Author's response to reviews

Title: Fertility desire and associated factors among PLHIV attending ART clinic in Fitche Hospital, North Shoa Zone, Oromiya, Ethiopia, 2013.

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FERTILITY DESIRE AND ASSOCIATED FACTORS AMONG PLHIV ATTENDING ART CLINIC IN FITCHE HOSPITAL, NORTH SHOA ZONE, OROMIYA, ETHIOPIA.

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December 6, 2013  
Jimma, Ethiopia
Abstract

Background: -Most couples living with HIV and AIDS are of child bearing age and face difficult choices concerning their sexuality and child bearing. Literatures evidenced that couple’s choices can be affected directly or indirectly by socio-economic, cultural and associated factors. But the extent of these desires and how it varies by individual, social, health and demographic characteristics is not well understood in Ethiopia in genera and particular in Fitche hospital.

Objectives: -To Identify fertility desire and associated factors among PLHIV attending ART in Fitche Hospital, North Shoa Zone, Oromiya, Ethiopia 2013.

Methods: Facility based cross-sectional study design was employed on 340 PLWHA attending Fitche Hospital ART clinic from February21-April 20th, 2013. The study participants were selected using simple random sampling technique. A pre- tested semi-structured questionnaire was used to collect data and analyzed using SPSS Version 16.0. Qualitative data was collected from key informants by in-depth interview using interview guide and triangulated with quantitative result.

Result: - Of all respondents majority 214 (62.9%) were females and 144 (42.4%) were 30-39 years and 184(54.1%) were attended primary to secondary school. The prevalence of fertility desire of PLHIV in Fitche Hospital was 133(39.1%). The indentified factors associated with fertility desire were:- Age from 18-29 years and 30-39 years[AOR, 3.95 and 3.914], marital length ≤4y, within5-9 and 10-14 years[AOR, 5.49, 4.80 and 2.82], having no living child and 1 to 3children[AOR, 11.42 and 3.67], community pressure[AOR, 3.665], partner fertility desire[AOR, 7.18], duration HIV-diagnosis≤1 years[AOR,4.99], disclosed HIV-serostatus to partner[AOR,3.9] and partner sero-difference[AOR, 2.049].

Conclusions: Study revealed that 39.1% of PLHIV have fertility desire with significant predictors of age, marital length, have fewer or no living children, partner fertility, community pressure, duration of HIV-diagnosis, discordant HIV-test and disclose HIV-serostatus to partner. Therefore, Policy makers and Ministry of Health need to consider and plan for the implications of increased numbers of PLHIV who may choose to have children and should give greater emphases to address PLHIV’s fertility issues in more comprehensive manner.

Key words: - Fertility Desires, PLHIV and Fitche Hospital.
Introduction

Background information

HIV the virus that causes AIDS acquired immunodeficiency syndrome as become one of the world’s most serious health and development challenges (1). The first cases were reported in 1981 and today, more than 30 years later and there are approximately 34 million people currently living with HIV and nearly 30 million people have died of AIDS-related causes since the beginning of the epidemic (1, 2).

Fertility desires defined as wish/intention to have more children despite the diagnosis of HIV, whereas intentions denote a commitment to implementing fertility desires (3). Historically, policies in many countries discouraged HIV-infected individuals from having children in order to reduce the number of children born with HIV or born to HIV-infected parents, but a more flexible approach towards reproductive choices of PLHIV has now emerged. This shift has been mainly informed by a reproductive rights approach and universal access to PMTCT and ART interventions and the availability of assisted reproductive techniques for HIV infected people in developed countries which have dramatically reduced the chances of sexual and perinatal HIV transmission (4, 5).

This has given rise to the growing recognition of the rights of PLHIV to have children or prevent unintended pregnancies (6-9).

It is important to study fertility desires and associated factors among PLHIV because HIV can be transmitted in the same way that pregnancy is achieved, that is, through unprotected hetero-sexual intercourse (10). Thus, unprotected sex among PLHIV, in order to conceive, carries the risk of transmitting HIV to sexual partners and subsequently to children during birth or breast feeding.

The reproductive decisions made by PLHIV and their partners have long-term consequences for the survival and wellbeing of their families and society at large (11).

The desire and intent to have children among HIV infected individuals may increase because of improved quality of life and survival following commencement of anti-retroviral treatment and reproductive health service as well (4).
The complex relationship between fertility and HIV and AIDS threatens the preventive strategies against the HIV epidemic in countries like Ethiopia, where the fertility rate is still high and PMTCT utilization low. The National HIV and AIDS strategic framework calls for a multi-sectoral response, guaranteeing rights of all people living with HIV and AIDS, and facilitating the supply and use of antiretroviral drugs. Ethiopia has adopted the WHO/UNICEF/UNAIDS 4-pronged PMTCT strategy as a key entry point to HIV care for women, men and families. Addressing all four prongs has potential to interrupt the cycle that leads to MTCT at several points(12). While the Government of Ethiopia’s HIV policy is supportive of HIV and reproductive health services integration, these services remain predominantly vertical in terms of program administration, funding and service delivery (13). More than for others, reproducing (or "giving life") for HIV-positive individuals means transcending the death that appears near, and these figures may be much higher in low-resource settings, where the disease prognosis is still very poor(14).

New HIV infections overall have declined by more than 20% since 2001 and, in 25 low- and middle-income countries, new infections have declined by more than 50%. Still, there were about 2.5 million new infections in 2011 or more than 7,000 new HIV infections per day and most new infections are transmitted heterosexually, although risk factors vary(1, 2, 15). Ethiopia is among the countries that are on top list of nations hard hit by HIV and AIDS pandemic. According to the 2011 EDHS, HIV prevalence is 1.5 percent of adults age 15-49 are infected with HIV and Women have higher HIV prevalence 1.9% than men 1% (14). PLHIV, just like the general population, desire to have children after learning of their HIV-status (17-19). Unlike the general population, however, people who know they are HIV infected have additional issues to consider, including potential health risks for (re)infections, vertical transmission of HIV and orphaning. Despite these concerns, studies show that some PLHIV still wish to have children for a range of reasons(4, 20). Most couples living with HIV and AIDS are of child bearing age and face difficult choices concerning their sexuality and child bearing (18).

As access to ART increases, HIV can be experienced as a chronic but treatable disease; PLHIV are more likely to desire children. Most recently, fertility issues in HIV positive PLHIVA are becoming increasingly important (3).
In a setting with high HIV prevalence and high fertility rates, addressing fertility issues of PLHIV is crucial. However, understanding of the factors associated with fertility desires of PLHIV in Ethiopia is remarkably low. In 2009, only 8 percent of HIV-positive pregnant women received ARV prophylaxis (16). Evidence relating to fertility and reproductive intentions among PLHIV is rare(21), despite the fact that more than 80% of PLHIV are of reproductive age(6).

Some studies revealed that the incidence of pregnancy was similar to the general population, despite the women having received counseling against pregnancy and provision of family planning services (21). For example study conducted in Brazil, in 2007, Cape Town, South Africa in 2009, Kabala, Uganda in 2011 and Nekemte, Ethiopia in 2011 shown that 15%, 11%, 17.6% and 69.4% HIV-infected women had at least one child post-HIV-diagnosis (4, 19, 22, 23).

HIV positive individuals may or may not have desire to have children and want to use family planning. But the extent of theses desires and associated factors is not well understood in Ethiopia in generas and particular in Fitche hospital.

Hence this study was conducted to identify fertility desires and associated factors among PLHIV attending ART clinics of Fitche Hospital.

**Objectives of the study**

**General objective**

To determine Fertility Desire and Associated Factors among PLHIV attending ART clinics in Fitche Hospital, North Shoa Zone, Oromiya, Ethiopia, 2013.

**Specific objectives**

1. To determine the prevalence of fertility desires among PLHIV attending ART clinic of Fitche hospital

2. To identify factors associated with fertility desire of PLHIV attending ART clinic of Fitche hospital.
METHODS

Study Area and period
The study was conducted from February 21st to April 20th 2013, in Fitche Hospital ART clinics which found in Fitche town, North shewa Zone, Oromiya Regional State in Northern part of Ethiopia and 115 Kms North of Addis Ababa.

According to the national population and housing census of Ethiopia, the projected population of the zone for 2007/2008 was estimated to be 1,388,617 and from those 6,951, 87 (50.06%) were males. The estimated to be pregnant women annually were 51,379 in the zone. The area has 2 hospitals, 48 health centers and 268 functioning health posts with estimated potential health service coverage of 91.6% (35, 36). The total numbers Reproductive ages currently on HAART and Pre-ART in north shoa zone was 8821(55).

There were different governmental and non-governmental organizations working on HIV and AIDS in the town. There were 13 health centers and two hospitals ART sites in North shewa Zone and Fitche Hospital is one of the oldest public Hospitals. Fitche Hospital was provides different services like OPD, IPD MCH, and TB and ART services by different disciplines. The total numbers of reproductive age PLHIV in Fitche Hospital is 2131 (from those 1211 on ART and 920 Pre-ART respectively) at the end of October 2012 reports of Fitche Hospital ART clinic (56).

Study Design
A facility based cross-sectional study design with both quantitave and qualitative data collection methods was employed to identify fertility desire and associated factors of PLHIV attending ART clinics in Fitche Hospital.

Source population:- All Reproductive age PLHIV who were attending ART clinic in Fitche Hospital.

Study Population
All Sampled reproductive age PLHIV who were attending ART clinic in Fitche Hospital.

Study unit:-
The study units were the individual ART and Pre-ART clients fulfills inclusion criteria.
Inclusion criteria
Those within the reproductive age (18 to 49) years for women and 18 years and above for men.
PLHIV who had no history of hysterectomy, bilateral tubal ligation and vasectomy.
On ART or Pre-ART for a period of at least 6 months prior to data collection duration.

Sample size determination
With an assumption of 50% of PLHIV desire children with a confidence level of 95% and marginal error of 5% and using a single population proportion formula.

\[
 n = \frac{(1.96)^2 \times 0.50(1-0.50)}{(0.05)^2} = 384
\]

Since the total numbers of reproductive age (source populations) ART & Pre-ART clients in Fitche Hospital were less than 10,000 which is 2131(56) correction formula was used to adjusted the final sample size was

\[
 \frac{n}{1+\frac{384}{2131}} = \frac{384}{1+\frac{384}{2131}} = 325
\]

By considering 10% non-response rate, the total sample size calculated was 357.

Qualitative method- For qualitative method the purposive nominee groups of key informants of mother supporting and peer educators recruited by ICAP, who are PLHIV was included.
The total 10 individual was considered has saturation of required information of which 4 from mother supporting group and the rest 6 from peers educator.

Sampling technique:- A list of reproductive age (18-49 women and 18 years & above men) PLHIV was prepared and entered into computer SPSS window 16.0 version from ART and Pre-ART registration book /HMIS data base then: The sample technique was simple random sampling technique selected randomly by computer generated ART and Pre-ART number.
For qualitative: -purposive sampling technique was used to selected key nominee groups of mothers supporting 4(four) and 6(six) two men and four women peer educators which are PLHIV.

Data collection procedures:- Quantitative data was collected by two trained clinical nurses who working in the ART clinics of the Hospital collect through face to face interview method using semi-structured questionnaire. Data collectors was trained for one day on the objective, relevance and benefits of the study, confidentiality of information, respondent’s right, informed consent and technique of interview. Qualitative data was collected by ART focal person through in-depth interview using semi-structured interview guide.
recorders and field-notes were used to capture the information obtained from the in-depth interview.

**Data Quality management:** The questionnaires for data collection were initially prepared in English, and translated to Afan Oromo and Amharic and back to English to check for its consistency by language expert.

Finally the corrected Afan Oromo and Amharic version was used to collect the data.

To ensure the quality of data appropriate training was given to data collectors for one day.

Before the actual data collection, the quantitative questionnaire was pre-tested on 5% of the sample (17 ART/ Pre-ART clients) in ART clinic of Kuyu district Hospital that located in Gerba guracha town 45 kilo meters from Fitche town and find in the same zonal administration.

The questionnaire was then assessing for its clarity, length and completeness. Some skipped patterns were then corrected; questions difficult to ask were rephrased. The data collection was supervised by one BSc nurse and the principal investigator. For qualitative data the interview was guided by interview guide and conducted in separate audio visual confident room. The participant was strongly assured that the data and the process are confidential and as well as unnamed.

**Data processing and Analysis:** After data collection, each questionnaire was checked for completeness and code was given before data entry. Data was edited, entered, sorted, cleaned missed values and missed variables and analyzed using SPSS version 16.0 statistical packages for analysis and the analysis was started with simple descriptive summaries like frequencies, mean and median. Adjustment was made for predictor variables that were significantly related to the outcome variable at the bivariate level.

All variables, find to be associated with the main outcome variables by having P< 0.25, in the bi-variate model were candidates for the multivariate model at 95% C.I (P-value < 0.05). The result was presented using tables, figures and narratives.

**MTCT and PMTCT knowledgeable:** Ten questions were asked about PMTCT. For a possible maximum score of ten; correct answers scored 1 while incorrect or unsure answers scored 0. Using Bloom’s criteria, a total score of 80% or more indicated good knowledge; 60% - 80% indicated moderate knowledge; and a score of less than 60% indicated poor knowledge (23).
**Qualitative data:** Data captured using tape records was translated word by word into English language and color coded, organized and summarized manually under the main thematic area and presented the result by extracted concepts from main themes and triangulated with the quantitative result.

**Ethical Consideration:** Ethical clearance letter was initially obtained from Jimma University College of Public Health and Medical Sciences Ethical Committee. Then written consent was secured from Fitche hospital medical director and matron office which was provided to head nurses and staff nurses to get permission. Moreover, to ensure confidentiality the name of respondents was not written on the consent form. Telling that his/her participation in the study was very important, every client to been interviewed was been informed that he/she has a full right to discontinued the interview.

**Result**

**Socio demographic characteristics**

Of 357 sampled PLHIVs, data were collected from 340 which a response rate of 95.2%. Among study participants majority 214 (62.9%) were females. Of all respondents 144 (42.4%) were between the age 30-39 years and 111(32.6%) were age 40± years. The range was from 18- 70 years for males and 18-49 years for females with a mean age of 36.2 ± 9.2 years. Concerning ethnicity, majority of the respondents 265(77.9%) were Oromo and regarding to religion 325(95.6%) of the respondents were Orthodox. More than half of respondents 195(57.4%) were married, of which 70(34.5%) has greater than 15 years marital duration.

With regard to educational status, 132(38.8%) were illiterate and 184(54.1%) were attended primary to secondary school. Concerning occupational status 78(22.9%) were daily labour, 77(22.6%) merchants, and 43(12.6%) governmental employments and 20(5.9%) were unemployment and family monthly income distribution of respondents, 94(27.6%) had an income less than equal to \( \leq 350 \), 105(30.9%) between 501-999 and only 60(17.6%) more than 1000 Ethiopian birr per month with average monthly income was 735.9±631.48 SD birr.

**Sexual activity and contraceptive use information of PLHIV**

The majority of respondents 234(68.8%) were sexually active of which 187(79.9%) had sex with regular partner (husband/wife). From these sexually active PLHIV about 207(88.5%, 18(7.7%) and 5(2.1%) were had one, two and three and more than three sexual partners respectively. From the total study participants about 87(25.6%) of them were changed their
sexual partner since HIV diagnosis. The majority of them 169(60.8%) were used condom, of which 120(71.0%) used always, 81(48.0%) used dual methods of contraceptive by themselves or their partners of which majority, 73(90.1%) were used Depo-Provera in addition to condom.

The main reason mentioned for use of condom, 115(33.8%) were said that for dual protection (pregnancy/STI/HIV), 35(10.3%) to protect a negative partner, 15(4.4%) fear of re-infection with new strain of HIV and 4(1.2%) advised by health professionals.

From those not used condom reasons mentioned were partner objection, feeling it was not comfortable and desired to conceived which account 59(17.4%), 25(7.4%) & 24(7.1%) respectively.

Table 1: Sexual Activity and contraceptive use information of PLHIV attending ART clinic in Fitche Hospital, North shoa Zone, Ethiopia, 2013.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency(n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual active in the last six months(n=340)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>234</td>
<td>68.8</td>
</tr>
<tr>
<td>No</td>
<td>106</td>
<td>31.2</td>
</tr>
<tr>
<td>Sex with whom n=234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular partner(husband/ housewife)</td>
<td>187</td>
<td>79.9</td>
</tr>
<tr>
<td>multiple sexual partners</td>
<td>47</td>
<td>20.1</td>
</tr>
<tr>
<td>Have sexual partner n=340</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>203</td>
<td>59.7</td>
</tr>
<tr>
<td>No</td>
<td>137</td>
<td>40.3</td>
</tr>
<tr>
<td>change sexual partner since HIV diagnosis n=340</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>87</td>
<td>25.6</td>
</tr>
<tr>
<td>No</td>
<td>253</td>
<td>74.4</td>
</tr>
<tr>
<td>Condom use n = 234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>169</td>
<td>72.2</td>
</tr>
<tr>
<td>No</td>
<td>65</td>
<td>27.8</td>
</tr>
<tr>
<td>Number of sexual partner n=234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>207</td>
<td>88.5</td>
</tr>
<tr>
<td>Two&amp; more than two</td>
<td>27</td>
<td>11.5</td>
</tr>
</tbody>
</table>

Reproductive history of PLHIV:-

From a total interviewed PLHIV, the majority 290(85.3%) had living children of which 59.4% had 1 - 3children and 25.9% had more than 4 children where as only 50(14.7%) had no biological living children. From those who had biological children 24(8.3%) were previously died related to HIV and AIDS or others diseases after learnt their or their partners’ serostatus. On the other hands about 58(17.1%) have had non biological children of which 48(82.8%) have one and the rest 10(17.2%) have more than two non biological children. From the total interviewed PLHIV’ about 83(24.4%) had at least one pregnancy by themselves or their partners post-HIV diagnosis of which 62.7% was intentional/ planned.
The outcomes of these pregnancies were 66.3% alive birth, 14.5% abortion, 7.25% still birth and 12.0% currently pregnant.

Table 2: Reproductive history of PLHIV attending ART clinic in Fitche Hospital North shoa Zone, Ethiopia, 2013.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency(n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of living children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No living child</td>
<td>50</td>
<td>14.7</td>
</tr>
<tr>
<td>1 to 3 children</td>
<td>202</td>
<td>59.4</td>
</tr>
<tr>
<td>≥ 4 children</td>
<td>88</td>
<td>25.9</td>
</tr>
<tr>
<td>Child died related HIV before</td>
<td>n=290</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>24</td>
<td>8.3</td>
</tr>
<tr>
<td>No</td>
<td>266</td>
<td>91.7</td>
</tr>
<tr>
<td>Pregnant or partner pregnancy since HIV-Dx</td>
<td>n= 340</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>83</td>
<td>24.4</td>
</tr>
<tr>
<td>No</td>
<td>257</td>
<td>75.6</td>
</tr>
</tbody>
</table>

Fertility desire of PLHIV:–
Out of 340 PLHIV interviewed 133(39.1%) with 95% CI of (34.3% - 44.3%) have fertility desire of which 24(18.0%), 18(13.5%), 33(24.8%) and 58(43.6%) were desired to have child within next 12 months, within one to 3 years, after three years and did not decided the time when to have children respectively.

From those who have fertility desire about 77(57.9%) and 56(42.1%) will have future desire number of a child, one and more than two children in the future and ranges from 1 to 4 children to achieved their fertility desire respectively.

With regarding to the preference of sex of child born in the future about 69(51.9%) were not preferred any sex as God known and 41(30.8%) was preferred male sex.

The main reasons mentioned for their current fertility desire were 36.8% wanted at least one
child to replaced themselves, 38.3% did not have desired number of children and 20.3% believed that by using ART/PMTCT to get HIV free baby (perceived efficacy of PMTCT and ART) and others reasons like to strength their marriage and replacing previously died baby (table 4). Of the total respondents 35(10.3%) were taken action to been pregnant or their partner’s of which 17(48.6%) were stopped taken contraceptive methods.

Out of the total study participants only 137(40.3%) were discussed about fertility intentions and others reproductive health needs with health professionals during follow up care.

With regarding PLHIV who have no fertility desire 207(60.9%) were mentioned their main reasons for not having fertility desire of which 69(33.3%), 59(28.5%), 34(16.4%) and 45(21.7%) were lack of adequate income, already achieved desired numbers of children, child bearing compromised their or their partner’s health and the rest mentioned fear of MTCT and fear of infected their partner while try to conceive respectively. This finding is supported by most of in-depth interview discussants, for instance: - as one woman discussant explained: “I have three children, me and the smallest are on ART but my husband is negative. Now I feel very sorry for the suffering of my baby hence I do not repeat the same sin by bearing positive child. Moreover my health shall be kept well by avoiding birth as my husband and ART providers advised me”.36/Female…).

**Disease related factors of PLHIV:-**

Out of the total respondents almost all 310(91.2%) were on ART, of which 307(99.0%) reported that their health status was improved after started HAART and their recent CD4 counts more than half 187(55.0%) was ≥350cells/m³. From total 340 PLHIV 50(14.7%) were 6months to 1 year, 130(38.2%) were 2-4 years and 160(47.1%) were more than 5(five years) since HIV-diagnosis.

Out of the total respondents the majority 222(65.3%) were stage three at the time of enrolled to ART clinic. One hundred ninety five PLHIV (87.4%) were disclosed their HIV-status to their partner and 254(74.7%) were disclosed their family.

Knowledge about prevention from mother-to-child transmission (PMTCT) 209(61.5%) had good knowledge of which 136(63.6%) women and 73(57.9%) men and also knowledge about mother to child transmission 298(87.6%) were knowledgeable about HIV transmission from mother to child while time of transmission of virus from mother to child 140(41.2%), 163(47.9%) and 224(65.9%) were answered correctly during breast feeding, labor and pregnancy respectively.
About 216(63.5%) PLHIV were have information PMTCT and of which 202 (59.4%) have positive attitude for PMTCT. Regarding to their sources of information about PMTCT majority of them 212(62.4%) were from health care providers and the rest 128(37.6%) were from mass medias and friends/peers. Of total PLHIV the main reasons mentioned was not used PMTCT 281(82.6%) had no awareness about availability of PMTCT and 52(15.3%) were fear of stigma and discrimination

Table 3: Disease related factors of PLHIV attending ART clinic in Fitche Hospital North shoa Zone, Ethiopia, 2013

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency(n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge about PMTCT</strong></td>
<td>n=340</td>
<td></td>
</tr>
<tr>
<td>good Knowledge</td>
<td>209</td>
<td>61.5</td>
</tr>
<tr>
<td>poor knowledge</td>
<td>131</td>
<td>38.5</td>
</tr>
<tr>
<td><strong>Partner HIV status</strong></td>
<td>n=203</td>
<td></td>
</tr>
<tr>
<td>Positive(concordant)</td>
<td>143</td>
<td>70.4</td>
</tr>
<tr>
<td>Negative(discordant)</td>
<td>60</td>
<td>29.6</td>
</tr>
<tr>
<td><strong>Duration of time since enrolled to ART</strong></td>
<td>n=340</td>
<td></td>
</tr>
<tr>
<td>6 months to 1 year</td>
<td>50</td>
<td>14.7</td>
</tr>
<tr>
<td>2 to 4 years</td>
<td>130</td>
<td>38.2</td>
</tr>
<tr>
<td>≥5 years</td>
<td>160</td>
<td>47.1</td>
</tr>
<tr>
<td><strong>Current CD4 count</strong></td>
<td>n= 340</td>
<td></td>
</tr>
<tr>
<td>≤350 cells/m³</td>
<td>153</td>
<td>45.0</td>
</tr>
<tr>
<td>≥350 cells/m³</td>
<td>187</td>
<td>55.0</td>
</tr>
<tr>
<td><strong>Disclosed HIV status to partner</strong></td>
<td>n=223</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>195</td>
<td>87.4</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
<td>12.6</td>
</tr>
<tr>
<td><strong>Disclosed HIV sero status to family</strong></td>
<td>n= 340</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>254</td>
<td>74.7</td>
</tr>
<tr>
<td>No</td>
<td>86</td>
<td>25.3</td>
</tr>
</tbody>
</table>

Community related factors of Fertility desire of PLHIV:-

Regarding to partner’s fertility desire more than half 104(51.2%) have fertility desire. Of total respondents about 99(29.1%) and 80(23.7%) reported that they were faced their partner’s or their family’s pressure and community pressure for having children respectively. Concerning social support only 40(11.8%) were got of which 25(62.5%) were received food and 15(37.5%) were psychosocial support and sources of these support was 20(50.0%) NGOs and 15(37.5%) were from family and the rest was from governmental institutions.
Table 4: Community related factors of Fertility desire among PLHIV attending ART clinic in Fitche Hospital North shoa Zone. Ethiopia 2013.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency (n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire of a partner to have child n= 203</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>104</td>
<td>51.2</td>
</tr>
<tr>
<td>No</td>
<td>99</td>
<td>48.8</td>
</tr>
<tr>
<td>Face partners or family pressure for having children n=340</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>99</td>
<td>29.1</td>
</tr>
<tr>
<td>No</td>
<td>241</td>
<td>70.9</td>
</tr>
<tr>
<td>Face community pressure for having children n=340</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>82</td>
<td>24.1</td>
</tr>
<tr>
<td>No</td>
<td>258</td>
<td>74.9</td>
</tr>
<tr>
<td>Did you get support n= 340</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>40</td>
<td>11.8</td>
</tr>
<tr>
<td>No</td>
<td>300</td>
<td>88.2</td>
</tr>
</tbody>
</table>

Factors associated with fertility desire among PLHIV:

Associations found to be statistically significant in the bivariate analysis at a p-value <0.25 were included in the multivariable analysis to determine which factors best explained or predicted the fertility desire among reproductive age PLHIV. Using the multiple logistic regression analysis (Table:6 below), factors significantly predictive of fertility desire for PLHIV to have more children included:-
Table 5: Factors predicting fertility desire from multiple logistic regression analysis among PLHIV attending ART clinic in Fitche Hospital, North shoa zone, Ethiopia, 2013.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Fertility desire (n=340)</th>
<th>COR (95% CI)</th>
<th>AOR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (%)</td>
<td>No (%)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-29 years</td>
<td>46 (13.5)</td>
<td>39 (11.5)</td>
<td>4.513(2.412,8.445)***</td>
</tr>
<tr>
<td>30-39 years</td>
<td>64(18.8)</td>
<td>80 (23.5)</td>
<td>3.061(1.740, 5.383)***</td>
</tr>
<tr>
<td>&gt; =40 years</td>
<td>23 (6.8)</td>
<td>88 (25.9)</td>
<td>1.00</td>
</tr>
<tr>
<td>Duration stayed with partner (n= 203)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤4 years</td>
<td>24(11.8)</td>
<td>13(6.4)</td>
<td>5.333(2.25,12.63)***</td>
</tr>
<tr>
<td>5-9 years</td>
<td>34(16.7)</td>
<td>20(9.9)</td>
<td>2.626(1.170, 5.896)***</td>
</tr>
<tr>
<td>10-14 years</td>
<td>20(9.9)</td>
<td>22(10.8)</td>
<td>2.031(2.275, 10.603)**</td>
</tr>
<tr>
<td>&gt;15years</td>
<td>18(8.9)</td>
<td>52(25.6)</td>
<td>1.00</td>
</tr>
<tr>
<td>Number of living children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>have no living child</td>
<td>38(11.2)</td>
<td>12(3.5)</td>
<td>20.056(8.24,48.83)***</td>
</tr>
<tr>
<td>have 1 to 3 children</td>
<td>83(24.4)</td>
<td>119(35)</td>
<td>4.540(2.24,9,207)***</td>
</tr>
<tr>
<td>have ≥4 children</td>
<td>12(3.5)</td>
<td>76(22.4)</td>
<td>1.00</td>
</tr>
<tr>
<td>community pressure for having children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>61(18.0)</td>
<td>19(5.6)</td>
<td>8.294(4.633,14.85)***</td>
</tr>
<tr>
<td>No</td>
<td>72(21.3)</td>
<td>186(55.0)</td>
<td>1.00</td>
</tr>
<tr>
<td>Partner fertility desire</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>78(22.9)</td>
<td>26(7.6)</td>
<td>13.043(6.737,25.25)***</td>
</tr>
<tr>
<td>No</td>
<td>20(5.9)</td>
<td>79(23.2)</td>
<td>1.00</td>
</tr>
<tr>
<td>Duration since HIV Dx</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 months to 1 year</td>
<td>27(7.9)</td>
<td>23(6.8)</td>
<td>2.241(1.176,4.27)**</td>
</tr>
<tr>
<td>2 to 4 years</td>
<td>51(15.0)</td>
<td>79(23.2)</td>
<td>1.818(0.942, 3.512)*</td>
</tr>
<tr>
<td>≥5 years</td>
<td>55(16.2)</td>
<td>105(30.9)</td>
<td>1.00</td>
</tr>
<tr>
<td>Disclose HIV status to partner n=223</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>90(40.4)</td>
<td>105(47.1)</td>
<td>3.143(1.22, 8.09)**</td>
</tr>
<tr>
<td>No</td>
<td>6(2.7)</td>
<td>22(9.9)</td>
<td>1.00</td>
</tr>
<tr>
<td>Partner HIV status (n = 203)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive(concordant)</td>
<td>74(36.5)</td>
<td>69(34.0)</td>
<td>1.00</td>
</tr>
<tr>
<td>Negative(discordant)</td>
<td>20(9.9)</td>
<td>40(19.7)</td>
<td>2.15(1.14, 4.02)**</td>
</tr>
</tbody>
</table>

Note: ***p<0.001, **p<0.05
Discussions

Reproductive age PLHIV in the Fitche Hospital North Shoa zone expected to have children and plan similar with HIV-negative reproductive age group in the general population.

The prevalence of fertility desire of PLHIV in this study was 39.1%, which is lower than study conducted in Cape Town South Africa and southwest Nigeria, which account 51% and 63.3%. (27-29). This may be due to different sociodemographic characteristics such as populations, cultural difference...etc and fertility rate..

The current study finding was lower than Ethiopian demographic and health survey of (EDHS2011) (63%) higher than current study (14). It was for general population and limited to those married only.

PLHIV who have fertility desire mentioned the main reasons for their current fertility desire of which 36.8% was wanted at least one child to replaced themselves, 38.3% was did not have desired number of children and 20.3% was believed that by using ART/PMTCT to get HIV free baby (perceived efficacy of PMTCT and ART) and others reasons like to strength their marriage and replacing previously died baby. This is similar with study done in rural Uganda, New Guinea, Rural Malawi, Ethiopia in (Addis Ababa and Nekemte) (21,23,26, 29,53). This indicates that the need for reproductive health services for clients in HIV care settings in order to meet the PLHIV’s diverse reproductive intentions for those who wishing to have children in future.

Multivariable logistic regression indicates that age was significant predictors of fertility desire with age within 18-29 and 30-39 years were 4 and 3.9 times more likely have fertility desire as compared to age 40+ years respectively. This is similar with studies in Brazil, United States, South Africa, Uganda and Nigeria(19, 28, 29, 37,38, 39) have showed that younger PLHIV are more likely to desire (more) children than older PLHIV.

The possible explanation may be that relatively older PLHIV have already achieved, or are closer to achieving, their desired family size than younger PLHIV. This has public health importance as many new HIV infections in Ethiopia are occurring in younger PLHIV.

The number of surviving children was predictor of fertility desires PLHIV who have no biological living children and those who have few or 1 to 3 children were 11.4times and 3.6 times more chance to have fertility desire as compared to those who have more than 4 biological living children.

This finding is in line with other studies done in the United States, Brazil; Nigeria and Malawi and in Ethiopia studies in Addis Ababa and Nekemt town (37,31, 35,21,23,36) and
South Africa(34, 38), Uganda(41, 42). PLHIV, like anyone else, continue to desire (more) children until they achieve their desired family size.

PWLHAs marital length less than 4years, within 5-9years and 10-14 years were 5.5, 4.8 and 2.8times more likely have to fertility desire as compared to those marital lengths more than 15years. The majority of in-depth interview discussants supported this finding, for instance: - as one 30years female discussant stated: “I want to give birth because my husband strongly desire to have children to replace our selves, so I have to get pregnant after one year. I stayed with my husband for 6 six years without having a child and marriage without children is meaningless and does not long last”. This may be due to relatively PLHIV who have longer marital duration have already achieved, or are closer to achieving, their desired family size than shorter marital length PLHIV’.

PLHIV’ faced community pressure for having children was 3.7times more likely have fertility desire as compared to those not faced community pressure for having children. This finding is consistent with studies in many societies and especially in SSA with those who are childless receiving negative social disapproval. The value of children in the identity and social status of men and women applies to PLHIV as well, and so they are under intense pressure from family, spouses and friends to reproduce (4,45, 46, 47).

This finding is supported by majority of in-depth interview discussants, for example: - as one man explained: “Bearing children is important as one with no children is forgotten when died. Wealth shall be transferred to children otherwise it is lost. My parents and community will not respect me and my property. One without child is not considered born and the community called them as mule/infertile endwodi (•• •••••• ••••••••) 45 yrs/ Male, Married 12th grade completed. Having children may re-establish the PLHIV with higher self-esteem, may help them restore a sense of normalcy in family life and health, and alleviate (mitigate) the potentially dehumanizing effects of living with HIV.

Partner fertility desire was 7times more likely have fertility desire as compared to those who have no partner. This is in line with the study done in South Africa and Ethiopia in Addis Ababa, south Wollo and Nekemte town(38,30, 23,26). This suggests that family planning and fertility related issues information should focus on partner as well.

PLHIV duration since HIV-diagnosis less than or equal to ≤1 years was 5 more likely to have fertility desire as compared to those who more than 5year and also the majority of in-depth interviews discussants supported this, for example:-as one man discussant explained:” I need a child strongly. It gives me self esteem and value so, no loneliness. I proved PLWAs can get negative child that is why I desire strongly after five years. I have a three and half
year old negative child which I got after started ART and happy now”.40years/Male married, 10th grade. One explanation would be that the PLHIV enrolled to ART for a longer period might have gone through extensive health education that might have influenced their intentions unlike those that have just enrolled to ART. The influence of longer time since diagnosis of infection probably reflects the cumulative effects of decisions made by individuals who had weighed the consequences of their wish for parenthood over several months or years.

PLHIV disclosure HIV-serostatus to partner was 4times more likely have fertility desire as compared to those who do not disclosed their serostatus to their partner. This finding is not in line with study conducted in Uganda found that those PLHIV with higher scores on social support and internalized stigma were less likely to desire children(4, 47).

This may suggest that perhaps PLHIV may want to have children to avoid stigma and secrete their status and social support may help them overcome the pressure from society to have children and this might be also to ensure family continuity in the future, to have offspring of their own to perpetuate their name and lineage after they die, and to be supported in old age.

PLHIV partners serodifference or discordant was 2 times more likely to have fertility desire. This is in line with other studies conducted in Uganda and Burkina Faso (39, 54). The majority of in-depth interview discussants supported this finding, for instance: - as one 24years female discussant stated: “I want to give birth because my husband, negative, need children to replace our selves so I have to get pregnant soon while my health is good enough. He is committing himself to bare sex even though he is negative as he wanted me give birth before my health gets poor and because there is no any assisted reproductive option for discordant but we can get PMTCT and ART help from hospital but I do not have any fear from child birth and currently pregnant”. This observation could be explained by the fact that, as this study shows it, some young people still ignore the modes of HIV infection. Moreover, the issue of conception would be particularly important as means to avoid partner infection should be vital that needs consideration on alternative options/technologies.

On this research by considering the strength of used qualitative method to supplement the result and also to explore factors that are not addressed by quantitative survey with the limitation of cause and effect relation was not assured.

**Conclusion**

Study revealed that 39.1% of PLHIV have fertility desire with significant predictors of age, marital length, have fewer or no living children, partner fertility desire, community pressure,
duration of HIV-diagnosis, discordant HIV-test result and disclose HIV-serostatus to partner. This reflects that reproductive decisions of PLHIVs are not only affected by their HIV status but also by cultural, social and personal factors in planning future pregnancy.

**Recommendations**

Based on the findings, the following recommendations were forwarded:-

Policy makers and Ministry of Health need to consider and plan for the implications of increased numbers of PLHIV who may choose to have children and should give greater emphases to address PLHIV’s fertility issues in more comprehensive manner.

Policy makers and health planners should plan and adapted assisted reproductive option/technologies for discordant partner which contribute to decrease HIV- new infections to sexual partner and new born.

Health professionals at different levels of institution should to be discontinuing from the conventional systematic advice against pregnancy but, in addition to laying emphasis on the risks, provide adequate information on the efficacy of PMTCT and practicable reproductive options for HIV-positive individuals.

Health professional’s work in ART clinics should be given attention for those coming for VCT and PIHCT by providing health messages about fertility, vertical transmission of HIV for discordant couples in this context is vital to ensuring informed reproductive decisions in these populations and also encourage on disclosure of HIV-serostatus to their partner.

**Acronyms**

AIDS------------------Acquired Immunodeficiency Syndrome  
ART-------------------Antiretroviral Therapy  
AOR-----------------Adjusted Odd Ratio
COR.............................Crude Odd Ratio
HAART -------------------Highly Active Antiretroviral Therapy
EDHS ----------------------Ethiopian Demographic and Health Survey
ETB------------------------Ethiopian Birr
FHAPCO----------------Federal HIV/AIDS prevention and control office
FMOH --------------------Federal Ministry of Health
HIV ----------------------Human Immunodeficiency Virus
JU..............................Jimma University
MTCT---------------------Mother –To- Child Transmission
PMTCT------------------Prevention of Mother to Child Transmission
PLWHA -------------------People living with HIV/AIDS
SPSS---------------------Statistical Package for Social Sciences
SSA------------------------Sub Saran African
UNAIDS------------------Joint United Nations Programme on HIV/AIDS
WHO ----------------------World Health Organization.

Authors’ contributions
Dereje Bayissa:-conceptualized the study, designed the study instrument collected the data and conducted the data analysis and wrote the first draft of the manuscript.
All co-authors:- Bosena Tebeje and Temamen Tesfaye contributed to revision of the subsequent draft manuscripts and approved the final and this version of the manuscript.

Competing interests
The authors declare that they have no competing interests and also there was no any non-financial competing interest (political, personal, religious, ideological, academic, intellectual, commercial or any other) in relation to this manuscript.

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