DE GRUYTER

International Journal of Adolescent Medicine and Health

Contraceptive use and its determinants among adolescent women in Tigray, Ethiopia: a multilevel modeling

Journal:	*International Journal of Adolescent Medicine and Health*
Manuscript ID	IJAMH.2020.0107
Manuscript Type:	Original Article
Date Submitted by the Author:	07-May-2020
Complete List of Authors:	Abebe, Haftom; Mekelle University College of Health Sciences, Biostatstics Belachew, Abate; Mekelle University Gebreegziabher, Letekirstos ; Mekelle University Zewdie, Yodit ; Mekelle University Berhe, Haftu; Mekelle University Bayray, Alemayoh ; Mekelle University Girma, Atkilt ; Mekelle University
Keywords:	Adolescent women, multilevel determinants, mixed effect logistic regression model

Contraceptive use and its determinants among adolescent women in Tigray, Ethiopia: a multilevel modeling

Abstract

Background: Adolescent women are central for intergenerational health of human populations. Complications from childbirth and pregnancy are the leading causes of death for adolescent women. Contraception is known to prevent the occurrence of pregnancy and its complications potentially lower the death rate for adolescent women. However, studies that identified determinants of contraceptive use specifically among adolescent women are often lacking in Ethiopia.

Objective: The aim of this study is to assess the contraceptive use and its multilevel determinants among adolescent women in Tigray region.

Methods: A community based cross-sectional study was conducted. Women who were 15-19 years of age residing in the selected households at the time of data collection were included in the survey. Multi-stage cluster sampling was used to select study units. A multivariable two-level mixed effect logistic regression model was fitted to assess independent effects of the explanatory variables on contraceptive use.

Results: A total of 1755 adolescent women were participated. Of these 12.3% were contraceptive users. Pills (40%) and intrauterine device (30%) were commonly used contraceptive methods. Educational level, marital status, age, being informed about contraceptive, health facility visit, duration of stay at their residence and having partner were the most important determinants for use of contraceptive among adolescent women. Study participants who were not at school currently had more likely to use contraceptive methods compared to those who were at school. Similarly, adolescent women who had no history of health facility visit had less likely to use contraceptive methods than those have history of health facility visit.

Conclusion and recommendation: The factors that affecting to use contraceptive methods were educational level, marital status, age, being informed about contraceptive, health facility visit, duration of stay at their residence and having partner. This study recommend that; in order to increase use of contraceptive methods among adolescent women, the family planning services providers and programmers should continue the promotion of family planning knowledge.

Background

Adolescent women are central for intergenerational health of human populations (1). The survival, health and well-being of adolescents are essential towards achieving the Sustainable Development Goals (SDGs) (2). Improving the health of adolescents is essential to have a more successful and sustainable future (1). More importantly, 10% reduction in adolescent birth/pregnancy is known to reduce maternal and infant mortality by 70% and 3%, respectively (2).

However, about 16 million adolescents give birth every year worldwide, in which 95% occurs in low- and middle- income countries (LMIC). In Africa, substantial proportions of these births (more than 40%) are also unplanned (3). About 2.5 million adolescents have unsafe abortions every year worldwide, of which 14 per cent of all unsafe abortions occurred in LMIC. And, about one in seven of all new human immunodeficiency virus (HIV) infections occur during adolescence (4). Ethiopia is among the seven countries in the world in which half of all adolescent births occur (5). As a report of Ethiopia Demographic and Health Survey (EDHS) 2016, 13% of births occur in adolescents. Whereas, in Tigray, a region where the current study is conducted, 7% of women who have undergone comprehensive abortion care are adolescent girls (6).

Complications from pregnancy and childbirth are the leading causes of death for adolescent women worldwide (7). Contraception is known to prevent the occurrence of pregnancy and its complication thus potentially lowers the death rate for adolescent women. It has crucial impact on health of women, family and the community as well (8). It has been proven to prevent unintended pregnancies, unsafe abortion, reduce maternal and child mortality and prevent sexually transmitted infections including HIV. Although the world has been working in achieving universal access to reproductive health services such as contraceptive use, adolescents in developing world still have a number of barriers and little access to good-quality reproductive health services (2,9).

In LMIC, current contraceptive use ranges from 6-67% for adolescents (15-19 years). Also, substantial proportion (7-67%) of adolescents have unmet need (5). In Ethiopia, though the knowledge towards contraceptive methods is universal, the overall contraceptive use remains

low (35.3%) among reproductive age women. The prevalence is also greatly varied across geographic areas, 50.1% in Addis Ababa to 1.4% in Somali region indicating greater regional variation. The contraceptive use among adolescent women is as low as 7.4% at national level in 2016 (10). About 32% adolescent women are known to have unmet need (11). According to small scale studies conducted among both female and male adolescents, about 21.5% and 68.1% rural and urban adolescents are known to use contraceptive, respectively (12,13).

Researchers investigated determinants for use of modern contraceptives in women. Poverty, poor access to services and commodities, place of residence, marital status, health concerns and worry about side effects, myths and misconceptions, and poor coordination of the programmes are among many other factors affecting family planning use in Africa (3,14). In Ethiopia, knowledge of reproductive health, age, educational status, discussion with family/relatives, peer groups, sexual partners and teachers, parent disapproval, lack of basic information and pressure from partners are found to affect adolescents (both male and female) from accessing and using reproductive health (12,13)

However, studies that identified determinants of contraceptive use specifically among adolescent women are often lacking in Ethiopia. On the other hand, individual health behavior is proven to be caused by multilevel factors that comprised of individual, interpersonal, community and organizational factors. Therefore, adolescent women contraceptive use assumed to be affected by multilevel factors thus needs statistical modeling that account the effect of these factors. Understanding multilevel factors affecting contraceptive use among adolescents is important for improving the access to and quality of health services. It is also essential to design reproductive health services based on evidences which in turn would result in improved health of the women and the community as well.

Therefore, the current study is aimed to assess the contraceptive use and its multilevel determinants among adolescent women in Tigray region. .

Methods

Study setting

Tigray is one of the nine regional states of Ethiopia with an estimated total population of 5,055,999 in 2014. Adolescent women are known to account 25% of reproductive age women. An estimated 80.5% of the populations are living in rural areas. The majority of the inhabitants are orthodox Christian. Administratively, the region is divided in to seven zones (6). There are two specialized hospital, 15 general hospitals, 22 primary hospitals and 223 health centers and 740 health posts in the region. The region has achieved primary healthcare coverage of 96% with emphasis on health promotion and disease prevention through investment in primary health care unit (PHCU) facilities: health posts, health centers and primary hospitals. The adolescent friendly services are given in PHCUs.

Study design and period

A household survey was conducted in three zones of Tigray –Central, Southern, and Eastern Zone in July, 2018.

Sample size and sampling strategy

Multi-stage cluster sampling was used to select study units. Facilities (clusters) and households were the primary and secondary sampling units, respectively. The clusters were formed by households within 15kms distance from health facilities. The list of facilities was obtained from Tigray Regional Health Bureau, and sample of clusters were selected randomly. Out of 184 health institutions, 56 (30%) were selected randomly, as WHO recommended the minimum number of representative premises (clusters) is 30%.

All adolescents from households within selected cluster were considered for this study. If a household had more than one adolescent woman, only one was included in the study randomly.

Data collection procedure

A structured questionnaire was used to interview the study participants. The data were collected by well experienced and trained data collectors who were college students.

Study Variables

In this study the dependent variable is contraceptive use among adolescent women. The outcome was binary, categorized as "Yes" and "No". The explanatory variables are grouped into facility/program/community level factors, and individual adolescent women and household related factors.

Data analysis

The collected data were entered, cleaned and analyzed using STATA Version 14.2. Descriptive statistics such as frequency and percentages were performed to describe the categorical variables. Cross tabulation of explanatory variables with outcome was also done to examine the associations. In this study, the data has a two-level hierarchal structure in which adolescent women were nested within health institutions/facilities. Clustering the observations within higher-level units can result in a hierarchically structured data set in which observations are not independent. A multilevel statistical approach was used to model the relation between contraceptive use among adolescent women and the independent variables. The first level represents the adolescent women and the second level is health facility. A multivariable two-level mixed effect logistic regression model was used to assess the effects of the explanatory variables on the contraceptive use among the adolescent women. First, bivariate analyses were done to assess the association between the independent variables and the dependent variable of the study. Then overall categorical variables with a p-value of < 0.25 at the bivariate analysis were included into the final model of multivariable two-level mixed effect logistic regression model in which odds ratio with 95% confidence intervals were estimated to identify explanatory variables of contraceptive use among adolescent women. P values less than 0.05 were used to declare statistical significance. The Intra-Class Correlation (ICC) was calculated using between-cluster variance and within cluster variance [$ICC = \sigma_u^2 /(\sigma_u^2 + \pi^2 /3)$],where σ_u^2 is the community (cluster) level variance and $\pi^2/3$ is the standard logistic distribution, that is, the assumed household variance component, which is $\pi^2 /3 \approx 3.29$. The Proportional Change in Variance (PCV) was also computed for the mixed effect model with respect to the empty model to show how much of variability on the odds of contraceptive use among adolescent women explained by the mixed effect model.

Ethical consideration

Ethical clearance was obtained from Institutional Review Board of Mekelle University, College of Health Science. The data collectors collected the information after obtaining verbal consent from each participant. Confidentiality of individual client information was recorded anonymously and confidentiality was assured throughout the study period.

Results

Characteristics of the study community

A total of 54 health facilities, making 54 clusters in which each cluster included households within 15 kilometers radius, were included in this study. Higher proportions of the clusters (61.1%) were from rural setting. Only five health facilities (9.3%) had nurse to population ratio below the WHO standard (1:5000). Similarly, except the general and tertiary hospitals (n=4), almost all primary health care units (92.6%) had youth-friendly services for the adolescents of their community.

Background characteristics of study subjects

A total of 1755 adolescent women were participated in this study. Of these, 1059 (60.3%) were rural residents. More than three-fourth 1,397(79.6%) were living with their family while 172(9.8%) and 130(7.4%) were living with husband and alone, respectively. More than two-third 1237(70.5%) were currently at school. More than half of the study subjects 989(56.4%) had secondary level education.

About 1563 (90%) were orthodox Christians whereas almost all (99.3%) were Tigrai ethnic. Higher proportion of the subjects 1257(71.6%) and 1537 (87.6%) were students and single, respectively. More than two-third (66.9%) of mothers of the study adolescents were illiterate while less than half 805(45.9%) of the fathers were illiterate.

More than eight in ten 1439 (82.0%) had no history of sex intercourse. Of those who had history of sex (n=316), almost all (97.8%) had started sex at age 15-19 years. Eight percent of the study adolescents had history of pregnancy of whom 47(32.9%) had termination. Eighty-one percent (n=1422) of the study subjects were living at less than 30 minutes to nearest health facility (Table 1).

Insert Table 1 about here

Knowledge and practice of adolescent women about sexuality and contraception

Almost all 1670(96.2%) had knowledge of risk of unprotected sex. Of these, more than two-third 1058(65.1%) reported unwanted pregnancy as risk of unprotected sex. On the other hand, about 90% heard about contraception while 1517(86.4%) knew where to get contraceptives. More than three-fourth of study subjects 1353(77.1%) didn't ever visit health facility. Three hundred sixteen (18%) of the study subjects had sexual partner and majority (75%) had discussion with their partners about contraception and supported their use (Table 2).

Insert Table 2 about here

The study subjects had knowledge of contraceptive methods. Accordingly, injection (71%), pills (65%), condoms (49.4%) and intrauterine device (35.7%) were the commonly known contraceptive methods (**Figure 1**). Regarding the source of information, higher proportions of the adolescents were heard about contraceptives from health institutions (43.5%), media (radio/TV) (42.4%) and schoolmate (20.3%). While only 7.5% heard about contraceptive from social media (**Figure 2**). Higher proportion of the subjects had responded health center (82.1%), hospital (68.6%), and health post (10.9%) as source of contraceptive methods (**Figure 3**). Moreover, 39%, 39% and 15% identified the importance of contraceptives as spacing birth, limiting birth and prevent sexual transmitted infection, respectively (**Figure 4**).

Insert Figure 1 about here

Insert Figure 2 about here

Insert Figure 3 about here

Insert Figure 4 about here

Contraceptive use among adolescent women of Tigray

The prevalence of contraceptive use among adolescent women was 12.3 percent (n=216). The pills (40%) and intrauterine device (30%) were commonly used contraceptive methods (**Figure 5**). The median duration of contraceptive use was 8 months and the inter-quartile range was 6 to 12 month while the range was 0 to 46 months.

More than half (51%) adolescents received contraceptives from health centers (**Figure 6**). Of the total of 1539 adolescent women who were not using contraceptives currently, 83.2% were not using contraceptives because they are not married while 3.8% were not using because they want to have baby (**Figure 7**).

Insert Figure 5 about here

Insert Figure 6 about here

Insert Figure 7 about here

Factors associated with contraceptive use

In multivariable mixed-effect logistics regression, schooling, educational level, marital status, age, being informed about contraception, health facility visit, duration of stay at their residence, having partner and hearing of contraceptive use message through media were showed statistically significant association with adolescent women contraceptive use. Adolescent women who were not at school currently had 2 times (AOR=2.05; 95%CI: 1.502, 4.183) higher odds to use contraceptive than those who were at school. The adolescent women who had higher level of education had lower odds of contraceptive use than illiterate counterparts. Those adolescents who were college or above had 92% (AOR=0.079; 95%CI: 0.015, 0.435) lower odds of contraceptive use than illiterate adolescents. Adolescents who were married, divorced and widowed had 4.8 times (AOR=4.749; 95%CI: 2.709, 8.325), 2.93 times (AOR=2.930; 95%CI: 10167, 7.361), and 9.2 times (AOR=9.208; 95%CI: 2.128, 39.846) higher odds of contraceptive use than single adolescent women, respectively. An adolescent woman with a unit higher age had about 16% higher (AOR=1.156; 95%CI: 1.054, 1.269) odds of contraceptive use than her lower counterpart. Those who didn't heard about contraceptives had 76.3% (AOR=0.37; 95%CI: 0.069, 0.823) lower odds of contraceptive use than those who heard about contraceptives. Similarly, adolescent women who had no history of health facility visit had 94.3% lower (AOR=0.057;

95%CI: 0.034, 0.096) odds of contraceptive use than those have history of health facility visit. Adolescent women who had been for more than 10 years in the setting had 50% lower (AOR=0.50; 95%CI: 0.318, 0.786) odds of contraceptive than those who stayed for less than 10 years in their current residence. Adolescent women who have no partner had 93% lower odds (AOR=0.054; 95%CI: 0.029, 0.098) than those who have sexual partner. Adolescent women who heard of contraceptive through median had 2 times (AOR=2.103; 95% CI: 1.207, 3.664) higher odds of contraceptive use than those not heard contraceptive through media.

As shown in the empty model 11% of the total variance in the odds of contraceptive use was accounted by between cluster variation of characteristics. The between cluster variability declined from 40.2% in the empty model into 28.9% in the combined model. Thus, the combined model was preferred for predicting adolescent women's contraceptive use. The PCV also showed that 28% of the variation in contraceptive use between communities was explained by mixed model, i.e., the combined model.

Insert Table 3 about here

Discussion

Adolescent women are central for intergenerational health of human populations. The survival, health and well-being of adolescents are essential towards achieving the Sustainable Development Goals. Improving the health of adolescents is essential to have a more successful and sustainable future (1). Complications from childbirth and pregnancy are the leading causes of death for adolescent women worldwide (7). Increasing the use of contraceptive in developing countries has reduced maternal death. About 2.5 million adolescents have unsafe abortions every year worldwide, of which 14% of all unsafe abortions occurred in developing countries. A bout one in seven of all new human immunodeficiency virus (HIV) infections occur during adolescence (4). Contraception is known to prevent the occurrence of pregnancy and its complication potentially lowers the death rate for adolescent women. (8).

This study analyzed the socio-economic and demographic factors associated with contraceptive use among adolescent women (15–19 age) in Tigray region. Results showed about 13% of the

adolescent women who live in rural area were used contraceptive. But it was lower than the study conducted in Gondar, 21.5% adolescent women who live in rural were known to use contraceptive (13). The low contraceptive use in the rural in our study could be due to the low awareness and knowledge of the respondents.

In this study, more than three fourth of the respondents were living with their family. About 18% of the adolescents had history of sex intercourse and 8% of adolescent had history of pregnancy of whom 32.9% had termination. As report of EDHS, 2016, 13% of births occur in adolescents and in Tigray region where the current study is conducted 7% of women who had undergone abortion care were adolescents (6). In the current study, 96% of the adolescent women had knowledge of risk of unprotected sex, more than three-fourth did not visit health facility, and 81% of the adolescents were living at less than 30 minutes to nearest health facility. Three hundred sixteen (18%) of the study subjects had sexual partner and 75% had discussion with their partners about contraception. The prevalence of contraceptive use among adolescent women was 12.3%. As report of EDHS the contraceptive use among adolescent women was 7.6% at the national level in 2016 [10].

In the current study household wealth index had no any association with the contraceptive use. In contrast household wealth index was positively affects contraceptive use in the previous study [16]. This may be due to the fact that in Ethiopia modern contraceptives are available free of charge. In the two-way association, mother's education is statistically associated with contraceptive use.

Results of multi-variable analysis showed that adolescent women education determines the odds of using contraception, similar associations were found previously [17, 18]. Adolescent women who had higher level of education had lower odds of contraceptive use than illiterate counterparts. In the current study, adolescent women who were not at school currently had 2 times higher odds to use contraceptive than those who were at school. Age had also association with the contraceptive use, where older adolescent women had higher odds than younger adolescent women in contraceptive use, similar scenarios had occurred in previous study [15]. Results showed that adolescent women who had no history of health facility visit had lower odds of contraceptive use than those have history of health facility visit. Similarly, adolescent

women who had no partner had lower odds of contraceptive use than those who have sexual partner. Adolescent women who heard of contraceptive through median had two times higher odds of contraceptive use as compared to those not heard contraceptive through media.

Conclusion:

The finding of this study showed that 12.3% of adolescent women were used contraceptive methods, and more than three-fourth were lived with their family. Eighteen percent of the respondents had sexual partners and 8% of adolescent had history of pregnancy of whom 32.9% had termination. The major reasons for using contraceptives were limiting birth or spacing birth, followed by prevention of STI/HIV. This study indicated that both individual and community level factors can influence the use of contraception by adolescent women. Factors which were significantly associated with contraceptive use were schooling, educational level, marital status, age, being informed about contraception, health facility visit, duration of stay at their residence, having partner and hearing of contraceptive use message through media. This study recommend that; in order to increase use of contraceptive methods among adolescent women, the family planning services providers and programmers should continue the promotion of family planning knowledge.

References

1. Call KT, Hein K, Mcloyd V, Petersen A, Kipke M. Adolescent Health and Well-Being in the Twenty-First Century : A Global Perspective. 2002;12(1):69–98.
2. WHO. Survive , Thrive , Transform. Global Strategy for Women's, Children's and Adolescents' Health (2016–2030). 2018 monitoring report: current status and strategic priorities. Geneva, Switzerland; 2018.
3. Woog V, Singh S, Browne A, Philbin J. Adolescent Women's Need for and Use of Sexual and Reproductive Health Services in Developing Countries. 2015;
4. UNFPA. State of world population 2014. 2014.
5. United Nations Population Fund. Girlhood, Not Motherhood: Preventing Adolescent Pregnancy. New York,USA; 2015.
6. Tigray Regional Health Bureau. TRHB 2009 and 2010 EFY Anual Profile Final. Mekelle, Ethiopia; 2018.
7. UNFPA. The State of World Population 2018. The power of choice; reproductive rights and the demographic transition. 2018.
8. WHO, USAID. Repositioning Family Planning: Guidelines for advocacy action. Brazzaville; 2008.
9. Michael T. Mbizvo, Sharon J. Phillips. Family planning: Choices and challenges for developing countries. Best Practice & Research. Clin Obstet Gynaecol. 2014;28:931–43.
10. Centeral Statistical Agency[Ethiopia], The DHS Program[ICF]. Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia, and Roc kville, Maryland, USA; 2016.
11. Gebreselassie T, Govindasamy P. Levels and Trends in Unmet Need for Family Planning among Adolescents and Young Women in Ethiopia. Calverton, Maryland, USA: ICF International; 2013.
12. Abajobir AA, Seme A. Reproductive health knowledge and services utilization among rural adolescents in east Gojjam zone , Ethiopia : a community-based cross-sectional study. 2014;1–11.
13. Feleke SA, Koye DN, Demssie AF, Mengesha ZB. Reproductive health service utilization and associated factors among adolescents (15 – 19 years old) in Gondar town , Northwest. BMC Health Services research . 2013;13-294.
14. Ochako R, Mbondo M, Aloo S, Kaimenyi S, Thompson R, Temmerman M, et al. Barriers to modern contraceptive methods uptake among young women in Kenya: a qualitative study. BMC Public Heal. 2015;15(118).
15. Getahun DS, Wolde HF, Muchie KF, Yeshita HY. Utilization and determinants of long term and permanent contraceptive methods among married reproductive age women at Janamora district, northwest Ethiopia. BMC Res Notes. 2018;11-836
16. González C, Houweling TA, Marmot MG, Brunner EJ. Comparison of physical, public and human assets as determinants of socioeconomic inequalities in contraceptive use in Colombia - moving beyond the household wealth index. International Journal for Equity in Health. 2010;9-10.
17. Masrie GA, Amare AT. Individual and community level associates of contraceptive use in Ethiopia: a multilevel mixed effects analysis . Archives of Public Health. 2019; 77-46.
18. Asiimwe JB, Ndugga P, Mushomi J, Manyenye Ntozi JP. Factors associated with modern contraceptive use among young and older women in Uganda; a comparative analysis. BMC Public Health. 2014;14-926

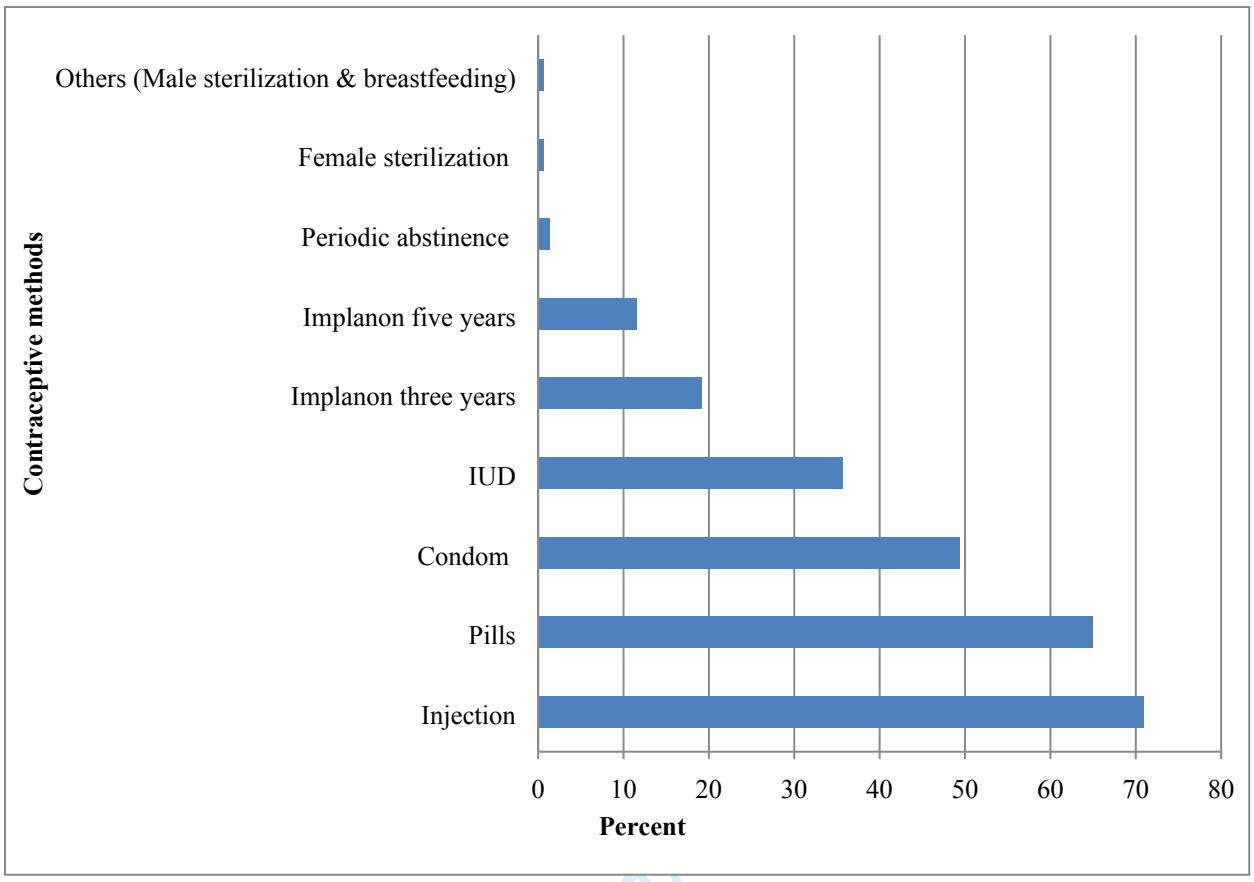

Figure 1: Knowledge of contraceptive methods by adolescent women in Tigray, Ethiopia in 2018 (n=1755)

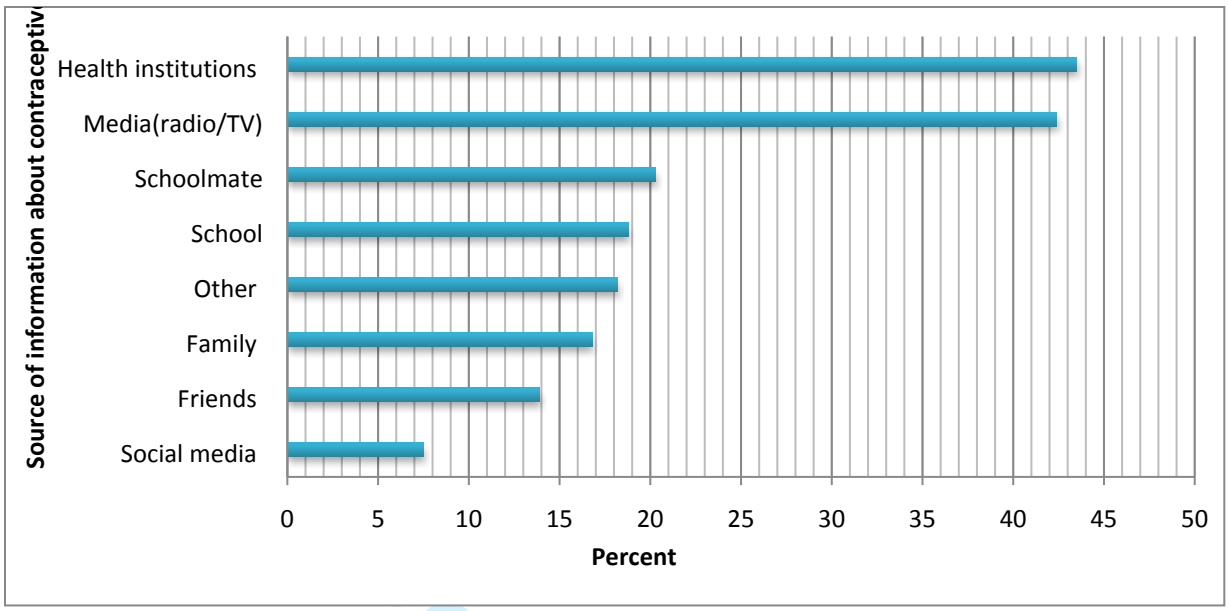

Figure 2: Source of information about contraceptive methods by adolescent women in Tigray, Ethiopia in 2018 (n=1755)

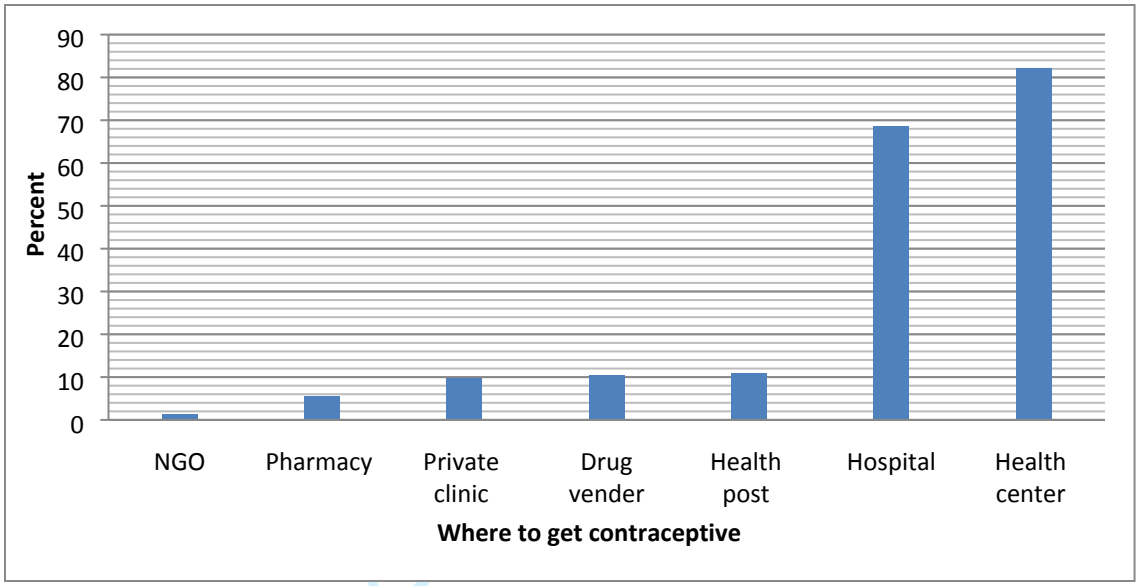

Figure 3: Source of contraceptive methods as responded by adolescent women in Tigray, Ethiopia in 2018 (n=1755)

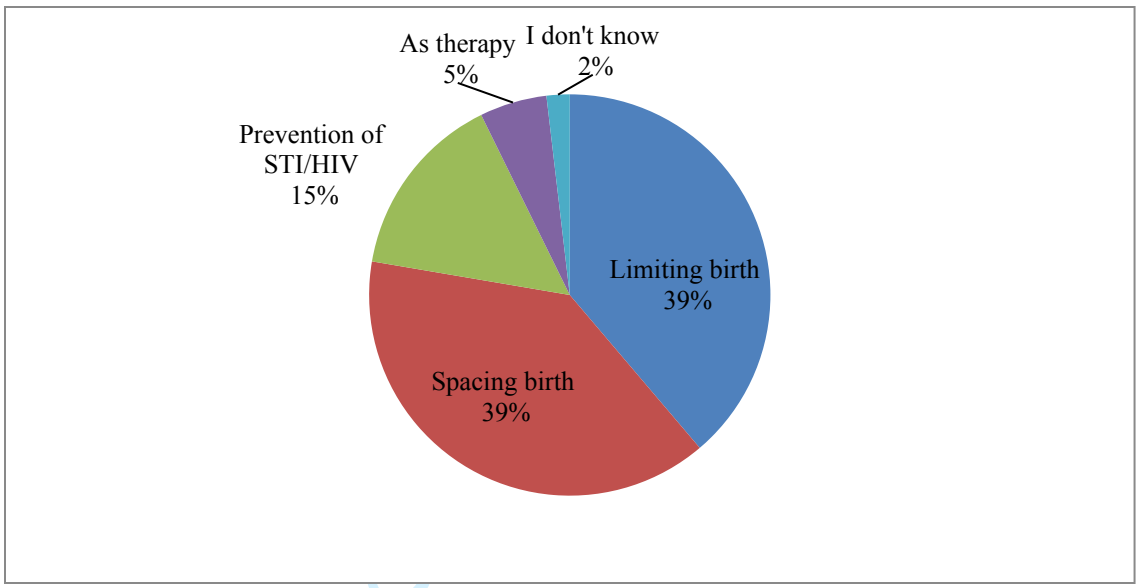

Figure 4: Reason for using contraceptives as responded by adolescent women in Tigray, Ethiopia in 2018 (n=1755)

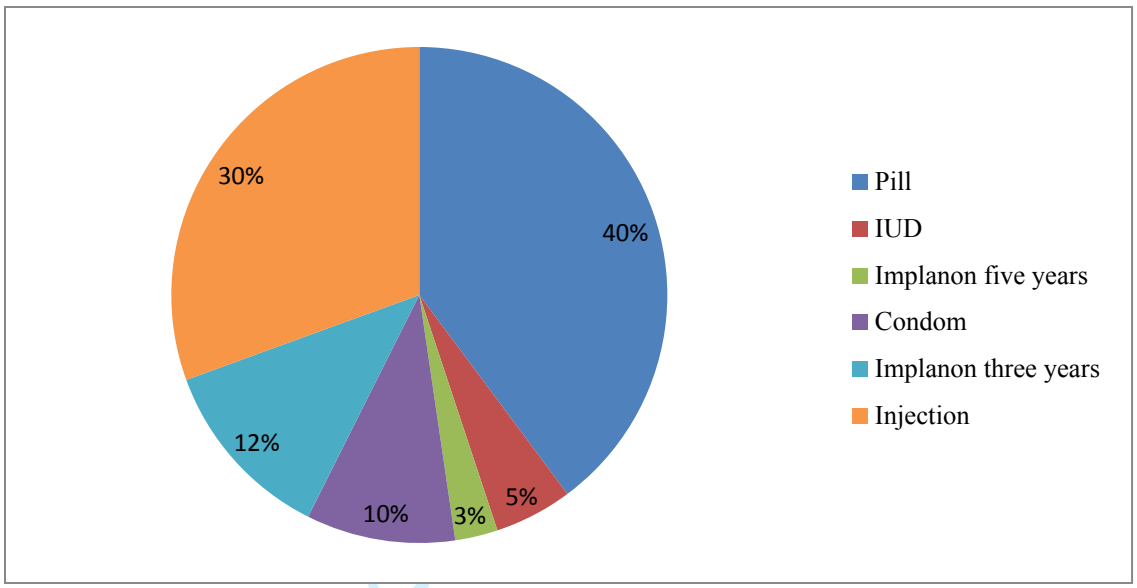

Figure 5: Types of contraceptives currently used by adolescent women in Tigray, Ethiopia in 2018 (n=216)

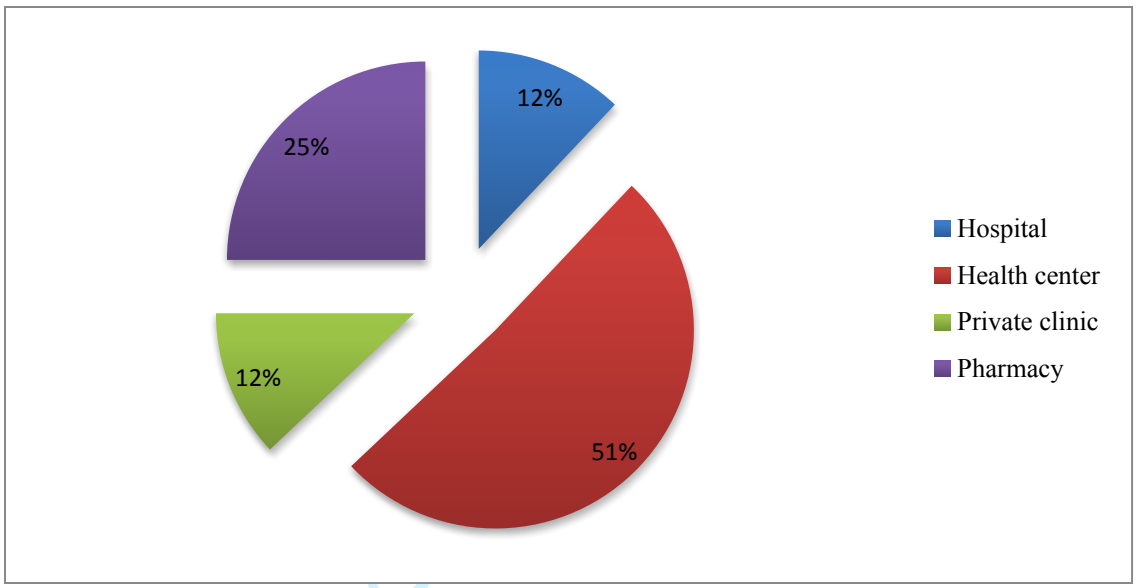

Figure 6: Place where current contraceptive user received contraceptives in Tigray, Ethiopia in 2018 (n=216)

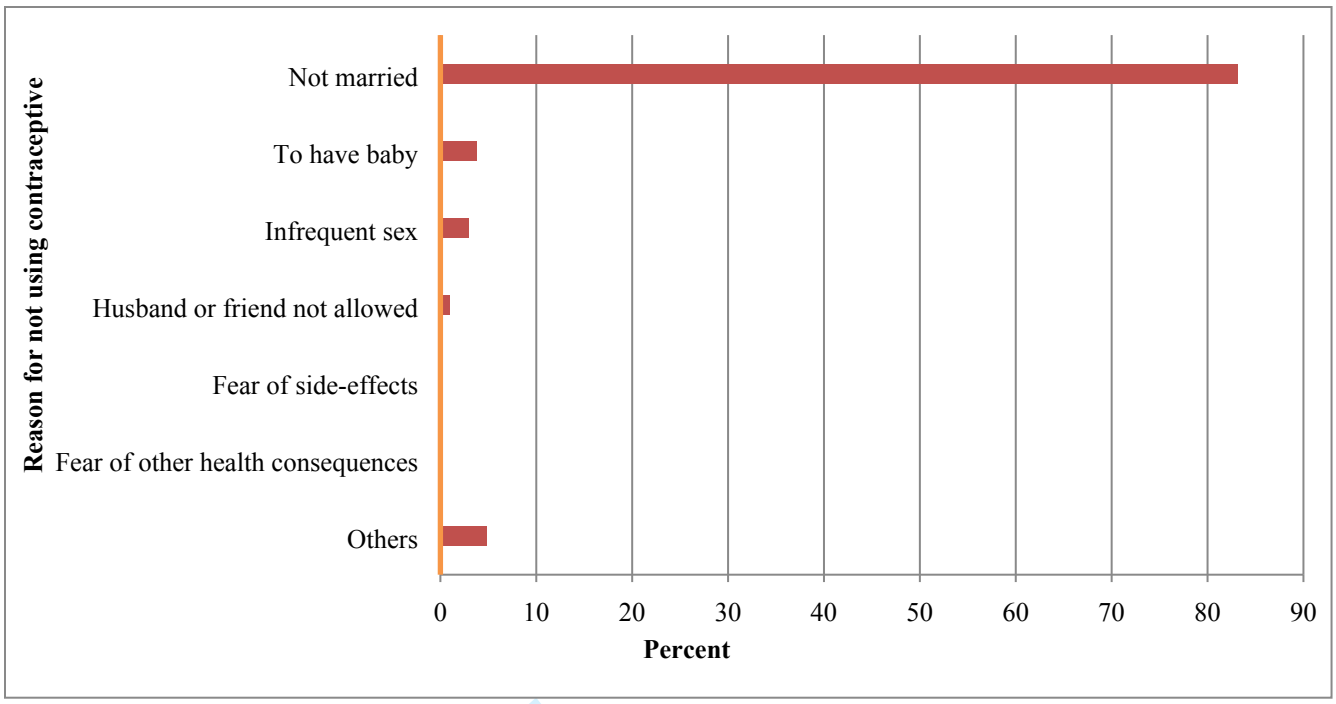

Figure 7: Reason for not using contraceptive currently among adolescent women in Tigray, Ethiopia in 2018 (n=1539)

Table 1. Background characteristics of study adolescent women in Tigray, June 2018 (n=1755)

Variables		Total: n (%)	Contraceptive Use: n (%)		X^2 test
			Yes	No	
Place of residence	Rural	734(41.8)	95(12.9)	639(87.1)	0.492
	Urban	1021(58.2)	121(11.8)	900(88.2)	
Currently lives with	Family	1397(79.6)	67(4.8)	1330(95.2)	<0.001
	Husband	172(9.8)	102(59.3)	70(40.7)	
	Friend	32(1.8)	3(9.4)	29(90.6)	
	Alone	130(7.4)	39(30.0)	91(70.0)	
	Others	24(1.4)	5(20.8)	19(79.2)	
Currently at school	Yes	1237(70.5)	58(4.7)	1179(95.3)	<0.001
	No	518(29.5)	158(30.5)	360(69.5)	
Educational status	Illiterate	20(1.1)	5(25.0)	15(75.0)	0.099
	Primary	548(31.2)	56(10.2)	492(89.8)	
	Secondary	989(56.4)	132(13.4)	857(86.6)	
	College or university	198(11.3)	23(11.6)	175(88.4)	
Religion	Muslim	177(10.1)	23(13.0)	154(87.0)	0.314*
	Orthodox	1563(89.1)	190(12.2)	1373(87.8)	
	Catholic	13(0.7)	2(15.4)	11(84.6)	
	Protestant	2(0.1)	1(50.0)	1(50.0)	
Ethnicity	Tigrai	1743(99.3)	214(12.3)	1529(87.7)	0.042*
	Afar	9(0.5)	0(0.0)	9(100.0)	
	Other	3(0.2)	2(66.7)	1(33.3)	
Occupation	Student	1257(71.6)	59(4.7)	1198(95.3)	<0.001
	House wife	238(13.5)	67(28.2)	171(71.8)	
	Daily worker	110(6.3)	29(26.4)	81(73.6)	
	Government employee	14(0.80)	4(28.6)	10(71.4)	
	Merchant	136(7.8)	57(41.9)	79(58.1)	
Marital Status	Single	1537(87.6)	95(6.2)	1442(93.8)	<0.001
	Married	168(9.6)	98(58.3)	70(41.7)	
	Divorced	39(2.2)	16(41.0)	23(59.0)	
	Windowed	11(0.6)	7(63.6)	4(36.4)	
Mother's education	Illiterate	1174(66.9)	166(14.1)	1008(85.9)	0.011
	Able to read and write	233(13.3)	24(10.3)	209(89.7)	
	Primary school	203(11.6)	14(6.9)	189(93.1)	
	Secondary school	104(5.9)	7(6.7)	97(93.3)	
	College or university	41(2.3)	5(12.2)	36(87.8)	

Table 1 continued…

Variables		Total: n (%)	Contraceptive Use: n (%)		X^2 test
			Yes	No	
Father's education	Illiterate	805(45.9)	111(13.8)	694(86.2)	0.119
	Able to read and write	367(20.9)	41(11.2)	326(88.8)	
	Primary school	302(17.2)	41(13.6)	261(86.4)	
	Secondary school	126(7.1)	12(9.5)	114(90.5)	
	College or University	155(8.8)	11(7.1)	144(92.9)	
Household wealth index	Poorest	364(20.7)	45(12.4)	319(87.6)	0.285
	Poor	349(19.9)	43(12.3)	306(87.7)	
	Medium	340(19.4)	31(9.1)	309(90.9)	
	Rich	351(20.0)	46(13.1)	305(86.9)	
	Richest	351(20.0)	51(14.5)	300(85.5)	
Ever had sex	No	1439(82.0)	17(1.2)	1422(98.8)	<0.001
	Yes	316(18.0)	199(62.9)	117(37.0)	
Age at first sex (n=316)	12-14	7(2.2)	4(57.1)	3(42.9)	0.713*
	15-19	309(97.8)	195(63.1)	114(36.9)	
Ever had pregnancy	No	1612(91.8)	132(8.2)	1480(91.8)	<0.001
	Yes	143(8.2)	84(58.7)	59(41.2)	
Ever had termination (143)	Yes	47(32.9)	27(57.4)	20(45.6)	0.826
	No	96(67.1)	57(59.4)	39(40.6)	
Distance to nearest health facility	<30 minutes	1422(81.0)	172(12.1)	1250(87.9)	0.576
	>=30 minutes	333(18.9)	44(13.2)	289(86.8)	

*Fisher exact test

Table 2: Knowledge of adolescent women about sexuality and contraception in Tigray, Ethiopia, 2018

Variables		Total: n (%)	Contraceptive Use: n (%)		X^2 test
			Yes	No	
Knows risk of unprotected sex	Yes	1670(96.2)	203(12.2)	1467(87.8)	0.39
	No	85(4.8)	13(15.3)	72(84.7)	
Risk of unprotected sex	Unwanted pregnancy	1087(65.1)	144(13.3)	943(86.7)	0.147*
	STIs	580(34.7)	59(10.2)	521(89.8)	
	Others	3(0.2)	0	3	
Heard about contraception	Yes	1576(89.8)	212(13.4)	1364(86.6)	<0.001
	No	179(10.2)	4(2.2)	175(97.8)	
Know where to get contraceptive	Yes	1517(86.4)	206(13.6)	1311(86.4)	<0.001
	No	238(13.6)	10(4.2)	228(95.8)	
Did you visit health facility	Yes	402(22.9)	136(33.8)	266(66.2)	<0.001
	No	1353(77.1)	80(5.9)	1273(94.1)	
Visited to discuss about contraceptive (n=402)	Yes	152(37.8)	107(70.4)	45(29.6)	<0.001
	No	250(62.2)	29(11.6)	221(88.4)	
Discussed about (n=152)	Availability of methods	128(84.2)	98(76.6)	30(23.4)	<0.001
	Side effects	24(15.8)	9(37.5)	15(62.5)	
Discussed with partner (n=316)	Yes	237(75.0)	160(67.5)	77(32.5)	0.004
	No	79(25.0)	39(49.4)	40(50.6)	
Partner support your contraceptive use (n=316)	Yes	236(74.7)	158(67.0)	78(33.0)	0.012
	No	80(25.3)	41(51.6)	39(48.8)	

*Fisher exact test

Table 3: Factors associated with contraceptive use among adolescent women in Tigray, Ethiopia (n=1755)

Variables	Null model	Combined model: AOR(95%CI)	P-value
Currently at schooling			
Yes		1	
No		2.057(1.502, 4.183)	<0.001
Education level			
Illiterate		1	
Primary		0.082(0.020, 0.339)	0.001
Secondary		0.123(0.029, 0.527)	0.005
College or university		0.079(0.015, 0.435)	0.003
Marital status			
Single		1	
Married		4.749(2.709, 8.325)	<0.001
Divorced		2.930(1.167, 7.361)	0.022
Windowed		9.208(2.128, 39.846)	0.003
Age		1.156(1.054, 1.269)	0.002
Heard about contraceptive			
Yes		1	
No		0.237(0.069, 0.823)	0.023
Had history of visit to health institutions			
Yes		1	
No		0.057(0.034, 0.096)	<0.001
Years lived in the community			
<10		1	
10+		0.500(0.318, 0.786)	0.003
Have partner			
Yes		1	
No		0.054(0.029, 0.098)	<0.001
Media exposure			
No		1	
Yes		2.103 (1.207.3.664)	0.009
Random effects result			
Community level variance	0.402	0.289	
ICC (%)	10.878	8.078	
PCV (%)	-	27.995	
AIC	1287.447	692.899	
BIC	1298.387	769.482	

ICC: Intra-class correlation coefficient; PCV: Percent change in variance; AIC- ; AOR: Adjusted Odds Ratio

Contraceptive use and its determinants among adolescent women in Tigray, Ethiopia: a multilevel modeling

Haftom Temesgen, Abate Bekelle, Letekirstos Gebreegziabher, Yodit Zewdie, Haftu Berhe, Alemayoh Bayray, Atkilt Girma