199       | 52%         |
| How many MC do you know                  |           |             |
| 1-2                                      | 58        | 15.2        |
| 3-4                                      | 223       | 58.2        |
| 5 and above                              | 102       | 26.6        |
| Do you use any method of MC              |           |             |
| Yes                                      | 224       | 58.5        |
| No                                       | 159       | 41.5        |
| **If no why**                            |           |             |
| Fear of side effect                      | 7         | 4.4         |
| Disagreement with husband                | 4         | 2.5         |
| Religious reasons                        | 5         | 3.2         |
| Community reason                         | 1         | 0.6         |
| Other                                    | 142       | 89.3        |
| Cultural acceptance                      |           |             |
Factors Affecting Modern Contraceptive utilization among reproductive women

In the bivariate logistic regression analysis age of respondent, educational status, husband’s educational status, marital status, occupation, and monthly income had a significant association with modern contraceptives at p<0.2. In multivariate logistic regression analysis Age, Educational status of the husband, Number of children wanted and Communication with the husband of MC have significantly associated. When compared to the age group under 25-29 years, those respondents in the age group of 15-59 years were 59.4% times less likely to use a modern contraceptive, (AOR = 0.406; C1=0.000, 0.398; P=.017). The odds of the utilization of modern contraceptives in the study area were 86.5% times (AOR=0.135; 95% CI= 0.002, 0.760; P=.033) less likely to use MC among 15-19 years as compared to women of 30-34 Years of age.

The odds of the utilization of modern contraceptive among educational status of an illiterate husband were 0.997 times less likely to use than whose educational status 9-12 (AOR=0.003;95%CI=0.000,0.316;P=0.014*) and Illiterate were 99.6% less to
use than diploma and above (AOR=0.004; 95% CI=0.000, 0.631; P=0.032). Women who want to have number of children 1-3 were 10.8 times more likely to use modern contraceptive than who want 6 and above children (AOR=10.802; 95% CI=4.027, 28.975; P=0.000) and women who want to have 4-5 were 2.6 more likely to practice modern contraceptive than who want to have 6 and above (AOR=2.624; 95% CI=1.437, 4.791; P=0.002).

A husband who had a negative feeling towards the utilization of modern contraceptive was 0.814 times less likely to use modern contraceptive than who had a positive feeling (AOR=0.186; 95% CI=0.056, 0.617; P=0.006) (table 4).

Table 4. Association between utilization of MC and associated factors in reproductive age women in Edaga hamus town, eastern zone April 23-May 10, 2017.

| Variable                  | Use of the MC method | COR (95% CI)                        | AOR                  |
|---------------------------|----------------------|-------------------------------------|----------------------|
|                           | yes                  | no                                  |                      |
| Age in years              |                      |                                     |                      |
| 15-19                     | 9                    | 46                                  | 1                    |
|                           | 0.089 (0.039, 0.205) | 0.00*                               | 0.055 (0.003, 1.081) |
|                           | 0.008 (0.002, 0.03)  | 0.00*                               | 0.406 (0.000, 0.398) |
| 20-24                     | 66                   | 30                                  | 1.152 (0.21, 0.133)  |
|                           | 0.135 (0.002, 0.760) | 0.033*                              |
| 25-29                     | 77                   | 3                                   | 0.210 (0.92, 0.481)  |
|                           | 0.069 (0.002, 2.591) | 0.148                               |
| 30-34                     | 59                   | 24                                  | 0.250 (0.98, 0.639)  |
|                           | 1.575 (0.000, 6.693) | 0.915                               |
| 35-39                     | 9                    | 14                                  | 0.667 (0.177, 2.513) |
|                           | 0.742 (0.003, 17.124)| 0.914                               |
| Educational status        |                      |                                     |                      |
| Illiterate                | 5                    | 30                                  | 1                    |
|                           | 0.250 (0.033, 1.893) | 0.180*                              | 0.681 (0.000, 5.995)|
| Can read write            | 2                    | 3                                   | 0.059 (0.016, 0.222) |
|                           | 0.52 (0.14, 17.984)  | 0.706                               |
| 1-4                       | 17                   | 6                                   | 0.161 (0.161, 0.056) |
|                           | 0.293 (0.008, 10.443)| 0.500                               |
| 5-8                       | 31                   | 30                                  | 0.156 (0.058, 0.424) |
|                           | 0.822 (0.021, 31.926)| 0.916                               |
| 9-12                      | 81                   | 76                                  | 0.027 (0.009, 0.080) |
|                           | 0.901 (1.340, 4.107)| 0.104                               |
| Diploma and above         | 88                   | 14                                  | 1                    |
|                           | 5.702 (0.569, 5.709)| 0.085                               |
| Educational status of husband |            |                                     |                      |
| Illiterate                | 5                    | 35                                  | 1                    |
| Can read and write        | 2                    | 20                                  | 1.389 (0.247, 7.823) |
|                           | 5.702 (0.569, 5.709)| 0.085                               |
| 1-4                       | 8                    | 15                                  | 0.089 (0.025, 0.313) |
|                           | 1.767 (0.67, 3.945)  | 0.734                               |
| 5-8                       | 49                   | 13                                  | 0.045 (0.015, 0.136) |
|                           | 0.074 (0.003, 1.949)| 0.119                               |
| Marital status | 9-12 | Diploma and above |
|----------------|------|-------------------|
| Unmarried      | 54   | 63                |
| Married        | 179  | 63                |
| Divorced       | 18   | 18                |
| Widowed        | 3    | 3                 |

| Occupational status | 9-12 | Diploma and above |
|---------------------|------|-------------------|
| Housewife           | 100  | 63                |
| Merchant            | 87   | 42                |
| Government employee | 21  | 34                |
| Student             | 6    | 8                 |
| Daily labor         | 10   | 12                |

| Income | 9-12 | Diploma and above |
|--------|------|-------------------|
| <600   | 99   | 97                |
| 600-1200 | 61 | 42      |
| >1200  | 64   | 20                |

| Have any pregnancy | 9-12 | Diploma and above |
|--------------------|------|-------------------|
| Yes                | 190  | 95                |
| No                 | 34   | 64                |

| Number of pregnancies | 9-12 | Diploma and above |
|-----------------------|------|-------------------|
| 1-2                   | 76   | 47                |
| 3-4                   | 58   | 25                |
| 5 and above           | 56   | 23                |

| Number of children wanted | 9-12 | Diploma and above |
|---------------------------|------|-------------------|
| 1-3                       | 16   | 18                |
| 4-5                       | 116  | 96                |
| 6 and above               | 92   | 45                |

| Feeling of the husband towards MC | 9-12 | Diploma and above |
|-----------------------------------|------|-------------------|
| Negative                          | 15   | 27                |
| Positive                          | 143  | 8                 |
| Nothing                           | 28   | 22                |

| Communication with the husband of MC | 9-12 | Diploma and above |
|--------------------------------------|------|-------------------|
| Sometimes                            | 60   | 16                |
| Always                               | 105  | 2                 |
| No communication                     | 20   | 47                |
Modern contraceptive methods by decreasing unwanted and unplanned pregnancies can substantially decrease maternal mortality and be an entry point to increase the utilization of other reproductive health services. Therefore, this study was tried to assess Prevalence and determinants of modern contraceptive utilization among Women in the Reproductive Age Group in Edaga-hamus Town, Eastern zone, Tigray Region, Ethiopia. In this study, the current prevalence of modern contraceptive utilization was 58.5%. The result is in line with the study conduct in Addis Abeba, 2005 (56.3%). However, the prevalence of modern contraceptive utilization in this study was higher than the study in South Nigeria (21.6%). United Nations millennium development goal (MDG) 2015 report for African continent (33.4%), and the 2015 sub-Saharan MDG reports. 2016 Ethiopian DHS for Amhara region, 46.9%, Gondar, Nekemte, Debreeberhan, and west Gojjam, Ghana, Kenya, and Nepal. the United Nations MDG 2015 report for Somalia, Eritrea and South Sudan which was 23.7, 20 and 6.8% respectively. This difference might be because of socio-demographic and cultural variation. Besides, there is a difference in the study time interval between other studies done and this study. Moreover, the discrepancy may be due to an educational grade of study participants, up-to-date house to house health education policy more organized in the town through the Ethiopian federal ministry of health. Studies were done in Benin City, Nigeria (64.5%) and in Holeta town (73%), were higher prevalence reported. This discrepancy might be due to the age difference or and religion of the participant. The commonest modern contraceptive method utilizing by up-to-date married men was injectables (54.4%), pills (14.7%) and implants (13.5%) married men were male condoms (2.2%) this is similar with study conduct in Holeta town, (injectable 48% followed by implant 15.3% and pill 5.4%). This showed they were aware of family planning and they knew the different methods. This study revealed that the odds of those age 15-19 years were less likely to use modern contraceptives by 59.4% and 86.5% as compared to age 25-29 and 30-34 years. This study similar to study conduct in Ethiopia demographic and health survey, and in contrary with study conduct in shire Endaslasi. This may be due to those who are 15-19 where most of them were unmarried but those 25-29, 30-34 were most of them are married and within this range of age, their educational status was high. Mother who had
negative husband approval towards modern contraceptive utilization were 81% less likely to use MC than who approve it positive husband approval. This finding of the study was supported by study conduct in Farta district south Gondar in 2014\(^{(24)}\). This might be due to the educational status of husbands who had high educational status were good approval towards modern contraceptives. The odds of the utilization of modern contraceptive among education status of an illiterate husband were 99.7% times less likely to use than whose educational status 9-12 (AOR=0.003;95%CI=0.000,0.316;\(P=0.014^*\)) and Illiterate were 99.6% less to use than diploma and above(AOR=0.004;95%CI=0.000,0.631;\(P=0.032\)). It is study mother who went to have several children, 1-3 and 4-5 were eleven and three times more likely to used modern contraceptive than who went 6 and above children.

**Limitation**

Since it was assessing modern contraceptive utilization limited in assessing knowledge and attitude towards contraceptives. Since it was assessing modern contraceptive utilization limited in assessing knowledge and attitude towards contraceptives.

**Conclusion and recommendation**

Factors such as age, educational status of the husband, the number of children wanted and feeling of the husband was associated with the utilization of modern contraceptive. Therefor train health professionals especially health extension workers to raise awareness education, enhance information, education and communication activities regarding modern contraceptives and create awareness about the quality of life and healthy live hood to the community through the training of health professionals to convince the community.
Declarations

Acronyms/Abbreviations

**ADU**: - Adigrat university; **C.I.**: - Confidence Interval; **CMR**: - Child mortality rate; **CPR**: - Contraceptive Prevalence Rate; **DHS**: - Demographic and Health Survey; **HIV**: - Human immune virus; **IPPF**: - International Planned Parenthood Federation; **IUCDs**: - Intra-Uterine Contraceptive Devices; **LAM**: - lactation amenorrhea method; **MC**: - Modern Contraception; **OCP**: - Oral Contraceptive Pill; **SDM**: - standard days method; **TFR**: - Total Fertility Rate; **WHO**: - World health organization.

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Availability of data and material

The datasets used during the current study available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Authors’ contributions

DT designed the study, performed statistical analysis, and drafted the paper. TG and LG participated in paper writing. All authors contribute to the data analysis and read and approved the final paper.

Ethical approval and consent to participate

Ethical clearance was obtained from the Ethical Review Board of ADU, College of Medicine and Health Sciences and it is also got granted from the Health office of Adigrat hospital. Verbal and written consents were obtained after explaining their full right to refuse, withdraw any time, without any explaining or giving reasons. Information's
obtained from individuals’ participants was kept secure and confidential. Names and other identifying data of respondents were made by using code throughout the study process to obtain confidentiality. Finally, data were collected according to the standard questionnaire prepared.

**Consent for publication**

Not applicable

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**Reference**

1. Organization WH, Unicef. Trends in maternal mortality: 1990-2015: estimates from WHO, UNICEF, UNFPA, World Bank Group, and the United Nations Population Division. 2015:20.

2. Organization WH, Unicef. Trends in maternal mortality: 1990-2015: estimates from WHO, UNICEF, UNFPA, World Bank Group, and the United Nations Population Division. 2015.

3. United Nations trends in contraceptive use worldwide new york department of economic and social Affairs 2015.

4. Yihunie lakew, aylau a reda, habtamu tamene, geographical variation and factors influencing modern contraceptive use among married women Addis Abeba, Ethiopia 2011
5. Addis Madera gebru, atsede fantahun areas, kahsu gebrekirstos, assessment of factors affecting long-acting of family planning utilization in adigrat town, Tigray, Ethiopia, American Journal of health research, July 3, 2015.

6. Andarge tobe1, honelgn nahusenay, and direslgne misker, factors associated with modern contraceptive service utilization among married reproductive age, Melo Koza southern Ethiopia tobe et al., j preg child health 2015.

7. Ethiopian demographic and health survey, 2016

8. Mussie Alemayehu, Haile Mariam lemma, kidan abrha, family planning use and associated factors among pastoralist community, afar Ethiopia, Alemayehu et al. bmc women's health 2016.

9. Fasil Haile Georgis, assessment of factors influencing the utilization of modern contraceptive methods among women in the reproductive age group Addis Abeba June 2006.

10. Alara ladi ejembi, tukur dahiru and alhaji a. aliyu, dhs on contextual factors influencing modern contraceptive, nigeria ,natalie la roche,2015.

11. Teka Girma, Abdurahman sultan, and Kebede legese, prevalence and factors influence the utilization of modern contraceptive methods among married women of reproductive age group (15-49 years) in holeta town, Oromia, Ethiopia, Girma et al., j preg child health 2016.

12. Netsanet Berhanu, assessment of modern contraceptive utilization and its associated factors among women of reproductive age taking anti-retroviral therapy, Addis Ababa, Ethiopia, May 2013.

13. Eko jimmy e.1, osonwa Kalu o.2,osuchukwu nelson c, the prevalence of contraceptive use among women of reproductive age, Calabar metropolis, southern Nigeria, international journal of humanities and social science invention, June 2013.

14. United Nations. Trends in Contraceptive Use Worldwide 2015. New York: Department of Economic and Social Affairs, Population Division 2015. 1–31.

15. Central Statistical Agency [Ethiopia] and ICF International. Ethiopia demographic and health survey 2016. Addis Ababa: Central Statistical Agency [Ethiopia]; 2016.
16. Tekelab T, Melka AS, Wirtu D. Predictors of modern contraceptive methods use among married women of reproductive age groups in western Ethiopia: a community based cross-sectional study. BMC Women’s Health. 2015;15(1):52.

17. Mohammed A, Woldeyohannes D, Feleke A, Megabiaw B. Determinants of modern contraceptive utilization among married women of reproductive age group in north Shoa zone, Amhara region, Ethiopia. Reprod Health. 2014;11(1):13.

18. Yitayal M, Berhane Y, Worku A, Kebede Y. The community-based health extension program significantly improved contraceptive utilization in west Gojjam zone, Ethiopia. J Multidisciplinary Healthcare. 2014;2014(7): 201–08

19. Agyei-Baffour P, Boahemaa MY, Addy EA. Contraceptive preferences and use among auto artisanal workers in the informal sector of Kumasi, Ghana: a discrete choice experiment. Reprod Health. 2015;12(1):32.

20. Uprety S, Ghimire A, Poudel M, Bhattrai S, Baral DD. Knowledge, attitude and practice of family planning among married women of reproductive age in a VDC of eastern Nepal. J Chitwan Med Coll. 2017;6(1):48–53.

21. Obi Andrew ifeanyichukwu and labor an adetunji, contraception usage: knowledge, attitude and associated factors among women of reproductive age attending a health facility in Benin City, Nigeria, science domain international, 2015

22. Andarge tobe1, honelgn nahusenay, and direslgne misker, factors associated with modern contraceptive service utilization among married reproductive age, Melo Koza southern Ethiopia tobe et al., j preg child health 2015.

23. Weyzer t tsehaye, daniel Mengistu and kalayouk Berhe, assessment of modern contraceptive methods utilization and its determinant factors among women of reproductive age groups shire endaslasie town, Tigray, Ethiopia 2011.

24. Tigabu Burhan kassa1, getu degu, zelalem Berhanu, assessment of modern contraceptive practice and associated factors among currently married women age 15-49 years in farta district, south Gondar zone, northwest Ethiopia, published online October 30, 2014
Figure 1. Educational status of women in reproductive age

Figure 2. Educational status of husband
Figure 3. Marital status of women of reproductive age

Figure 4. Type of contraceptive ever used
Figure 5 currently used contraceptive

Figure 6 the source of contraceptive they get