

# Fertility intention and use of contraception among women living with the human immunodeficiency virus in Oromia Region, Ethiopia

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**Background:** The human immunodeficiency virus (HIV) epidemic resulted in decreased fertility among HIV-positive women, who did not want to transmit the virus to their unborn children. With the availability of antiretroviral therapy that suppresses viral load, HIV-infected women live normal lives and even acknowledge the desire and intention to have children, a factor that is rarely acknowledged in antiretroviral therapy (ART) clinic services. This study examined fertility intentions and contraception use among a sample of women attending an ART clinic in Oromia Region, Ethiopia.

**Methods:** A quantitative, cross-sectional and descriptive design was used on a sample of 362 HIV-positive women. Data were collected using a researcher-administered questionnaire.

**Results:** The ages of the participants ranged from 18 to 49 years and most were between the ages of 23 and 32. A desire and intention to fall pregnant was reported by 46.6% ( $n = 158$ ) of the participants. A total of 114 (35.5%) had given birth after they were diagnosed with HIV and 4% were pregnant at the time of the study. Of the study participants who wanted to have children, 60.7% ( $n = 82$ ) planned to have a child within two years. In the period before they were diagnosed with HIV, most participants used injectable contraceptives but this changed to using the condom after they were diagnosed with HIV.

**Conclusion:** The high number of women who have both the desire and intention to have children among this sample of HIV-positive women requires that reproductive health services need to include family planning as an essential component of reproductive health services. The change to using the condom as a contraceptive method indicates the positive impact of health promotion received at ART clinic.

**Keywords:** contraception use, fertility intention, HIV infections, pregnant women

## Introduction

The sub-Saharan Africa region remains most affected by HIV, accounting for an estimated 67% of the global prevalence of infections, and women of reproductive age account for the majority of the people living with HIV. Compared with other African countries, the overall HIV prevalence in Ethiopia has remained, being reported at 1.14% nationally and even lower in rural areas (WHO Regional Office for Africa, 2014). However, as with other African countries, women disproportionately account for higher prevalence of the HIV-positive population.<sup>1-3</sup>

Reductions in births among HIV-infected women occurred because of reduced intention to have children.<sup>4</sup> However, from the early 2000s, the desire to have children among these women showed increasing trends because of the improved quality of life and survival following the commencement of anti-retroviral treatment and tailor-made reproductive health services.<sup>5</sup> In fact, the availability of ART seems to have increased HIV-positive women's desire and intention to have children to levels approaching those of the general population.<sup>6</sup>

A focus on reproductive health has been credited to the global successes achieved in the improvement of maternal and child health services in the past decade.<sup>7</sup> However, this success needs to be enhanced in the face of renewed desire to have children by People Living With HIV and AIDS (PLWHA). This therefore requires significant investments in sexual and reproductive health services to cater for the needs of this group of women. In practice, there are limited reproductive health services for HIV-positive people, and the few that are available are limited to prevention of pregnancy.

Among reasons cited for lack of these services is that health facilities are not ready to discuss fertility desires for HIV-positive women, partly due to limited human and financial resources.<sup>8</sup>

The intention to have children among African HIV-positive women may be influenced by, among others, the fact that in many African societies a woman's identity, position and status is influenced by the ability to bear children. Furthermore, this ability affects her social standing, individual recognition, partnership stability and, through these conventions, her financial security.<sup>9</sup> In actuality, among African populations, failure to have children has been associated with negative social consequences, including domestic violence.<sup>10,11</sup>

In sub-Saharan Africa, where the HIV prevalence is highest, the traditional roles of women, the socio-cultural importance of motherhood, and a woman's partner's desire for children, independent of her own desire, may be significant predictors of pregnancy and childbirth. The infection rate among pregnant women in sub-Saharan Africa is also alarmingly high, where 90% of global new child infections occur through mother-to-child transmission (MTCT).<sup>12</sup>

The fertility intentions of HIV-infected women are affected by the same community and cultural norms as those of uninfected women, and are generally similar to those of uninfected women. However, these intentions are seldom acknowledged in the planning and provision of reproductive health services.<sup>13</sup>

A significant factor that prevented women living with HIV and AIDS (WLHA) from fulfilling their desire for motherhood was the

fear of transmitting infection to the child, which has changed since the successful implementation of Prevention of Mother-To-Child-Transmission programme.<sup>14</sup> For many women, the desire to have children is determined by social and personal expectations, with women who desire to have children being more likely to be married or to have a partner. Other studies found that for HIV-positive people, reproductive potential, demographic characteristics, ethnicity, marital status, fertility status and partner's HIV status influenced the desire for a child, whereas the person's own clinical condition in relation to HIV had little or no impact.<sup>15,16</sup>

With a population of about 100 658 562, Ethiopia is the second most populous country in Africa. The fertility rate in rural Ethiopia is nearly two and half times greater than in urban centres (6.0 versus 2.4). Among the nine regional states under the Federal Government of Ethiopia, Oromia Region has the highest fertility rate of about 6.2 children per woman, contrasting with Addis Ababa, with a below-replacement level of fertility of 1.4 children per woman (Ethiopian Demographic Health Survey, 2011).<sup>17</sup> Oromia is also the largest population of the nine regions, which is estimated at 28.8 million.<sup>18</sup>

Contraceptive use in Ethiopia is very low,<sup>19,20</sup> with only 14.7% of married women nationally, and 13.6% in Oromia Regional State using any method of contraception.<sup>17</sup> Concerns have been raised about uncontrolled fertility, which has adversely influenced the socio-economic, demographic and environmental situations in the country.<sup>21</sup> Promotion of the use of contraception has been identified as an effective tool for this situation. A high level of education, being married, and current use of ART have been positively associated with the use of contraception.<sup>22</sup>

Literature has indicated that, age, marital status, level of education and the number of children significantly influenced the desire for children among HIV-infected individuals.<sup>23,24</sup> On the contrary, the disclosure of one's seropositive status to the partner/spouse is associated with a lesser desire for children. Concerns expressed by women about the possibility of bearing HIV-positive children include the impact of pregnancy on their own health, and what will happen to their children in the event of their death.<sup>23</sup> On the other hand, the high social value placed on children has a significant influence towards the desire to have children among many African women,<sup>24,25</sup> including those that are HIV positive. Childbearing is also a human rights issue that should not be denied to HIV-positive people.<sup>26</sup>

The fertility intention and use of contraception of HIV-positive women are influenced by their culture, their level of education, their socio-economic status, and the condition of their health.<sup>13,27</sup> Despite the growing importance of fertility considerations and options for HIV-infected women in Ethiopia, little is known about their actual fertility intentions and utilisation of contraception, hence this study.

The objectives of the study were to examine the fertility intentions of a sample of women living with HIV/AIDS, and to describe the utilisation of contraception methods used by this sample.

## Methods

This cross-sectional quantitative study was conducted among women who attended the HIV clinic in Adama Hospital Medical College, in Oromia Region, Ethiopia, which is a government-owned hospital that provides ART services at no cost to the

patient. The population consisted of an estimated 4 000 HIV-positive women who receive ART services at the ART clinic every month. A non-probability sampling technique was implemented to select a minimum sample of convenience of 368 participants, which was obtained using the Raosoft sample size calculator.

The women were approached by the researcher or research assistants while awaiting their turn to get services at the clinic. The purpose of the study was briefly explained and they were requested to participate. Those who agreed were given more details and invited to be interviewed in private.

Data were collected by the use of a self-developed questionnaire, which was translated from English to the local Amharic language. Preparation for data collection included the training of two data collectors on research methods, ethics and the use of the data collection tool.

SPSS® version 20 (IBM Corp, Armonk, NY, USA) was used to analyse the data for frequency distributions and measures of central tendency, and logistic regression was employed to test for associations between variables, using a 5% statistical level of significance

The study obtained ethics approval from the Ethics Committee of the Department of Health Studies at UNISA. Permission to conduct the study was granted by the Oromia region Health Bureau, as well as the board and management of Adama Hospital Medical College. Informed consent was obtained from each participant before administering the interview schedule.

## Results

Of the 368 eligible clients sampled in the ART treatment clinic during the study period, 362 agreed to participate in the study, giving a response rate of 98.4%. The age range of the participants was 18 to 49 years. Some 30.4% ( $n = 110$ ) of the respondents were in the age group 28–32, and 27.6% ( $n = 100$ ) were between 23 and 27 years old.

The majority of the respondents (71.8%;  $n = 260$ ) were Orthodox Christians. The Oromo ethnicity was 44.2% ( $n = 160$ ) and 30.9% ( $n = 112$ ) were Amharas. A significant number of the respondents (21.5%;  $n = 78$ ) were illiterate. More than half of them (63.5%,  $n = 230$ ) were married, while 16.3% ( $n = 59$ ) were divorced and 13% ( $n = 47$ ) were widowed. The sample consisted of 27.07% ( $n = 98$ ) housewives while 20.9% ( $n = 76$ ) were daily labourers. A significant number (30.7%;  $n = 111$ ) did not have a monthly income, whereas 20.7% ( $n = 75$ ) of the respondents' incomes were within the range 201–400 ETB (Ethiopian Birr), and 19.3% ( $n = 70$ ) of the study participants' incomes were between 401 and 600 ETB. Birr. Table 1 shows the socio-demographic characteristics of the participants.

## Gravida history and fertility intention

Table 2 shows the frequency distributions of fertility intentions of the 172 participants who reported the desire to have children in the future. The majority of the participants (88.7%;  $n = 321$ ) had previously given birth, with 44.2% ( $n = 142$ ) of them having had 2–3 live births, and 38.3% ( $n = 107$ ) had given live birth to one child. Some 35.5% ( $n = 114$ ) had given birth after they were diagnosed with HIV. The majority (70.3%;  $n = 232$ ) had planned their last pregnancy, whereas 29.7% ( $n = 98$ ) had had an unplanned last pregnancy.

**Table 1:** Demographics of the participants

Variables	Frequency and %
<b>Age groups</b>	
18–22	17 (4.7)
23–27	100 (27.6)
28–32	110 (30.4)
33–37	64 (17.7)
38–42	52 (14.4)
43–47	19 (5.2)
Total	362
<b>Religion</b>	
Orthodox	260 (71.8)
Catholic	6 (1.7)
Muslim	29 (10.8)
Protestant	54 (14.9)
Other	3 (0.8)
Total	362
<b>Ethnicity</b>	
Oromo	160 (44.2)
Amhara	112 (30.9)
Gurage	51 (14.1)
Tigre	33 (9.1)
Other	6 (1.7)
Total	362
<b>Marital status</b>	
Married	230 (63.5)
Single	20 (5.5)
Widowed	47 (13.0)
Divorced	59 (16.3)
Unmarried	6 (1.7)
Total	362

At the time of data collection 4% ( $n = 14$ ) of the study participants were pregnant, whereas 96% ( $n = 348$ ) were not pregnant. The proportion of those that had future fertility desires was 46.6% ( $n = 158$ ) and 47.2% ( $n = 160$ ) had no future fertility intention. Of the study participants who wanted to have children, 31.1% ( $n = 42$ ) of them planned to have a child within a period of less than two years, 29.6% ( $n = 40$ ) of the women wanted to have children two years later, and 8.15% ( $n = 11$ ) were uncertain about when they would like to have children.

Ensuring the continuation of posterity was the most frequently stated reason for wanting to have children, with attempt to hide the HIV-positive status (in their communities being pregnant was perceived to confirm negative HIV status, as HIV-positive women were discouraged from falling pregnant) and the partner wanting a child less frequently stated.

Of the women aged 23–27 years, 37.7% ( $n = 58$ ) stated their fertility intention, and 32.7% ( $n = 55$ ) of the women in the age group of 28–32 have a fertility intention. Of those with fertility intentions, 74.4% ( $n = 120$ ) were Orthodox in religious affiliation.

**Table 2:** Frequency distributions of fertility intentions

Variables	Frequency/number (%)
<b>Ever given birth</b>	
Yes	321 (88.7)
No	41 (11.3)
Total	362
<b>Number of children</b>	
1	8 (2.5)
2	111 (34.6)
3	91 (28.3)
4+	111 (34.6)
Total	321
<b>Given birth after learning of HIV-positive status</b>	
Yes	114 (35.5)
No	207 (64.5)
Total	321
<b>Desire to have children in the future</b>	
Yes	172 (47.5)
No	190 (52.5)
Total	362
<b>Number of intended children in the future</b>	
None	25 (6.9)
One	33 (9.1)
Two	73 (20.2)
Three	35 (9.7)
More than 3	6 (1.7)
Total	172
<b>Reason for desire to give birth</b>	
To hide HIV-positive status from people	9 (5.2)
To avoid stigma and discrimination	13 (7.6)
To replace my heredity	118 (68.6)
My partner wants a child	9 (5.2)
Other	23 (13.4)
Total	172

**Table 3:** Fertility intentions with the socio-demographic variables

Variables	Fertility intention		OR	p-value
	Yes			
<b>Age groups</b>				
38–42	13 (7.6)	39 (20.5)	0.24 (0.11-0.54)	0.00
<b>Educational level</b>				
Secondary education	30 (17.4)	12 (6.6)	2.85 (1.22-6.75)	0.01
<b>Ethnicity</b>				
Gurage	35 (20.3)	16 (8.4)	2.30 (1.12-4.74)	0.02
<b>Marital status</b>				
Widowed	5 (2.9)	42 (22.1)	0.11 (0.04-0.29)	0.00
<b>Monthly income (ETB)</b>				
401–600	24 (14.0)	46 (24.2)	0.49 (0.25-0.96)	0.03

Of the illiterate participants, 25% ( $n = 43$ ) had fertility intentions. A significant proportion of the married women (70.9%,  $n = 120$ ) had fertility intentions, and 33.1% ( $n = 57$ ) of the women with no income also had fertility intentions. The fertility intentions with significant values are reflected in Table 3.

### Contraception use

A significant proportion of the participants (47.5%,  $n = 172$ ) had fertility intention, and 65.7% ( $n = 113$ ) of these were using contraception before they were diagnosed with HIV, with injectable contraceptives being the most frequently used. Of the total of 172 of the study participants who stated their fertility intention, 68% ( $n = 117$ ) reported using contraceptives after HIV

diagnosis. At the time of the study, 58.2% ( $n = 96$ ) of the women who reported using contraceptives had fertility intentions. In all, 50% of the women ( $n = 48$ ) who reported using contraceptives at the time of the study were using injectables and 34.4% ( $n = 33$ ) were using condoms. Table 4 shows the statistically significant variables associated with fertility intentions.

### Discussion

Globally, health systems often fail to acknowledge the desires of HIV-infected women to have children, and this has resulted in failure to provide appropriate related services for these women. In areas of high HIV prevalence, health services often emphasise antiretroviral therapy (ART) and other health care services, but disregard issues of fertility and childbearing among this group of people. Often the determinants of fertility intentions among HIV-infected women are not known, and inadequate attention is paid to this area of reproductive life of a section of the population.

Studies have linked fertility desire with increased adherence to ART among females, and thus highlight the need to incorporate fertility-related counselling and contraception advice in HIV treatment services.<sup>27</sup> Because fertility desires may change over time, fertility-related counselling and contraception advice require ongoing assessment and long-term care.

This study showed a high proportion (47.5%;  $n = 172$ ) of HIV-positive women who wished to have children, and this is much higher than the 16% reported in Uganda,<sup>28</sup> the 19.2% in Brazil<sup>29</sup> and the 25.8% previously reported by Ogilvie in Canada.<sup>6</sup> It was, however, consistent with the results reported in Addis Ababa, where 44.7% of the respondents expressed the desire for children.<sup>23</sup> This suggests that the desire to have children among HIV-positive women may be higher in Ethiopian communities than in other countries. Interestingly, more HIV-positive women than men reported the desire for children even though they already have children,<sup>23</sup> which suggests that among African women the desire to have children is a much more complex matter than just the wish to continue posterity.

The results also showed that 43.6% ( $n = 75$ ) of the participants who wished to have children planned to have children within a period of less than two years, 34.3% ( $n = 59$ ) wanted to have children over a period exceeding two years, and 20.3% ( $n = 35$ ) were not specific about when they would want to have children. The reproductive decisions in HIV-positive women are not only affected by their HIV status but depend on different factors, especially not having a child previously, and being married or in a relationship. Large numbers of HIV-positive women with no income, housewives, those that are illiterate, and women in the age group 28–32 years had the intention to fall pregnant. In another study conducted in Canada, being of African origin was a significant predictor of wishing to have children among HIV-positive women, which may explain these findings.<sup>24</sup>

The most prevalent family planning method among the HIV-positive women before their HIV diagnosis was injectables, which changed to condoms after the HIV-positive diagnosis. Similar results of condom use being the preferred contraceptive among HIV-positive women in Kenya were also reported.<sup>30</sup> The finding that many HIV women in this sample wanted to have children in the near future are similar to a study conducted in Lesotho<sup>31</sup> and this has significant implications for the transmission of HIV to sexual partners and to newborns.

**Table 4:** Fertility Intention

Variables	Fertility intention		Crude OR	p-value
	Yes	No		
<b>Types of contraceptive</b>				
Condom	30 (18.8)	11 (7.7)	3.52 (1.58–7.97)	0.00
Pills	21 (13.1)	44 (30.8)	0.38 (0.20–0.73)	0.01
Injectable	87 (52.5)	70 (48.9)	0.50 (0.28–0.91)	0.02
<b>Ever used FP after HIV-positive status known?</b>				
Yes	117 (68.0)	104 (54.7)	0.57 (0.36–0.89)	0.01
No	55 (32.0)	86 (45.3)		
Total	172	190		
<b>Discussed reproductive health topics with counsellors?</b>				
Yes	133 (77.3)	129 (67.9)	0.62 (0.38–1.02)	0.05
No	39 (22.7)	61 (32.1)		
<b>Topics to discuss</b>				
Current contraceptive use	83 (23.9)	104 (25.9)	2.51 (1.38–4.56)	0.00
MTCT of HIV	91 (26.1)	116 (28.9)	4.12 (2.00–8.62)	0.00
Condom utilisation	85 (24.4)	107 (26.7)	2.75 (1.48–5.11)	0.00
<b>Discussed FP with health providers?</b>				
Yes	140 (81.4)	128 (67.4)	0.47 (0.28–0.79)	0.00
No	32 (18.6)	62 (32.6)		
<b>Methods used</b>				
Abstinence	75 (14.2)	86 (15.2)	1.77 (1.05–3.01)	0.03
Condom	112 (21.3)	119 (21.0)	3.31 (1.41–7.92)	0.00
Pills	72 (13.7)	83 (14.6)	1.74 (1.03–2.94)	0.03
Tubal ligation	56 (10.6)	70 (12.3)	0.55 (0.33–0.92)	0.02
<b>Do you intend to use contraception methods in future?</b>				
Yes	39 (69.0)	10 (14.7)	16.16 (6.00–44.91)	0.00
No	14 (31.0)	58 (52.3)		

The desire to have children in this group of HIV-positive women requires that this factor be integrated into counselling content in the services offered in the ART clinic. This desire does not impact only on their being sero-positive, and therefore the need to consider the risk of HIV transmission to the child, but also the difficulty of combining being a parent with the constraints of their illness. However, considering the high value of childbearing in Ethiopian society, it is recommended that systematic counselling on reproductive options be offered to all ART clinic attendees. This will assist them in making informed reproductive choices rather than taking a risk of transmitting HIV to their partners.<sup>32</sup> Moreover, there are reports of unmet reproductive counselling needs among HIV-positive women, and health services at health facilities should address this unmet need.<sup>33-35</sup> Health services should therefore intentionally enquire about, plan and implement reproductive health needs and intentions of HIV-positive women, which will provide a comprehensive service.<sup>36</sup>

## Conclusion

Although most HIV prevention programmes seem to focus on prevention of pregnancy among HIV-positive women, this study has demonstrated that the desire and intention to have children among this group of women cannot be disregarded and ignored. Reproductive health care services in ART clinics need to integrate these desires into reproductive care services. With availability of ART and an increased ability to live a normal life, the desire and intention to have children among HIV-positive women has been invigorated and this needs to be acknowledged and integrated into reproductive health services, as recommended by previous studies.<sup>24,37</sup>

## References

1. Abdool Karim Q, Sibeko S, Baxter C. Preventing HIV Infection in women: a global health imperative. *Clin Infect Dis*. 2010;50(s3):S122-9. <http://dx.doi.org/10.1086/651527>
2. Baral S, Beyrer C, Muessig K, et al. Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Infect Dis*. 2012;12(7):538-49. [http://dx.doi.org/10.1016/S1473-3099\(12\)70066-X](http://dx.doi.org/10.1016/S1473-3099(12)70066-X)
3. Dellar RC, Dlamini S, Karim QA. Adolescent girls and young women: key populations for HIV epidemic control. HIV and adolescents: focus on young key populations; 2015. p. 64.
4. Yeatman S. The impact of HIV status and perceived status on fertility desires in rural Malawi. *AIDS Behav*. 2009;13(S1):12-9. <http://dx.doi.org/10.1007/s10461-009-9534-1>
5. Myer L, Carter RJ, Katyal M, et al. Impact of antiretroviral therapy on incidence of pregnancy among HIV-infected women in sub-Saharan Africa: a cohort study. *PLoS Med*. 2010;7(2):e1000229. <http://dx.doi.org/10.1371/journal.pmed.1000229>
6. Ogilvie GS, Palepu A, Remple VP, et al. Fertility intentions of women of reproductive age living with HIV in British Columbia, Canada. *AIDS*. 2007;21:S83-8. <http://dx.doi.org/10.1097/01.aids.0000255090.51921.60>
7. Mascarenhas MN, Flaxman SR, Boerma T, et al. National, regional, and global trends in infertility prevalence since 1990: a systematic analysis of 277 health surveys. *PLoS Med*. 2012;9(12):e1001356. <http://dx.doi.org/10.1371/journal.pmed.1001356>
8. Rossi ADS, Amaral E, Makuch MY. Access of people living with HIV to infertility services: perspective of Brazilian healthcare professionals. *AIDS Care*. 2011;23(10):1329-35. <http://dx.doi.org/10.1080/0954012.1.2011.564113>
9. Ombelet W, Cooke I, Dyer S, et al. Infertility and the provision of infertility medical services in developing countries. *Hum Reprod Update*. 2008;14(6):605-21. <http://dx.doi.org/10.1093/humupd/dmn042>
10. Ola TM. The socio-cultural perception and implications of childlessness among men and women in an urban area, Southwest Nigeria. *J Soc Sci*. 2009;21(3):205-9.
11. Dhont N, van de Wijgert J, Coene G, et al. 'Mama and papa nothing': living with infertility among an urban population in Kigali, Rwanda. *Hum Reprod*. 2011;26(3):623-9. <http://dx.doi.org/10.1093/humrep/deq373>
12. World Health Organization. Sexual and reproductive health of women living with HIV/AIDS: guidelines on care, treatment and support for women living with HIV/AIDS and their children in resource-constrained settings. Geneva: World Health Organization; 2006.
13. Cooper D, Harries J, Myer L, et al. "Life is still going on": reproductive intentions among HIV-positive women and men in South Africa. *Soc Sci Med*. 2007;65(2):274-83. <http://dx.doi.org/10.1016/j.socscimed.2007.03.019>
14. Liamputtong P. Women, motherhood, and living with HIV/AIDS: an introduction. In: Women, motherhood and living with HIV/AIDS. Dordrecht: Springer, Netherlands; 2013. p. 1-24. <http://dx.doi.org/10.1007/978-94-007-5887-2>
15. Heard I, Sitta Rémi. Reproductive choice in men and women living with HIV: evidence from a large representative sample of outpatients attending French hospitals (ANRS-EN12-VESPA Study). *AIDS*. 2007;21(suppl 1):S77-82. <http://dx.doi.org/10.1097/01.aids.0000255089.44297.6f>
16. Macro ORC. Central Statistical Agency: Ethiopia Demographic and Health Survey 2005. Calverton (MD): ORC Macro; 2006.
17. Macro ORC, Measure DHS. Ethiopia Demographic and Health Survey, 2011: preliminary report. Addis Ababa: Central Statistical Agency; 2011.
18. Bekele A, Fleming K, Habtamu Z, et al. The association of TB with HIV infection in Oromia Regional National State, Ethiopia in 2006/7. *Ethiop J Health Dev*. 2009;23(1):63-7.
19. Assefa H, Tekleab M, Misganaw F. Family planning. In: Kloos H, editor. Ethiopia in epidemiology and ecology of health and disease in Ethiopia. Addis Ababa: Shama Books; 2006. p. 2-3.
20. Mekonnen W, Worku A. Determinants of low family planning use and high unmet need in Butajira District, South Central Ethiopia. *Reprod Health*. 2011;8(1):1.
21. Alene GD, Worku A. Estimation of the total fertility rates and proximate determinants of fertility in North and South Gondar zones, Northwest Ethiopia: an application of the Bongaarts' model. *Ethiop J Health Dev*. 2009;23(1):1-8
22. Andia I, Kaida A, Maier M, et al. Highly active antiretroviral therapy and increased use of contraceptives among HIV-positive women during expanding access to antiretroviral therapy in Mbarara, Uganda. *Am J Pub Health*. 2009;99(2):340-7. <http://dx.doi.org/10.2105/AJPH.2007.129528>
23. Tamene W, Fantahun M. Fertility desire and family-planning demand among HIV-positive women and men undergoing antiretroviral treatment in Addis Ababa, Ethiopia. *Afr J AIDS Res*. 2007;6(3):223-7. <http://dx.doi.org/10.2989/16085900709490418>
24. Loutfy MR, Hart TA, Mohammed SS, et al. Fertility desires and intentions of HIV-positive women of reproductive age in Ontario, Canada: a cross-sectional study. *PLoS ONE*. 2009;4(12):e7925. <http://dx.doi.org/10.1371/journal.pone.0007925>
25. Peltzer K, Chao LW, Dana P. Family planning among HIV positive and negative prevention of mother to child transmission (PMTCT) clients in a resource poor setting in South Africa. *AIDS Behav*. 2009;13(5):973-9. <http://dx.doi.org/10.1007/s10461-008-9365-5>
26. Gruskin S, Ferguson L, O'Malley J. Ensuring sexual and reproductive health for people living with HIV: an overview of key human rights, policy and health systems issues. *Reprod Health Matters*. 2007;15(29):4-26. [http://dx.doi.org/10.1016/S0968-8080\(07\)29028-7](http://dx.doi.org/10.1016/S0968-8080(07)29028-7)
27. Myer L, Morroni C, Rebe K. Prevalence and determinants of fertility intentions of HIV-infected women and men receiving antiretroviral therapy in South Africa. *AIDS Patient Care STDS*. 2007;21(4):278-85. <http://dx.doi.org/10.1089/apc.2006.0108>
28. Nakayiwa S, Abang B, Packer L, et al. Desire for children and pregnancy risk behavior among HIV-infected men and women in Uganda. *AIDS Behav*. 2006;10(5):95-104. <http://dx.doi.org/10.1007/s10461-006-9126-2>
29. Paiva V, Santos N, França-Junior I, et al. Desire to have children: gender and reproductive rights of men and women living with HIV: a challenge to health care in Brazil. *AIDS Patient Care STDS*. 2007;21(4):268-77. <http://dx.doi.org/10.1089/apc.2006.0129>
30. Mutiso SM, Kinuthia J, Qureshi Z. Contraceptive use among HIV infected women attending Comprehensive Care Centre. *East Africa Med J*. 2008;85(4):171-7.

31. Adair T. Unmet need for contraception among HIV-positive women in Lesotho and implications for mother-to-child transmission. *J Biosoc Sci.* 2009;41(02):269–78. <http://dx.doi.org/10.1017/S0021932008003076>
32. Kirunda I, Livesley N, Zainab A, et al. Strategies used by facilities in Uganda to integrate family planning into HIV care: what works and what doesn't. *Afr J Reprod Health.* 2010;14(4):149–50.
33. Craft SM, Delaney RO, Bautista DT. Pregnancy decisions among women with HIV. *AIDS Behav.* 2007;11(6):927–35. <http://dx.doi.org/10.1007/s10461-007-9219-6>
34. Stanwood N, Cohn S, Heiser J, et al. Contraception and fertility plans in a cohort of HIV positive women in care. *Contraception.* 2007;75:294–8. <http://dx.doi.org/10.1016/j.contraception.2006.12.012>
35. Kikuchi K, Wakasugi N, Poudel, KC, et al. High rate of unintended pregnancies after knowing of HIV infection among HIV positive women under antiretroviral treatment in Kigali, Rwanda. *BioSci Trends.* 2011;5(6):255–63. <http://dx.doi.org/10.5582/bst.2011.v5.6.255>
36. Finocchiaro-Kessler S, Dariotis JK, Sweat MD, et al. Do HIV-infected women want to discuss reproductive plans with providers, and are those conversations occurring? *AIDS Patient Care STDS.* 2010;24(5):317–23. <http://dx.doi.org/10.1089/apc.2009.0293>
37. Cooper D, Moodley J, Zweigenthal V, et al. Fertility intentions and reproductive health care needs of people living with HIV in Cape Town, South Africa: implications for integrating reproductive health and HIV care services. *AIDS Behav.* 2009;13(51):38–46. <http://dx.doi.org/10.1007/s10461-009-9550-1>

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