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Integration of Long Acting and Permanent Contraceptive Methods with an ART Program Was Poor in Tigray Region, Ethiopia

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Abstract- Background: Use of contraceptive methods is one of the efficacious interventions that help to prevent HIV transmission and unintended pregnancies among HIV positive women. However, contraceptive utilization, in general, and Long Acting and Permanent Contraceptive (LAPM) methods, in particular, and its integration with HIV treatment services is not well understood in poor-resource settings. The study aimed to assess the level of integration of LAPM with ART, LAPM utilization and associated factors among HIV positive women in public hospitals of Tigray, northern Ethiopia.

Methods: A cross-sectional study was conducted in 2013 among 343 HIV positive married women selected using two-stage cluster sampling. Data were analyzed using SPSS version 20. Multiple logistic regression analysis was used to identify independent predictors of LAPM utilization.

Results: Long Acting and Permanent Contraceptive utilization was 29.7%; among which, only 37.3% got LAPM from ART clinics. Higher knowledge on LAPM (OR=3.2, 95% CI:1.35,7.8), positive attitudes towards LAPM (OR=4.2, 95% CI:2.19,8.2), delivery at age older than 18 years (OR=2.5, 95% CI:1.19,5.4), having less CD4 cells (OR=2.8, 95% CI:1.2,6.3) and desire to limit number of children (OR=2.1, 95% CI:1.2,4.1) were positively associated with LAPM utilization.

Conclusion: Overall LAPM utilization and integration of family planning services with ART service were lower. Integration of LAPM service with ART is crucial to optimize ART and address the special needs of HIV positive women to prevent unwanted pregnancy.

Keywords: integration, utilization of Lapm, tigray, public hospitals, ethiopia.

I. INTRODUCTION

The World Health Organization (WHO) promotes a strategy of preventing HIV infection among women, and preventing unintended pregnancies [1]. Prevention of unintended pregnancies among HIV positive women, although highly cost-effective, is a neglected strategy in combating HIV/AIDS [2-4].

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Studies done in different countries of Sub-Saharan Africa (SSA) show that the use of ART was associated with almost 80% increased risk of pregnancy [5]. Prevention of unwanted pregnancy using contraceptive methods would benefit HIV positive mothers as compared to HIV free women to decrease HIV transmission and prevent unwanted pregnancy [6].

In Ethiopia, a large proportion of people living with HIV/AIDS are under ART including the Prevention of Mother to Child Transmission of HIV (PMTCT) service [7]. However, family planning utilization is low and the integration of family planning service with ART is observed to be poor. Especially, the Long Acting and Permanent contraceptive Methods (LAPM) are least used by HIV positive mothers, though these methods are more advantageous to reduce problems of non-adherence to family planning methods than the short acting methods [8, 9]. Not only LAPM utilization would be important for preventing unintended pregnancies among HIV positive mothers, but also it would be a cost effective strategy to prevent mother to child transmission rate of HIV [10, 11]. In Tigray, not limited to HIV positive women, the unmet need for family planning among unmarried women is 15% for child spacing and 7% for child limiting. In the same study, only 5.6% and 0.3% were using implants and female sterilization, respectively, and none of them were Intra Uterine Contraceptive Device (IUCD) users. However, evidence on LAPM utilization among HIV positive mothers in the region is scarce. One of the reasons for the hypothesized lower LAPM utilization among HIV positive women would be poor integration of family planning services with ART clinics.

In light of these, the current study aimed to point out the level of LAPM utilization among HIV positive mothers, reasons associated with non-use of LAMP and the integration level of family planning services with ART clinics among HIV positive women in public hospitals of Tigray, region northern Ethiopia.

II. METHODS

An institutional based cross-sectional study was conducted in four hospitals of Tigray region in 2013. The

region has an estimated total population of over four million with a sex ratio of one [12]. The region owns 16 public hospitals including one teaching hospital and a number of private hospitals. Unlike the private hospitals, family planning and ART services are provided for free in the public hospitals in Ethiopia. Thus, our study focused merely on public hospitals in which majority of women receive family planning and ART services.

The study focused on HIV positive married women of reproductive age who were on ART during the study period. Using predetermined parameters of 95% Confidence Interval (CI), 4% Marginal Error, 7.1% estimated proportion of LAPM utilization in South Africa [13], 10% non-response rate, Design Effect of two to compensate the higher variability that may be introduced due to the sample design, we included a total of 348 HIV positive women in our study.

The study women were selected using a two-stage cluster sampling. In the first stage, all the public hospitals were considered as clusters. There may be no or little difference in the provision of family planning and ART services among the hospitals since the treatment protocols are similar. Thus, we selected four public hospitals at random out of 16. We allocated the sample size needed from each hospital using probability proportional to size sampling. In the second stage, women were selected using systematic random sampling at every equal interval. The women were consented for service-exit interview using a face-to-face approach. The questionnaire focused on LAPM utilization and associated factors. It was first prepared in English and then translated back into the local language-Tigrigna. To check consistency of the contents of each question, the questionnaire was back translated into English by a different person. The questionnaire was adapted from different studies [13-16] but customized to the contextual population and health settings. It contained socio-demographic and economic characteristics of study participants, reproductive history, clinical characteristic, knowledge on LAPM, attitude towards and utilization of LAPM. We pretested the questionnaire on 15 HIV positive women in a different area to check the plausibility of the tool, estimate time for the interview, ensure understandability of the questions.

To assess the level of LAPM integration with ART services, we used checklist enquiring availability of contraceptive methods and teaching materials, number and type of trained health professionals and availability of registration book and referral document. Integration of family planning with ART services was defined as receiving any types of family planning methods from ART clinics together with the ARV drugs. The data collection was carried out by twelve trained clinical nurses who used to work in different hospitals and the overall data collection process was supervised by other four health professionals.

a) Data analysis

The raw data were entered into EPI data version 3.1 and analyzed using SPSS version 20 for windows (SPSS Inc. version 20, Chicago, Illinois). Descriptive analyses were run to estimate the level of LAPM utilization, integration of LAPM with ART services and descriptions of women characteristics. Knowledge of and attitude towards LAPM utilization among the study participants were measured based on respondents' answers to certain knowledge and attitude questions. Accordingly, knowledge was defined as "higher knowledge", "moderate knowledge" and "lower knowledge" if a woman answered 80%, 60-79% and less than 60% of the knowledge questions, respectively. Similarly, attitude was defined as "positive" and "negative" if a woman answered above the average of the attitude questions, and below the average of the attitude questions, respectively average and below.

The predictors of LAPM utilization were assessed using multiple logistic regression analysis. The effect sizes of predictors was estimated using adjusted Odds Ratio (OR) for the sample and 95% CI of OR for the population effect sizes. A p-value of less than 0.05 was considered as statistically significant for all tests.

b) Ethics statement

The Ethical Review Committee of Mekelle University, College of Health Sciences approved the study protocol as well as the verbal consent of the participants. Informed verbal consent was obtained from study participants after the purposes of the study were explained to them. The information and informed consent sheet contained information on selection criteria, confidentiality, voluntary participation, benefit and risks and contact information of the investigators. The right of the respondents to withdraw from the interview was assured. Any personal identifier was not encoded; identifiers of the women were replaced with identification numbers. The study neither had employed any intervention nor had taken any biomedical body sample.

III. RESULTS

a) Sociodemographic and economic characteristics of women

A total of 343 HIV positive reproductive aged women who were on ART participated in the study which gave a response rate of 98.5%. Fifty percent of the women were younger than 31 years. The vast majority of the women, (92.7%), were followers of Orthodox Christianity. With regard to place of residence, 65.3% of the women used to live in urban during the study period. Overall, women were with less educational level than their partners. Only 51.9% and 64.4% of the women and their partners attended a formal education. Nearly one-third (65.9%) of the women were limited to indoor

activities. As such, half of the study participants had an average household monthly income of \$55.6-111.1 [Table 1].

Table 1: Sociodemographic and clinical characteristics of respondents and their partner in Tigray Public hospitals, 2013

Variables	n(%)
Age (n=343)	
20-24	29(8.5)
25-29	89(25.9)
30-34	113(32.9)
35-39	112(32.7)
Educational status of women (n=343)	
uneducated	165(48.1)
1-8 grade	104(30.3)
9-12 grade	66(19.2)
College and above	8(2.3)
Education status of husband (n=343)	
uneducated	122(35.6)
1-8 grade	123(35.9)
9-12 grade	78(22.7)
College and above	20(5.8)
Occupational status of wife (n=343)	
Housewife	226(65.9)
Business	44(12.8)
Salaried employee	15(4.4)
Daily laborer	58(16.9)
Household income (n=343)	
<\$55.6	111(32.4)
\$55.6-111.1	171(49.9)
>\$111.1	61(17.8)
ART regimen (n=343)	
D4T-3TC-NVP	94(27.4)
TDF-3TC-NVP	57(16.6)
D4T-3TC-EFP	22(6.4)
TDF-3TC-EFP	37(10.8)
AZT-3TC-NVP	114(33.2)
AZT-3TC-EFV	16(4.7)
2nd Line	3(0.9)
WHO clinical stage at admission (n=343)	
Stage 1	59(17.2)
Stage 2	72(21.0)
Stage 3	167(48.7)
Stage 4	45(13.1)

b) Antiretroviral Therapy profile

Regarding to WHO clinical staging, 48.7% of the women were at stage 3 and 327 (95.3%) of the participants were in stage T₁ during admission to ART. However, the WHO clinical stage decreased to 16 (4.7%) during the study period. The proportion of women with CD4 cells less than 200cells/mm³ before ART initiation was 75.5%; but, this declined to only 16.3% during the study period after ART initiation. The women were under a different ART regimen, but one-third of them were taking AZT-3TC-NVP.

c) Reproductive history of respondents

The mean age at marriage was 18.16 (SD± 3.5) and age at first birth was 21 (SD±4. 1) years. More than

two-third (67.9%) of the participants got married before the age of 18 years. Nine in ten of the respondents had history of childbirth in their lifetime. Each women had average children of 2.4(SD±1.2) and 46.1% of them had three or more children. Regardless of the number of children that the women had, however, 183 (53.4%) of mothers had desired to have more children in the future [Table 2]. Experience of unintended pregnancy was reported among 66 (19.2%) of the respondents. Similarly, 55(16%) of the women had a history of



abortion among which 11(20.4%) had more than one death; but, half of them encountered more than one episodes. Two in ten women had a history of child child deaths [Table 2].

Table 2 : Reproductive history of HIV positive women, in Tigray Public hospitals, 2013

Variables	n(%)
Age at marriage (n=343)	
<18 year	233(67.9)
≥18 year	110(32.1)
History of birth (n=343)	
Yes	310(90.4)
No	33(9.6)
Number of children (n=310)	
Two and less than two	185(53.9)
Three and above	158(46.1)
Age at delivery (n=310)	
<18 year	95(27.7)
≥18 year	248(72.3)
Time gap between previous and last birth (n=310)	
Less than 3 years	125(40.3)
3 and above	185(59.7)
History of child death (n=343)	
Yes	65(21.0)
No	245(79.0)
Number of child deaths (n=65)	
One	34(52.3)
Two and above	31(47.7)
Was the last birth intended? (n=343)	
Yes	277(80.8)
No	66(19.2)
History of abortion (n=343)	
Yes	55(16.0)
No	288(84.0)
Need to have more children in the future (n=343)	
Yes	183(53.4)
No	160(46.6)

Table 3 : Knowledge of HIV positive married women on LAPM in Tigray Public hospitals, 2013

Knowledge statements (n=219)	Yes n (%)	No n (%)
Implant prevent pregnancy effectively for 3-5 years	212(96.8)	7(3.2)
Implants require a surgical procedure during insertion & removal	173(79)	46(21)
Implants results in immediate reversal pregnancy	176(80.4)	43(19.6)
HIV positive women can use IUCD	132(60.3)	87(39.7)
Women on ARV can use IUCD	145(66.2)	74(33.8)
IUCD is not a problem in quick return of pregnancy after removal	133(60.3)	86(39.4)
IUCD is effective in preventing pregnancy for 12 years	155(70.8)	64(29.2)
IUCD has no interference with sexual intercourse	118(53.9)	101(46.1)
Women should only be sterilized when they don't want more children	129(58.9)	90(41.1)
Women on ARV can use sterilization method	126(57.3)	93(42.5)
Sterilization needs mild surgical procedure	74(33.8)	145(66.2)

d) Knowledge of respondents on LAPM

The proportion of women with higher knowledge on LAPM was 53 (69.9%); while 53 (24.2%) and 13 (5.9%) had moderate and lower knowledge, respectively. Nearly 219 (64%) had ever heard of LAPM. A small number of women had ever heard of permanent methods- female sterilization (37%) and vasectomy

(17.8%). However, only six in ten of the women knew the right time to have female sterilization. With regard to sources of information, most of the women (95%) had heard of LAPM from a health institution followed by media (44.3%). The reasons for LAPM utilization were for child limiting (70.5%) and child spacing (84.7%). Most of the women, 96.8% and 70.8%, had positive knowledge

on the effectiveness of implants and IUCD for prevention of pregnancy, respectively.

e) Attitude of the respondents towards LAPM utilization

The overall attitude showed that only 3 in 10 of the respondents had positive attitude towards LAPM utilization. Eighty six percent of the women believed that HIV positive women can use LAPM; while in contrast,

30% believed that short term contraceptives are more comfortable than LAMP for HIV positive women. In addition, 53% considered that LAPM can delay fertility when a need arises. Only half of the respondents believed that their partners have to have vasectomy given that they need no more children [Table 4].

Table 4 : Attitude of HIV positive women towards LAPM utilization in Tigray Public hospitals, 2013

Attitude statements (n=343)	Disagree n(%)	Neutral n(%)	Agree n(%)
HIV positive women can use LAPM	20(5.8)	27(7.9)	296(86.3)
HIV positive women on ART can use LAPM	15(4.4)	17(5)	311(90.7)
LAPM use can cause infertility	44(12.8)	118(34.4)	181(52.8)
Higher child deaths should not be compensated by many births	143(41.7)	69(20.1)	131(38.2)
Men should share the responsibility of taking vasectomy	91(26.5)	60(17.5)	192(56)
Short acting methods is more comfortable than LAPM for HIV positive women	153(44.6)	86(25.1)	104(30.3)
HIV positive women who use LAPM get abandoned by their husbands	91(26.5)	48(14)	204(59.5)
LAPM use among couple results disagreement	123(35.9)	36(10.5)	184(53.6)
Couple should have discussion before LAPM use	24(7)	9(2.6)	310(90.4)
Partners should approve family planning use	73(21.3)	3(0.9)	267(77.8)

f) LAPM utilization and integration

Ever users of any contraceptives were 76%; but, only 30% had utilized LAPM. Among the LAPM users, 80% of them were using implants followed by IUCD (13%). With regard to intention of using LAPM, 50% reported that they were using it since it is effective, but

11% of them were using it with the influence of health professionals. The most frequent reasons for non-use of LAPM among the eligible women were preference of short-acting methods (88%), husband's objection (4%) and fear of side effects (5.8%) [Table 5].

Table 5 : LAPM Utilization among HIV positive women in Tigray Public hospitals, 2013

Characteristics	n(%)
Ever use of contraceptive methods (n=343)	
Yes	261(76.1)
No	82(23.9)
Use of LAPM (n=102)	
Yes	102(29.7)
No	214(70.3)
Type of LAPM (n=102)	
IUCD	13(12.7)
Implant	82(80.4)
Female sterilization	7(6.9)
Integration of FP with ART services (n=102)	
Integrated	38(37.3)
Not integrated	64(62.7)
Intention to use LAPM in the future (n=241)	
Yes	59(24.5)
No	182(75.5)
Counselled by health professionals on LAPM (n=241)	
Yes	186(77.2)
No	55(22.8)
Time of counseling (n=241)	
Before starting ART	75(40.3)
After starting ART	111(59.7)

Pertaining to service integration, only 37% of the women got family planning services from ART clinic.

The rest received it from other clinics was separate from ART clinic. That's, HIV positive women had visited more

clinics at different time to get family planning methods and ART.

g) Predictors of LAPM utilization

Multiple logistic regression was run over the data to identify the factors that had significant association with LAPM utilization. Knowledge, attitude, age at delivery, current CD4 count and family size were significant predictors of LAPM utilization.

Higher knowledge on- and positive attitude towards LAPM were associated with the odds of using

LAPM (OR=3.2, 95% CI:1.35,7.8) and (OR=4.2, 95% CI:2.19,8.2), respectively. After controlling the effect of others, women with less CD4 cells (<200cells/mm³) (OR=2. 8, 95% CI: 1.2,6.3) and those with a desire to limit the number of children (OR=2. 1, 95% CI: 1.2,4.1) were more likely to utilize LAPM. Similarly, the odds of utilizing LAPM was higher among older women (OR=2.5, 95%: 1.19,5.4) and women with more children (OR=2.4, 95% CI: 1.2,5.08) than their counterparts [Table 6].

Table 6 : Predictors of LAPM utilization among HIV positive women in Tigray Public hospitals, 2013

	LAPM Utilization		OR(95% CI)
	Use n(%)	Non use n(%)	
Characteristics			
Attitude			
Positive	58(53.2)	51(46.8)	4.2(2.19, 8.2)*
Negative	44(18.8)	190(81.2)	1
Knowledge			
Low	3(23.1)	10(76.9)	1.1(0.2, 5.9)
Moderate	11(20.8)	42(79.2)	1
High	79(51.6)	74(48.4)	3.2(1.35, 7.8)*
Age at delivery			
<18y	21(22.1)	74(77.9)	1
≥18y	81(32.7)	167(67.3)	2.5(1.19, 5.4)*
Family size			
Less than four	58(25.3)	171(74.7)	1
Four and above	44(38.6)	70(61.4)	2.4(1.2,5. 08)*
Current CD4 count (cells/mm³)			
< 200	31(55.4)	25(44.6)	2.8(1.2, 6.3*
≥200	71(24.7)	216(75.3)	1
Need of more children in the future			
Yes	44(24)	139(76)	1
No	58(36.2)	102(63.8)	2.1(1.2, 4.1)

* $p < 0.05$

IV. DISCUSSION

Long Acting and Permanent Contraceptive utilization was 29.7%. Positive attitudes towards LAPM, knowledge on LAPM, age at delivery, the desire to limit the number of children and less CD4 count were predictors of LAPM utilization among HIV positive women. The integration of family planning service with ART was poor.

The current study indicates that a considerable number of HIV positive women heard of IUCD (63.5%), female sterilization (63.5%) and male sterilization (17.8%). In addition, the Ethiopian women have more knowledge on short acting contraceptives [9,19]. However, this finding was inconsistent with a study done in South Africa, in which the utilization for IUCD ranges from 26–41% [16-18]. A study in South Africa showed

that 93% of the participants heard about female sterilization and 28% about male sterilization [18]. The discrepancy could be due to the differences in the characteristics of study participants and nature of study settings and health system.

The current study found that LAPM utilization increases as the age of the participant increases. Similar finding was reported by a study done in South Africa, which shows that IUCD awareness was significantly associated with age [18]. It's obvious that women in Ethiopia start to give birth since the early age. Thus, They are more likely to use the LAPM since they would have enough number of children as their age goes on.

Attitude is the proximate predictor of LAPM utilization. If women have a positive attitude towards LAPM, they are more likely to utilize it. Working on avoiding misconception related to LAPM is crucial to

enhance the utilization of LAPM. For instance, the current study reported that more women had misconception that LAPM may cause infertility. Our study indicated a promising thing in which only 38% of the respondents had negative attitude towards LAPM utilization. The same is true in case of Pretoria where 79% and 76% had a favorable attitude towards IUCD utilization and female sterilization, respectively [13].

In the current study, a majority of the respondents (90.7%) agreed that women on ART can use LAPMs. This finding was higher as compared to a study done in Cape Town which showed that more than half of participants were either unaware of or unsure that women ART can use an IUCD [13]. Apart from this, 30.3% of the participants in this study believed that short acting contraceptive methods are more comfortable than LAPMs for HIV positive women. This is consistent with the finding in Cape Town where 44.1% of HIV positive participants were either unaware or unsure that sterilization is a more effective method of contraception than the injection [13].

The use of ART was associated with almost 80% increased risk of pregnancy since the health of the women gets improved [5]. Moreover, Ethiopia is a third country in which many HIV positive individuals reside- [7] - and has also set a plan in the HSDP IV to increase CPR from 32% in 2010 to 66% by the year 2015 [20]. However, LAPM utilization in this study is only 29.7%. This implies that the government of Ethiopia should work more on increasing the contraceptive utilization so as to reduce the unplanned pregnancies and maternal mortality. In addition, LAPM utilization among HIV positive women should be more than the general population to avert vertical transmission of the disease [20,21].

There is a good initiative from the Ethiopian government in which currently it allows the health extension workers to insert Implanon and this would increase accessibility of the methods to reach the remote areas. The same is true in this study that only 12.7% were using IUCD, while (80.4%) had used Implanon. In our study, however, the utilization of IUCD is higher than studies done in Pretoria (1%) -[22] - and there was no user of IUCD in a study done in Cape Town [15, 25]. In the current study, only 7% of the study participants used female sterilization,. But, this is consistent with three studies done in Cape Town and Pretoria in which 7.1%, 10%, and 13% of the HIV positive women used female sterilization [13,18,22].

In Ethiopia, most of the maternal health services are provided by the government at not cost. Obtaining the participation of the private health care sector in the provision of maternal health service, including LAPM could create a chance for women for easily accessibility of the services and it would be reachable to the population. On the contrast, in Nairobi only 10% of the

HIV positive mothers got the contraceptives from government health institution [15].

Providing appropriate counseling for HIV positive women about LAPM could increase the number of family planning users. But, there were different reasons why women were using or not using LAPM. The most frequently mentioned reasons for using LAPM were awareness of the effectiveness of the methods and thorough counseling from health professionals. Similar findings were reported in Tigray region, though the study was not limited to HIV positive women [23]. Among the reasons for not using LAPM, fear of insertion and removal, uncertainty of the safety for health and their effectiveness and influence of partners were some of the frequent ones. These findings are comparable with other studies in which 30.3% of the participants believed that short acting contraceptives are more comfortable than LAPM for HIV positive women and 3.7% of the respondents also mentioned fear of side effect is one of the barriers for utilization [13].

Fifty four percent of the HIV positive mothers in this study wanted to have more children in the future which is also consistent with a study done in Tigray region [23]. But, this was inconsistent with studies done in Nairobi and Swaziland in which 86% of the HIV positive women don't want to get pregnant for the next two years and 39.9% don't intend for future fertility [15,24]. This dissimilarity may be attributable to the differences in the study and population settings, including the access to health, level of awareness, sociodemographic characteristics of the women and etc.

This finding indicates that HIV positive women who had CD4 cells less than 200cells/mm³ were more likely to use LAPM as compared with those who had higher CD4 cells. Moreover, the majority of LAPM users had a BMI less than 18.5 kg/m² (56.9%). As CD4 count is the indicator of viral suppression, having more CD4 count indicates that the health of the mothers is improved. Thus, they may feel to have more children. Moreover, a significant number of HIV positive women (53.2%) want to have a child for the future and one-third of household had a family size of five and more.

In our study, HIV positive women who had a higher knowledge were more likely to use LAPM and this is consistent with a study done in Rwanda which showed a greater rate of LAPM utilization as knowledge of mothers on the contraceptive methods increases [8].

While the Ethiopian family planning national guidelines advocate for dual family planning methods to prevent HIV/STI transmission and unintended pregnancies for HIV positive mothers [18], only 26% of the women were using condom together with other types of family planning methods. In addition, 2 in 5 women had an unintended pregnancy in their latest one. Increasing access to family planning and reducing

unintended pregnancies among HIV clients have a number of economic benefits [25].

A systematic review of 16 studies found that integration of family planning with HIV services had a positive contribution to the increase of HIV testing, quality of services, reduction of costs, condom and contraceptive use. It also has a potential role in reducing unwanted pregnancy, vertical transmission and health care costs [25,26]. In a study done in Tigray region, nearly half of the HIV positive women got their FP from ART clinic [23]. But, integration of family planning with the ART clinic was lower in our study which is only 37.3%. Moreover, findings from checklist also indicate that most of the hospitals don't have enough number of trained health professionals on LAPM, LAPM contraceptive methods and adequate IEC material in all ART clinics.

The study may have a limitation in that the partners' influence on the use of family planning was not addressed in this study. In addition, some of the data for the sensitive issues such as abortion might not be valid. However, we are confident that this limitation wouldn't have a negative influence on the findings given that the study attempted to cover all other attributes that may be associated with LAPM.

V. CONCLUSION

LAPM utilization was low in the northern region of Ethiopia. Negative attitude towards LAPM, fear of developing side effects, partners objection, improvement in health and preference of short acting contraceptive influenced women not to use LAPM. Integration of family planning services with ART program was poor.

VI. ACKNOWLEDGEMENT

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Competing interests

The authors declare that they have no any competing interests.

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