

Contraceptive Practices and Fertility Desires Among HIV-Infected and Uninfected Women in Kenya: Results From a Nationally Representative Study

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Background: Prevention of unplanned pregnancies is a critical element in the prevention of mother-to-child transmission of HIV infection, but its potential has not been fully realized. We assessed the utilization of family planning (FP) and fertility desires among women of reproductive age by HIV status.

Methods: We selected a nationally representative sample of households using a stratified 2-stage cluster design and surveyed women aged 15–49 years. We administered questionnaires and examined predictors of current use of FP and desire for children among sexually active women with known HIV infection and women who were HIV uninfected.

Results: Of 3583 respondents, 68.2% were currently using FP, and 57.7% did not desire children in the future. Among women who did not desire children in the future, 70.9% reported that they were using

FP, including 68.7% of women with known HIV infection and 71.0% of women who were HIV uninfected. Women with known HIV infection had similar odds of using FP as women with no HIV infection (odds ratio, 1.12; 95% confidence interval: 0.81 to 1.54). Women with no HIV infection had significantly higher adjusted odds of desiring future children (adjusted OR, 2.27; 95% confidence interval: 1.31 to 3.93) than women with known HIV infection.

Conclusions: There is unmet need for FP for HIV-infected women, underscoring a gap in the national prevention of mother-to-child transmission of HIV strategy. Efforts to empower HIV-infected women to prevent unintended pregnancies should lead to expanded access to contraceptive methods and take into account women's reproductive intentions.

Key Words: HIV, Kenya, women, contraception, fertility

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INTRODUCTION

Women of childbearing age account for nearly half of all persons infected with HIV worldwide,¹ and without interventions to prevent mother-to-child transmission of HIV, 12%–40% of HIV-infected pregnant women will transmit HIV to their infants.² More than 1.4 million Kenyans were estimated to be living with HIV infection, and HIV prevalence was estimated to be 9.2% among women of reproductive age in the first Kenya AIDS Indicator Survey conducted in 2007 (KAIS 2007).³ The high prevalence of HIV among women of reproductive age raises concerns regarding the capacity of programs for the prevention of mother-to-child transmission of HIV (PMTCT) to care for infected women and their exposed newborns.

Prevention of unintended pregnancy is the second prong of the Joint United Nations Programme on HIV/AIDS PMTCT program framework,⁴ but uptake of contraceptives is generally low in Kenya. According to the 2008–2009 Kenya Demographic and Health Survey (DHS), 32% of women aged 15–49 years used any contraceptive method despite high level of knowledge of family planning (FP).⁵ KAIS 2007 found low levels (45%) of modern contraceptive use among Kenyan women aged 15–49 years who did not desire a child in the future.³ The low uptake of FP among the general population in Kenya presents a risk to the success of PMTCT

interventions in the country. Studies have shown there is similarly low utilization of FP methods among HIV-infected women elsewhere in East Africa. Among HIV-infected mothers in the PMTCT program in Kitale District Hospital in western Kenya, only 44% had been using some form of FP.⁶ Similarly, a study in Uganda reported that slightly more than half (51.6%) of HIV-infected women were using a FP method at the time of the study.⁷

DHS data from Kenya and Malawi show that nearly three-fourths of HIV-infected women did not want to have more children in the future, but only 20% of these women in Kenya and 32% in Malawi were using contraceptives.⁸ Moreover, knowledge of HIV infection is not necessarily associated with greater use of FP. In KAIS 2007, 52% of Kenyan women who reported that they were infected with HIV and did not desire a child were using modern contraceptive methods compared with 49.4% of those who reported being HIV uninfected.³ In Uganda, one-third of HIV-infected women reported being pregnant since their diagnosis, and 28% of infected men reported their sexual partner being pregnant since their own HIV diagnosis.⁷

Fertility desires are generally lower among HIV-infected women. A qualitative study among HIV-infected women in Nyanza showed that perceptions about side effects of contraceptive methods strongly influenced HIV-infected women's choices along with access to FP and partners' resistance to contraceptive use.⁹

Among Kenyan women who reported they were HIV infected in KAIS 2007, 8.1% wanted a child within the next 2 years, and 10.5% desired a child but sometime further in the future.³ Higher monthly income, being on antiretroviral therapy (ART), longer duration of HIV clinic attendance, longer period since diagnosis of HIV infection, disclosure of serostatus to partners, and higher CD4⁺ T-cell count were all associated with reduced desire for children.¹⁰

The second Kenya AIDS Indicator Survey (KAIS 2012) was a nationally representative survey conducted in 2012–2013 among persons aged 18 months to 64 years to monitor progress on key indicators in the national HIV response. In this article, we examined contraceptive use and fertility desires among a subsample of sexually active women aged 15–49 years.

METHODS

Study Design

The survey methods for KAIS 2012 have been described in detail elsewhere.¹¹ Briefly, we selected eligible households using a stratified 2-stage cluster sampling design. Trained interviewers administered household and individual questionnaires. Trained laboratory technicians collected blood specimens for biologic testing in a central laboratory.

Study Population

Our study population consisted of sexually active women aged 15–49 years who were usual household residents or were present at the household residence on the night preceding the

survey and consented to participate in the survey. Persons with cognitive or hearing disabilities were excluded.

Laboratory Methods

We asked women for their verbal consent to collect a blood sample for biologic testing at the National HIV Reference Laboratory (NHRL) in Nairobi. We tested blood specimens for HIV antibody and if positive, HIV RNA concentration. We tested all specimens for HIV antibody [Vironostika HIV-1/2 UNIF II Plus O Enzyme Immunoassay (EIA) assay; bioMérieux SA, Marcy l'Etoile, France] and confirmed HIV antibody-positive results with the Murex HIV.1.2.O HIV EIA (DiaSorin, SpA, Saluggia, Italy). Repeat testing was done for discordant results and if results remained discordant, final results were obtained using polymerase chain reaction (Cobas Amplicor HIV-1 Monitor Test, v1.5; Roche Molecular Diagnostics, Pleasanton, CA). We tested all HIV-positive specimens for HIV RNA concentration (Abbott m2000 Real-Time HIV-1 assay; Abbott Park, IL). Virologic suppression was defined as HIV RNA concentration <1000 copies per milliliter.

Measurements

We had 2 main outcome variables: use of FP and desire for future children. We defined modern contraceptives as a subset of FP methods, which included: male and female sterilization, oral contraceptives, intrauterine devices, injected contraceptives, implantable contraceptives, and male and female condoms. Rhythm/natural methods, withdrawal, abstinence, and other methods were not considered to be modern contraceptive practices. Predictor variables included age, marital status, area of residence (urban versus rural), religion, socioeconomic status, educational attainment, parity, and number of living children. For women who were using FP, we recorded type of contraceptive used.

Women who reported previous HIV-positive diagnoses but were HIV-negative based on KAIS 2012 laboratory testing (N = 15) and women who reported previous HIV-negative diagnoses but were HIV-positive based on KAIS 2012 laboratory testing (N = 128) were excluded from the analysis. Hereafter, we refer to women with laboratory-diagnosed HIV-positive test results and who self-reported HIV-positive status as women with known HIV infection. Women with laboratory-diagnosed HIV-negative test results and who self-reported no HIV infection are referred to as HIV-uninfected women.

Statistical Analysis

Data were weighted to account for the survey's sampling design and adjust for nonresponse. We estimated point prevalence and 95% confidence intervals (CI) for selected demographic and reproductive health variables. We also compared use of FP and desire for future children among women by HIV status. We conducted bivariate and multivariate analyses to identify correlates of FP and desire for future children. We report results as odds ratios (OR), adjusted odds ratios

(aOR), and 95% CI. In the multivariate model, we included variables that were associated with the outcome of interest in bivariate analyses at $P < 0.1$. Variables that remained significant based on $P < 0.05$ were considered independently and significantly associated with the outcome of interest.

Ethical Considerations

The Kenya Medical Research Institute (KEMRI) Ethical Review Committee, the United States Centers for Disease Control and Prevention (CDC) Institutional Review Board, and the Committee on Human Research of the University of California, San Francisco (UCSF) reviewed and approved the KAIS 2012 protocol.

RESULTS

We interviewed 8035 (87.4%) of the 9189 eligible households and identified 6910 eligible women aged 15–49 years who lived in these households. Of these, 4394 were sexually active, and 3583 of these women provided information on self-reported HIV status (Table 1). A total of 3245 completed the FP portion of the interview, and 3581 completed the fertility desires component. These women had a median of 1 previous live birth (IQR, 0–1) (data not shown). One hundred thirty-seven (4.0%, 95% CI: 3.2 to 4.7) women had known HIV infection, and 3446 (96.0%, 95% CI: 95.2 to 97.0) were HIV uninfected. Of the women whom we interviewed regarding FP, 68.2% (95% CI: 66.1 to 70.3) were using FP, and of those, 93.0% (95% CI: 91.8 to 94.3) were using modern contraceptive methods. Among women with known HIV infection, 70.8% (95% CI: 62.7 to 78.9) were using FP compared with 68.1% (95% CI: 65.9 to 70.3) of HIV-uninfected women. The most common FP methods used were injected contraceptives (47.2%) and oral contraceptives (18.6%) (data not shown).

Of the women interviewed regarding their desire to have children, 57.7% (95% CI: 55.4 to 59.9) had no desire to have children in the future, including 85.6% (95% CI: 79.9 to 91.2) of women with known HIV infection and 56.5% (95% CI: 54.2 to 58.9) of HIV-uninfected women (Table 1). Among women who did not desire future children, 70.9% (95% CI: 68.3 to 73.5) were using contraceptives, including 68.7% (95% CI: 58.9 to 87.5) of women with known HIV infection and 71.0% (95% CI: 68.5 to 73.7) of HIV-uninfected women (data not shown).

Women with known HIV infection had similar odds of using FP as women with no HIV infection (OR, 1.12; 95% CI: 0.81 to 1.54) (Table 2). In multivariate analysis, being married or cohabiting (compared with never married or never cohabited), Roman Catholic or Protestant Christian (compared with other or no religion), aged 20–39 years (compared with aged 15–19 years), in wealth quintiles higher than the poorest, with education levels higher than no primary education, and having 1 child compared with no child were independently associated with higher adjusted odds of contraceptive use.

HIV-uninfected women had significantly higher odds of desiring future children than women with known HIV

infection (OR, 4.07; 95% CI: 2.77 to 5.99); this difference persisted in multivariate analysis (adjusted odds ratio, 2.27; 95% CI: 1.31 to 3.93) (Table 3). In multivariate analysis, being aged 15–39 years (compared with aged 40–49 years), having no or 1 child (compared with having 2 or more children) and not using modern contraceptives were independently associated with increased odds of desiring a child in the future.

Among women with known HIV infection who reported FP use (N = 87), 89.2% (95% CI: 80.8 to 97.7) were currently in HIV care. Sixty-four percent (95% CI: 53.1 to 74.6) were currently taking ART, and over half (55.4%, 95% CI: 43.9 to 66.9) were virally suppressed. Among HIV-infected women who were not using FP (N = 1049), 87.9% (95% CI: 76.1 to 99.6) were currently in HIV care, 57.2% (95% CI: 41.3 to 73.1) were on ART, and 53.2% (95% CI: 36.3 to 70.1) were virally suppressed (data not shown).

DISCUSSION

In KAIS 2012, we found that approximately two-thirds of sexually active Kenyan women aged 15–49 years were using FP, with the majority using modern contraceptives. According to the Kenya 2008–2009 DHS, the percentage of women aged 15–49 years who used any contraceptive method was lower, at 32%.⁵ We also found that 6 out of 10 women did not want a child in the future, higher than reported in 2007, where 5 out of 10 women did not want a future child.³ Among these, 68.7% of women with known HIV infection and 71.0% of HIV-uninfected women were using FP. This was higher than reported in 2007, where, among women who did not desire a child in the future, only 52.0% of women who self-reported HIV infection and 49.4% of women who self-reported being uninfected with HIV were using FP.³

The results of this analysis highlight progress in addressing FP needs for HIV-infected and HIV-uninfected women, which has coincided with the scale-up of other HIV-related prevention and treatment services including routine HIV testing of pregnant women, provision of maternal and infant prophylaxis for HIV-infected pregnant mothers and their infants, and provision of ART to those in need of treatment. Still, our results highlight unmet FP needs, particularly for women who were aware of their HIV infection, where approximately 30% of women in need of FP were not receiving it. Prevention of unintended pregnancies constitutes an important second prong of the mother-to-child transmission elimination framework among HIV-infected women; yet these findings suggest that the prioritization of FP services may need greater emphasis in the Kenyan national PMTCT program. According to the reproductive health road map, Kenya intends to strengthen integration of FP and HIV services in all facilities by 2015 as one of the main priority activities for reproductive health programs.¹²

In our study, prevalence of FP use was similar among women with previous diagnoses of HIV infection and HIV-uninfected women. Adequacy of FP counseling for HIV-infected women has been questioned when repeat pregnancies are reported. Besides the lack of time, it has been reported that many women discover their HIV status during antenatal care,

TABLE 1. Select Characteristics Among Sexually Active Women Aged 15–49 Years by HIV Status, Kenya AIDS Indicator Survey 2012

| Characteristics | All (Unweighted, N = 3583) | | Known HIV Infection* (Unweighted, N = 137) | | HIV-Uninfected† (Unweighted, N = 3446) | |
|--------------------------------|----------------------------|---------------------|--|---------------------|--|---------------------|
| | Unweighted, n | Weighted % (95% CI) | Unweighted, n | Weighted % (95% CI) | Unweighted, n | Weighted % (95% CI) |
| Total | 3583 | | 137 | | 3446 | |
| Marital status | | | | | | |
| Never married/never cohabited | 358 | 10.4 (8.9 to 11.8) | 7 | 4.5 (1.2 to 7.8) | 351 | 10.6 (9.1 to 12.1) |
| Married/cohabited | 2873 | 79.9 (78.2 to 81.7) | 93 | 68.7 (60.7 to 76.6) | 2780 | 80.4 (78.6 to 82.2) |
| Separated/divorced | 186 | 5.2 (4.4 to 6.1) | 10 | 6.7 (2.5 to 10.8) | 176 | 5.2 (4.3 to 6.0) |
| Ever widowed | 166 | 4.5 (3.7 to 5.3) | 27 | 20.2 (13.5 to 26.9) | 139 | 3.8 (3.0 to 4.6) |
| Residence | | | | | | |
| Rural | 2204 | 61.8 (58.9 to 64.7) | 80 | 59.7 (47.9 to 71.4) | 2124 | 61.9 (59.0 to 64.8) |
| Urban | 1379 | 38.2 (35.3 to 41.1) | 57 | 40.3 (28.6 to 52.1) | 1322 | 38.1 (35.2 to 41.0) |
| Religion | | | | | | |
| Roman Catholic | 803 | 23.7 (21.2 to 26.2) | 28 | 20.5 (14.2 to 26.8) | 775 | 23.8 (21.3 to 26.4) |
| Protestant/other Christian | 2402 | 70.0 (67.4 to 72.7) | 101 | 76.5 (69.0 to 84.1) | 2301 | 69.8 (67.0 to 72.5) |
| Other‡ | 378 | 6.3 (4.7 to 7.8) | 8 | 3.0 (0 to 6.7) | 370 | 6.4 (4.8 to 8.0) |
| Age category, yrs | | | | | | |
| 15–19 | 233 | 6.6 (5.6 to 7.6) | 2 | 1.9 (0 to 4.3) | 231 | 6.8 (5.8 to 7.8) |
| 20–29 | 1695 | 47.3 (45.2 to 49.4) | 44 | 33.0 (24.4 to 41.6) | 1651 | 47.9 (45.7 to 50.1) |
| 30–39 | 1124 | 31.3 (29.4 to 33.1) | 61 | 42.6 (33.3 to 52.0) | 1063 | 30.8 (28.9 to 32.7) |
| 40–49 | 531 | 14.8 (13.5 to 16.2) | 30 | 22.5 (14.7 to 30.4) | 501 | 14.5 (13.2 to 15.9) |
| Wealth index | | | | | | |
| Poorest | 655 | 18.1 (15.1 to 21.0) | 18 | 13.3 (6.5 to 20.1) | 637 | 18.3 (15.3 to 21.3) |
| Second | 741 | 20.8 (18.5 to 23.1) | 34 | 26.1 (16.1 to 36.2) | 707 | 20.6 (18.3 to 22.8) |
| Middle | 728 | 20.3 (18.1 to 22.5) | 29 | 24.7 (17.4 to 32.0) | 699 | 20.1 (17.9 to 22.3) |
| Fourth | 661 | 18.3 (15.9 to 20.7) | 36 | 24.0 (15.0 to 33.0) | 625 | 18.1 (15.6 to 20.5) |
| Richest | 798 | 22.5 (19.4 to 25.6) | 20 | 11.8 (6.1 to 17.6) | 778 | 23.0 (19.8 to 26.1) |
| Highest educational attainment | | | | | | |
| No primary | 515 | 10.3 (8.7 to 12.0) | 12 | 5.6 (1.3 to 10.0) | 503 | 10.5 (8.8 to 12.2) |
| Incomplete primary | 64 | 1.9 (1.3 to 2.6) | 3 | 2.0 (0 to 4.3) | 61 | 1.9 (1.2 to 2.6) |
| Complete primary | 1223 | 35.8 (33.6 to 38.0) | 47 | 36.0 (27.3 to 44.6) | 1176 | 35.8 (33.6 to 38.0) |
| Secondary or higher | 1781 | 51.9 (49.6 to 54.3) | 75 | 56.4 (47.5 to 65.3) | 1706 | 51.8 (49.3 to 54.2) |
| Parity | | | | | | |
| None | 995 | 31.0 (29.2 to 32.8) | 62 | 44.7 (34.3 to 55.0) | 933 | 30.3 (28.5 to 32.2) |
| 1 | 1495 | 45.8 (43.9 to 47.8) | 38 | 29.7 (21.0 to 38.4) | 1457 | 46.5 (44.5 to 48.5) |
| ≥2 | 760 | 23.2 (21.3 to 25.2) | 33 | 25.6 (16.9 to 34.3) | 727 | 23.1 (21.2 to 25.1) |
| Family planning | | | | | | |
| Yes | 2158 | 68.2 (66.1 to 70.3) | 87 | 70.8 (62.7 to 78.9) | 2071 | 68.1 (65.9 to 70.3) |
| No | 1087 | 31.8 (29.7 to 33.9) | 38 | 29.2 (21.1 to 37.3) | 1049 | 31.9 (29.7 to 34.1) |
| Modern contraceptive use | | | | | | |
| Yes | 1992 | 93.0 (91.8 to 94.3) | 85 | 98.4 (96.1 to 100) | 1907 | 92.8 (91.5 to 94.1) |
| No | 166 | 7.0 (5.7 to 8.2) | 2 | 1.6 (0 to 3.9) | 164 | 7.2 (5.9 to 8.5) |
| Wants children in the future | | | | | | |
| Yes | 1563 | 42.3 (40.1 to 44.6) | 24 | 14.4 (8.8 to 20.1) | 1539 | 43.5 (41.1 to 45.8) |
| No | 2018 | 57.7 (55.4 to 59.9) | 113 | 85.6 (79.9 to 91.2) | 1905 | 56.5 (54.2 to 58.9) |
| HIV status | | | | | | |
| Known HIV infection | 137 | 4.0 (3.2 to 4.7) | — | — | — | — |
| HIV uninfected | 3446 | 96.0 (95.2 to 97.0) | — | — | — | — |

*Laboratory-confirmed HIV-positive, self-reported HIV-positive.

†Laboratory-confirmed HIV-negative, self-reported HIV-negative.

‡Other includes Muslim, other religions, and no religion.

TABLE 2. Factors Associated With Use of FP Methods Among Sexually Active Women Aged 15–49 Years, Kenya AIDS Indicator Survey 2012

| Variable | Unadjusted Odds Ratio (95% CI) | P | Adjusted Odds Ratio (95% CI) | P |
|---------------------------------------|--------------------------------|---------|------------------------------|---------|
| HIV status | | | | |
| Known HIV infection* | 1.12 (0.81 to 1.54) | 0.492 | — | — |
| HIV uninfected† | 1.0 | — | — | — |
| Marital status | | | | |
| Never married/never cohabited | 1.0 | — | 1.0 | — |
| Married/cohabited | 5.07 (4.30 to 5.98) | <0.0001 | 3.90 (2.98 to 5.10) | <0.0001 |
| Separated/divorced | 1.69 (1.31 to 2.19) | <0.0001 | 1.11 (0.79 to 1.56) | 0.5625 |
| Ever widowed | 1.65 (1.30 to 2.09) | <0.0001 | 1.10 (0.77 to 1.58) | 0.5904 |
| Residence | | | | |
| Rural | 1.0 | — | 1.0 | — |
| Urban | 1.32 (1.16 to 1.51) | <0.0001 | 1.19 (0.97 to 1.46) | 0.0887 |
| Religion | | | | |
| Roman Catholic | 1.79 (1.37 to 2.34) | <0.0001 | 1.98 (1.42 to 2.76) | <0.0001 |
| Protestant/other Christian | 1.84 (1.43 to 2.35) | <0.0001 | 1.89 (1.36 to 2.62) | 0.0001 |
| Other‡ | 1.0 | — | 1.0 | — |
| Age category, yrs | | | | |
| 15–19 | 1.0 | — | 1.0 | — |
| 20–29 | 5.39 (4.42 to 6.57) | <0.0001 | 1.79 (1.24 to 2.59) | 0.0019 |
| 30–39 | 6.77 (5.53 to 8.27) | <0.0001 | 1.62 (1.09 to 2.42) | 0.0183 |
| 40–49 | 4.39 (3.52 to 5.48) | <0.0001 | 0.91 (0.60 to 1.40) | 0.6769 |
| Wealth index | | | | |
| Poorest | 1.0 | — | 1.0 | — |
| Second | 1.35 (1.12 to 1.62) | 0.0013 | 1.55 (1.20 to 2.00) | 0.0009 |
| Middle | 1.58 (1.27 to 1.95) | <0.0001 | 1.78 (1.34 to 2.35) | <0.0001 |
| Fourth | 1.68 (1.34 to 2.09) | <0.0001 | 2.10 (1.54 to 2.87) | <0.0001 |
| Richest | 1.64 (1.30 to 2.06) | <0.0001 | 2.06 (1.50 to 2.82) | <0.0001 |
| Highest educational attainment | | | | |
| No primary | 1.0 | — | 1.0 | — |
| Incomplete primary | 2.21 (1.56 to 3.13) | <0.0001 | 2.12 (1.26 to 3.57) | 0.0045 |
| Complete primary | 2.18 (1.80 to 2.64) | <0.0001 | 1.80 (1.40 to 2.32) | <0.0001 |
| Secondary or higher | 2.16 (1.79 to 2.60) | <0.0001 | 1.53 (1.21 to 1.93) | 0.0003 |
| Parity | | | | |
| None | 1.0 | — | 1.0 | — |
| 1 | 1.94 (1.66 to 2.26) | <0.0001 | 1.45 (1.21 to 1.74) | <0.0001 |
| ≥2 | 1.57 (1.30 to 1.90) | <0.0001 | 1.18 (0.95 to 1.48) | 0.134 |

*Laboratory-confirmed HIV-positive, self-reported HIV-positive.

†Laboratory-confirmed HIV-negative, self-reported HIV-negative.

‡Other includes Muslim, other religions, and no religion.

and issues, such as understanding and accepting the test result and its implications, often far outweigh any future FP concerns.^{6,7} The missed opportunities for counseling HIV-infected women regarding FP were well illustrated in 2 Kenya PMTCT operations research studies where more than one-fifth of women reported that they engaged in a discussion about FP during their antenatal visit, but fewer than 4% reported receiving any postpartum counseling on this topic.¹³

Efforts to increase uptake of FP need to focus on addressing barriers to access. According to the Kenya DHS 2008–2009, some barriers that prevent women from using FP include the fear of side effects and health concerns. Also, religious prohibitions, opposition to use, menopause, infertility, desire for many children, and infrequent sex contribute to lower use of FP.³ Field experiences in Kenya and Uganda on

integrating FP into PMTCT have shown that in settings with few resources, providers simply lack the time to counsel HIV-infected women on FP.^{6,7}

Our study had several limitations. All FP responses were from self-reported data, and we could not corroborate reported information with other data sources such as clinical or pharmacy records. The survey nature of KAIS 2012 precluded in-depth exploration of, for instance, why the respondents who did not desire having children were not using contraceptives. This analysis excluded women who did not report on their HIV status during the interview, which may have decreased the statistical power to detect associations. Finally, because of small sample sizes of women with known HIV infection, estimates reported on access to care and treatment may be unreliable and should be interpreted

TABLE 3. Factors Associated With Desire for Future Children Among Sexually Active Women Aged 15–49 Years, Kenya AIDS Indicator Survey 2012

| Variable | Unadjusted Odds Ratio (95% CI) | P | Adjusted Odds Ratio (95% CI) | P |
|--------------------------------|--------------------------------|---------|------------------------------|---------|
| HIV status | | | | |
| Known HIV infection* | 1.0 | — | 1.0 | — |
| HIV uninfected† | 4.07 (2.77 to 5.99) | <0.0001 | 2.27 (1.31 to 3.93) | 0.0034 |
| Marital status | | | | |
| Never married/never cohabited | 2.90 (2.46 to 3.41) | <0.0001 | 0.97 (0.59 to 1.59) | 0.8977 |
| Married/cohabited | 1.0 | — | 1.0 | — |
| Separated/divorced | 0.56 (0.44 to 0.70) | <0.0001 | 0.65 (0.39 to 1.07) | 0.0909 |
| Ever widowed | 0.41 (0.32 to 0.53) | <0.0001 | 0.71 (0.38 to 1.31) | 0.2727 |
| Residence | | | | |
| Rural | 1.0 | — | 1.0 | — |
| Urban | 1.36 (1.19 to 1.56) | <0.0001 | 1.03 (0.75 to 1.43) | 0.848 |
| Religion | | | | |
| Roman Catholic | 0.74 (0.59 to 0.92) | 0.008 | 1.10 (0.60 to 2.02) | 0.7519 |
| Protestant/other Christian | 0.70 (0.57 to 0.86) | 0.0006 | 1.05 (0.59 to 1.87) | 0.8554 |
| Other‡ | 1.0 | — | 1.0 | — |
| Age category, yrs | | | | |
| 15–19 | 12.15 (9.79 to 15.08) | <0.0001 | 85.34 (35.73 to 203.84) | <0.0001 |
| 20–29 | 11.71 (9.98 to 13.74) | <0.0001 | 47.60 (22.97 to 98.64) | <0.0001 |
| 30–39 | 3.27 (2.71 to 3.95) | <0.0001 | 8.13 (3.97 to 16.66) | <0.0001 |
| 40–49 | 1.0 | — | 1.0 | — |
| Wealth index | | | | |
| Poorest | 1.0 | — | 1.0 | — |
| Second | 0.77 (0.66 to 0.92) | 0.0029 | 0.71 (0.50 to 1.01) | 0.0534 |
| Middle | 0.75 (0.61 to 0.91) | 0.0031 | 0.72 (0.50 to 1.04) | 0.0796 |
| Fourth | 0.88 (0.73 to 1.07) | 0.2126 | 0.79 (0.51 to 1.24) | 0.3102 |
| Richest | 1.29 (1.05 to 1.59) | 0.0146 | 0.90 (0.56 to 1.44) | 0.6631 |
| Highest educational attainment | | | | |
| No primary | 1.0 | — | — | — |
| Incomplete primary | 0.79 (0.53 to 1.19) | 0.2545 | — | — |
| Complete primary | 1.05 (0.84 to 1.32) | 0.6477 | — | — |
| Secondary or higher | 1.06 (0.86 to 1.32) | 0.5774 | — | — |
| Parity | | | | |
| None | 0.56 (0.45 to 0.70) | <0.0001 | 1.99 (1.33 to 2.97) | 0.0008 |
| 1 | 1.63 (1.33 to 1.99) | <0.0001 | 2.06 (1.51 to 2.83) | <0.0001 |
| ≥2 | 1.0 | — | — | — |
| Modern contraceptive use | | | | |
| Yes | 1.0 | — | — | — |
| No | 1.13 (0.93 to 1.38) | 0.212 | 1.88 (1.20 to 2.94) | 0.0056 |

*Laboratory-confirmed HIV-positive, self-reported HIV-positive.

†Laboratory-confirmed HIV-negative, self-reported HIV-negative.

‡Other includes Muslim, other religions, and no religion.

with caution. Despite these limitations, KAIS 2012 had a large sample size, was nationally representative, and we believe our estimates of contraceptive use and fertility desires to be generalizable.

There is need to integrate FP services, PMTCT, reproductive health care, and maternal and child health services in all health facilities to address the gaps of FP for both HIV-infected and HIV-uninfected women.¹⁴ In low-resource settings, it is likely that models of integration will have the largest effect by maximizing limited resources to improve outcomes. For HIV-infected women who do not wish to become pregnant, FP offers the added benefit of

PMTCT and, by extension, reduces the number of children needing HIV prophylaxis, treatment, care, and support.¹⁵ We recommend that greater programmatic emphasis should be placed on FP services for all women.

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