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Contraception and fertility plans in a cohort of HIV-positive women in care

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Abstract

Objective: To examine determinants of contraceptive use, desired future childbearing, and sterilization regret among HIV-positive women.

Methods: 118 HIV-positive women, age 18-46, receiving care at a University HIV Clinic completed a survey on their reproductive history in 2004. We reviewed their medical records for contraception, antiretroviral medications and HIV/AIDS disease markers. We performed descriptive analysis of population characteristics and logistic regression to assess predictors of their desire to have future children.

Results: Subjects had a median age of 37, had been diagnosed with HIV for a mean of 9.2 years and 55% had AIDS. Most (68%) subjects were currently monogamous and 29% were abstinent. Forty-seven percent had been sterilized and of those who were sexually active but not sterilized, 90% were using reversible contraception. One-third of subjects desired future childbearing, including 12% of those who had been previously sterilized. In a multivariate analysis, predictors of desire for future childbearing were: younger age, not being on HIV medication, higher current CD4 cell count and having a relationship duration of less than 2 years.

Conclusion: HIV-positive women have reproductive patterns similar to HIV-negative women, with most having borne children and many wanting children in the future. A substantial proportion has been sterilized and express sterilization regret. Potent antiretroviral therapy has greatly improved the outlook for HIV-infected women, even those with an AIDS diagnosis. Many HIV-positive women want to have children and would benefit from preconception counseling and counseling about reversible methods of contraception.

Keywords

Contraception; HIV; AIDS; Anti-retroviral; Tubal ligation

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1. Introduction

Half of the over 40 million people living with human immunodeficiency virus or acquired immunodeficiency syndrome (HIV/AIDS) worldwide are women [1]. Since the introduction of highly active antiretroviral therapy (HAART) in 1996, there have been dramatic reductions both in morbidity and mortality among men and women with HIV [2-7], such that many patients and providers view HIV as a chronic but manageable infection [8]. Like other women of reproductive age, many HIV-positive women desire childbearing and parenthood despite having a chronic illness. HIV-infected women also want safe and effective contraception to prevent unintended pregnancies, prevent acquisition of sexually transmitted infections (STIs), and prevent transmission of HIV to their sexual partners.

It is unclear whether advances in HIV therapy and the success of HAART over the past decade have affected fertility desires and contraceptive use patterns of HIV-infected women in care. The HIV Cost and Services Utilization Survey found 89% of heterosexually active HIV-infected women reported using at least one contraceptive method in the past 6 months. Seventy-eight percent of women used male condoms, 33% had a tubal ligation and 5% used oral contraceptives [9]. Prior studies suggest that the rate of pregnancy after HIV diagnosis ranges from 18%-40%, with lower pregnancy rates than prior to HIV diagnosis [10-12]. Interview data found that 29% of HIV-infected women wanted to have children in the future [10].

The purpose of this study was to examine correlates of contraceptive use, desire for future fertility and potential for sterilization regret among women cared for in a university HIV clinic. We hypothesized that the advice to use barrier protection consistently to prevent STI acquisition and HIV transmission to partners might result in lower rates of use for other forms of reversible contraception such as hormonal methods, and that permanent sterilization might be associated with decreased condom use. We also hypothesized that HIV disease severity would influence women's plans for future childbearing.

2. Methods

From January through June 2004, we recruited a convenience sample of 118 HIV-positive women from the Infectious Diseases (ID) Clinic at the University of Rochester Medical Center. This clinic is staffed by ID specialists and had 843 HIV-positive patients in care with 36% women. Women who were not fluent in written and spoken English, who were incarcerated or currently pregnant were not eligible. All female patients ages 18 to 45 who presented for HIV care during the study interval were asked to participate. No patients declined to participate though some chose to complete the survey during a subsequent clinic visit. The Research Subjects Review Board at the University of Rochester approved this study protocol and all subjects provided written informed consent.

Subjects completed a self-administered, eight-page, 60-question written survey and received \$5.00 cash reimbursement. For confidentiality, subjects completed the survey in the exam room by themselves while waiting for the clinician. The survey queried each subject's demographics, reproductive history and plans, contraceptive experience and use, condom use (male or female), and general state of health. We then reviewed the medical record of each subject, abstracting data on: current HIV medications, current contraceptive medication, past contraceptive methods, history of sterilization (tubal ligation or hysterectomy), most recent HIV viral load, most recent CD4 count (most within one month of the survey), lowest recorded CD4 count, stage of HIV/AIDS disease, health insurance type, and age. We found that a substantial number of subjects did not self-report their tubal ligations. Although the tubal ligation history was recorded in the medical record, the date of the surgery could not be reliably verified.

We performed descriptive analysis of population characteristics using chi-square or Fisher's exact tests for categorical variables and t-tests for continuous variables. We compared contraceptive methods used before and after HIV diagnosis using Fisher's exact tests or chi-squared tests. We performed bivariate analyses of demographic and HIV disease factors looking for associations for desire for future childbearing. We then assessed the predictors of a subject's desire to have future children using multivariable logistic regression, including those variables which were associated with a future childbearing in bivariate analyses with a $p \geq 0.2$.

3. Results

The 118 subjects had a median age of 37, ranging from 21 to 46 years old. Their racial and ethnic diversity was similar to that of the clinic population - 53% Black, 33% White and 9% Hispanic - with the exception of a lower percentage of Hispanic women (9% versus 20%). This lower rate of Hispanic subjects was due to our inclusion of women who were able to complete the survey in English. Eighty-seven percent of subjects had government health insurance, 41% had not completed high school, and one-third worked outside the home.

Most (68%) subjects were currently monogamous with one man and most of the remaining subjects (29%) were abstinent. Two of the subjects were in exclusively lesbian relationships. Of those not abstinent from heterosexual intercourse, 66% reported that their male partner was HIV-negative and 26% that their male partner was HIV-positive. The average age on sexual debut was 15 years and 37% reported more than 20 lifetime sexual partners. Half were never married. Of those who reported their primary risk behavior for HIV, 79% said it was through heterosexual sex and 13% through shared needles.

Women had been diagnosed with HIV a mean of 9.2 years and 55% had AIDS. Median CD4 count was 456 and 49% had a viral load under 1,000 copies. Overall, 59% were on potent antiretroviral medications and 41% were on no antiretroviral medications. Of those not on medications, most were appropriately not on therapy due to low HIV RNA and/or high CD4 counts rather than non-compliance. Of those with AIDS, 80% were on antiretroviral medications. Twenty-seven percent rated their own health as fair or poor.

Of those not abstinent, 76% were currently using male or female condoms. Of these, 97% said the primary reason they used condoms was to prevent their partner from getting HIV and 60% said to prevent pregnancy. Subjects who reported that their partner was HIV-negative were significantly more likely to use condoms most of the time with each coitus (80%) than those who reported their partner to be HIV-positive (50%) or did not know their partner's status (43%), $p = 0.025$. Of subjects not using condoms, the most common (44%) reason for not using them was that their sexual partner did not like to use condoms (male or female).

When asked what methods of contraception they had **ever** used before and then after their HIV diagnosis, subjects reported significant changes in the methods they used. Significantly fewer women used oral contraceptives, withdrawal, spermicide or diaphragm in the time after their diagnosis. More women used male and female condoms or were abstinent after their diagnosis. Significantly fewer (7 versus 24%, $p=0.039$) women used no contraception after diagnosis of HIV (Table 1).

Most subjects had been pregnant (93%) and most had borne children (91%), 38% had one or more abortions, and 45% had one or more miscarriage. Table 2 summarizes current contraception use. By self-report and chart review, 54% had been sterilized. Sterilization was not associated with age but was associated with higher parity ($p=0.001$). Of those who were sexually active but not sterilized, 65% were using condoms alone, 25% were using condoms and/or hormonal methods and 6.5% were using no method of contraception.

Efavirenz is a non-nucleoside, reverse transcriptase inhibitor which the Food and Drug Administration changed from a pregnancy category C to D in December, 2004 [13]. We found that most of the 32 women in our sample on efavirenz were using effective methods of contraception. Sixty-eight percent had been sterilized, 9% were abstinent, and 6% used hormonal methods. Sixteen percent used only condoms and none reported using no method of contraception.

When asked if they wanted to have another child in the future, 65% of subjects responded no, 15% not sure, and 20% yes. Of women who had had a tubal ligation, 79% responded that they did not want another child, 9% were not sure, and 12% reported that they did want another child. The average ages of these three groups were significantly different, with those wanting future children being younger (38.0 vs. 34.2 vs. 33.2, $p=0.02$, respectively). These three groups were not significantly different in regards to race, duration of relationship, time since HIV diagnosis or stage of HIV disease. Women who had been sterilized were not significantly different from those who were not sterilized in regards to age, race, education, time since HIV diagnosis, being on HAART, current CD4 count or how they believe they acquired HIV infection.

In bivariate analysis, age, time since HIV diagnosis, most recent and nadir CD4 counts, duration of current relationship, and HAART therapy status were all significantly associated with future childbearing desires (Table 3). Race, marital status, parity and viral load were not associated with a desire for future children. In a multivariate analysis, the predictors of desiring future children were: younger age, being with current partner fewer than two years, having a higher current CD4 count, and not being on antiretroviral medication currently (Table 4).

4. Discussion

This population of HIV-positive women in care appears to have reproductive histories and plans similar to HIV-negative women. Most of the participants are mothers and are in long-term monogamous heterosexual relationships. Childbirth, miscarriage and abortion are common events in the study population as they are among reproductive-age women in general [14]. Twenty percent plan to have children in the future and 15% may want children in the future. Factors associated with wanting children in the future were younger age, shorter duration of current relationship, higher current CD4 count, and not being on antiretroviral therapy. These factors reflect general social and personal plans as well as HIV-specific issues women consider when planning for a future pregnancy. It is not surprising that women with HIV who have done well with their disease, as reflected in higher current CD4 counts and better control of their HIV viremia, as reflected in lower HIV RNA and/or not requiring antiretroviral medication, would feel most able to consider the physical and emotional challenges of pregnancy and new parenthood. Conversely, those women on antiretroviral therapy may not feel able to take on the responsibilities of parenthood.

After HIV diagnosis, subjects retrospectively reported an increase in effective barrier method use (particularly of female condoms), an increase in abstinence, and a decrease in use of hormonal methods. These trends likely reflect a combination of contraceptive pattern change over the reproductive lifetime and altered behavior in response to the diagnosis with HIV and their need for antiretroviral medications. Current reported condom use in these heterosexually active women was 76%, and use of condoms with most or all acts of sex was 80% for subjects with HIV-negative partners. Despite routine barrier protection counseling in this HIV Specialty Clinic, not all subjects chose to use condoms 100%. This underuse likely reflects other pressures women face, such as their partners' resistance to condom use, their fear of disclosure of their HIV status to their partners and/or their wish to conceive a pregnancy.

Subjects' current contraceptive behavior has some similarities and some differences from the general population age 35 to 39 years [15]. Current use of contraception was high in subjects who were sexually active, with only 6.5% nonusers (similar to 7% in the general population). In contrast, almost one-third of the study population reported being abstinent compared to less than 8% in the general population. Almost half of subjects had been sterilized, compared to the general population of whom 41% have been sterilized. The higher proportion of Black subjects in our study may explain this finding as Black women are more likely to have a tubal ligation than White women [15].

Of women in the study population who had been sterilized, 9% may want and 12% definitely want future children. In national studies, the three-year risk of regretting sterilization is 4% and the seven-year risk is 8% [16]. Thus, the 12% of women who have been sterilized who definitely do and the 9% who may want children in the future represent a relatively high rate of tubal regret in this population. The main factor associated with tubal regret in the general population is age less than 30 at the time of the sterilization [16]. Although we cannot determine what factors contributed to increased sterilization regret in the study population, potential factors may be relatively younger age at time of sterilization. Unfortunately, we were not able to verify the year of sterilization for our subjects. Alternatively, it is possible that HIV-infected women may be at increased risk for sterilization regret because of having made the decision to proceed with sterilization primarily as a result of their HIV diagnosis, and might have regret associated with the improvement in prognosis in recent years.

Our study has several limitations. The cross-sectional nature allows us to find associations but we are unable to make definitive conclusions on cause and effect. Thus, reported changes in contraceptive behavior before and after HIV diagnosis may be due to the knowledge of HIV infection and/or other life events such as changing relationships. In the survey, we asked subjects to remember past events, thus, recall bias is possible. As with other surveys on sensitive topics, social desirability and stigma may have biased respondents' answers. As subjects in this study are accustomed to answering sensitive questions associated with their clinical care, and had privacy to complete the self-administered survey, social desirability bias should be minimal. We limited the subjects to those who understood English well enough to complete our survey, thus excluding approximately half of the Hispanic patients from the clinic population. It is not clear if our results would have been significantly different if we had had a Spanish version of the survey. Finally, the study population received care in an academic setting from ID specialists and thus may not be generalizable to the HIV-positive female population in care.

Before the introduction of potent antiretroviral therapy, the health and life-expectancy of a person with HIV were much poorer than in the current era [6,7]. It is not surprising that women with HIV prior to 1996 would be more likely to have requested permanent sterilization or to have their providers (both obstetrician-gynecologists and ID specialists) recommend permanent sterilization. Half of the subjects were diagnosed HIV-positive prior to 1996, thus this study population represents those who have received treatment both before the advent and then in the context of potent antiretroviral therapy.

The relatively high rates of tubal ligation and of tubal regret in our study speak to the need to counsel HIV-positive women about reversible methods of contraception and to ask them about their plans for future childbearing. For those planning a pregnancy, preconception counseling is crucial to maximize the control of their HIV disease and minimize the use of teratogenic antiretroviral medications such as efavirenz. Those who do not wish to be pregnant should be counseled on the full range of contraceptive options including highly effective long-term but reversible methods. Hormonal methods of contraception, both combination and progestin-only, may be compatible with many antiretroviral medications and not inhibit the effectiveness

of these medications [17]. HIV-positive women who are at low risk of new STI acquisition and are not profoundly immuno-compromised may safely use intrauterine devices [18,19]. The use of a hormonal method or intrauterine device in combination with condoms can increase contraceptive efficacy while still providing protection against STI and HIV transmission.

Young women acquiring HIV through heterosexual contact are the new wave of the HIV epidemic. Many are living longer, healthier lives if they have access to HIV care. HIV providers and reproductive clinicians should ask HIV-infected women about their reproductive plans, discuss effective reversible methods of contraception, and use this information to optimally treat their HIV disease. With best practices, an HIV-positive woman receiving care for her HIV may obtain excellent control of her HIV disease and her fertility with a reversible method of contraception, allowing her to have a healthy child at the time of her choosing while preventing HIV transmission both to her sexual partner and her child.

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References

1. UNAIDS, AIDS Epidemic Update. World Health Organization 2006 Report on the global AIDS epidemic Annex 2: HIV/AIDS estimates and data. 2005 http://www.unaids.org/en/HIV_data/2006GlobalReport/ assessed 9/23/06
2. Anastos K, Barron Y, Cohen MH, et al. The prognostic importance of changes in CD4+ cell count and HIV-1 RNA level in women after initiating highly active antiretroviral therapy. *Ann Intern Med* 2004;140:256–64. [PubMed: 14970148]
3. Anastos K, Barron Y, Miotti P, et al. Risk of progression to AIDS and death in women infected with HIV-1 initiating highly active antiretroviral treatment at different stages of disease. *Arch Intern Med* 2002;162:1973–80. [PubMed: 12230420]
4. Egger M, May M, Chene G, et al. Prognosis of HIV-1-infected patients starting highly active antiretroviral therapy: a collaborative analysis of prospective studies. *Lancet* 2002;360:119–29. [PubMed: 12126821]erratum 2002; 360: 1178
5. Hogg RS, Heath KV, Yip B, et al. Improved survival among HIV-infected individuals following initiation of antiretroviral therapy. *JAMA* 1998;279(6):450–4. [PubMed: 9466638]
6. Chu SY, Buehler JW, Berkelman RL. Impact of the human immunodeficiency virus epidemic on mortality in women of reproductive age, United States. *JAMA* 1990;264(2):225–9. [PubMed: 2355444]
7. Rothenberg R, Woelfel M, Stoneburner R, et al. Survival with the acquired immunodeficiency syndrome. Experience with 5833 cases in New York City. *N Engl J Med* 1987;317(21):1297–302. [PubMed: 3500409]
8. Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents - October 6, 2005. 2005 [cited 2006 March]; Available from: <http://www.aidsinfo.nih.gov/guidelines/GuidelineDetail.aspx?MenuItem=Guidelines&Search=Off&GuidelineID=7&ClassID=1>. May 4, 2006 [assessed 9/23/06].
9. Kanouse DE, Collins RL, Miu A, Berry SH. HIV-infected population national data. *J Acquir Immune Defic Syndr* 2005;38(Suppl 1):S6–S7. [PubMed: 15867631]
10. Chen JL, Philips KA, Kanouse DE, Collins RL, Miu A. Fertility desires and intentions of HIV-positive men and women. *Fam Plann Perspec* 2001;33:144–52, 165.
11. Bedimo AL, Bessinger R, Kissinger P. Reproductive choices among HIV-positive women. *Soc Sci Med* 1998;46:171–9. [PubMed: 9447641]
12. Stephenson JM, Griffioen A. The effect of HIV diagnosis on reproductive experience. Study Group for the Medical Research Council Collaborative Study of Women with HIV. *AIDS* 1996;10(14):1683–7. [PubMed: 8970689]

13. Company B-MS. Important change in SUSTIVA® (efavirenz) package insert - Change from Pregnancy Category C to D. 2004 [cited; Available from: www.fda.gov/medwatch/SAFETY/2005/Sustiva_DHCPletter-061005.pdf].
14. Henshaw SK. Unintended pregnancy in the United States. *Fam Plann Perspect* 1998;30(1):24–9. [PubMed: 9494812]
15. Mosher, WD.; Martinez, G.; Chandra, A.; Abma, J.; Willson, S. Use of contraception and use of family planning services in the United States, 1982-2002. National Center for Health Statistics; Bethesda, MD: 2004.
16. Hillis SD, Marchbanks PA, Tylor LR, Peterson HB. Poststerilization regret: findings from the United States Collaborative Review of Sterilization. *Obstet Gynecol* 1999;93(6):889–95. [PubMed: 10362150]
17. Chu JH, Gange SJ, Anastos K, et al. Hormonal contraceptive use and the effectiveness of highly active antiretroviral therapy. *Am. J. Epidemiol* 2005;161(9):881–90. [PubMed: 15840621]
18. Sinei SK, Morrison CS, Sekadde-Kigundu C, Allen M, Kokonya D. Complications of use of intrauterine devices among HIV-1-infected women. *Lancet* 1998;351(9111):1238–41. [PubMed: 9643743]
19. WHO. Selected practice recommendations for contraceptive use. World Health Organization, Department of Reproductive Health and Research; Geneva: 2004.

Table 1

Self-reported ever use of contraceptive methods among 118 women before and after HIV diagnosis. Some subjects reported using more than 1 method.

Method	Before %	After %	p
Male condom	64	81	0.08
Oral contraceptives	55	22	0.002
Withdrawal	24	5	<0.001
None	24	7	0.039
Female condom	14	25	0.003
Spermicide	12	4	0.001
Depo Provera acetate	11	14	0.018
Abstinence	10	28	0.001
Diaphragm	9	2	0.007
Intrauterine device	5	1	NS

Table 2

Current contraceptive use among 118 HIV-infected women in care

Method	%
Sterilized	54%
Condoms and sterilized	31%
Sterilized only	13%
Abstinent and sterilized	10%
Not sterilized	46%
Condoms only	22%
Abstinent	13%
Condoms and hormonal	6%
Hormonal only	2%
None	3%

Table 3

Univariate predictors of wanting future children

	Wants future children	Does not want future children	p value
Mean age (years)	34	38	<0.001
Mean time since HIV diagnosis (years)	7.3	9.6	0.03
Most recent CD4 count	576	419	0.03
Lowest CD4 count	270	178	0.02
Sexual relationship duration < 2 years	59%	41%	0.001
Sexual relationship duration > 2 years	24%	76%	
On HAART therapy	24%	76%	0.001
Not on HAART therapy	53%	47%	

Table 4

Multivariable predictors of wanting future children from a logistic regression model.

	OR (95% CI)
Younger age (in years)	1.22 (1.05, 1.41)
With current partner less than 2 years	5.16 (1.49, 17.90)
Higher current CD4 count (in count/mL ³)	1.003 (1.0006, 1.005)
Not being on antiretroviral medication	9.63 (1.92, 48.39)
Years since diagnosis	0.91 (0.80, 1.03)