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Knowing a Sexual Partner Is HIV-1-Uninfected Is Associated With Higher Condom Use Among HIV-1-Infected Adults in Kenya

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Abstract

The relation between awareness of sexual partner's HIV serostatus and unprotected sex was examined in HIV clinic enrollees. Increased condom use was associated with knowing that a partner was HIV-negative (adjusted odds ratio = 5.99; $P < 0.001$) versus not knowing partner's status. Partner testing may increase condom use in discordant couples.

In sub-Saharan Africa, approximately 45% of couples living with HIV-1 have an HIV-uninfected partner,^{1,2} and 57% to 73% of HIV-infected persons seeking or receiving HIV care do not know their partner's HIV status.^{3,4} HIV treatment programs may contribute to HIV prevention by identifying HIV-uninfected partners and promoting condom use in serodiscordant relationships.

Some studies have suggested that lack of awareness of partner's HIV-1 serostatus is associated with increased sexual risk behavior among HIV-infected adults accessing care.^{3,4} Others have suggested no association⁵ or that adults with HIV-concordant partners are more likely to have unprotected sex than those with seronegative partners or partners of unknown status.⁶ These studies were relatively small (<400 sexually active adults), and only one study⁶ compared unprotected sex among adults unaware of partner's HIV status to those with HIV-negative partners. In this study, we tested whether HIV-infected adults enrolling in HIV care and knew their partner was HIV-uninfected were more likely to report recent condom use than those unaware of partner's HIV status.

We performed a cross-sectional analysis using a de-identified data repository from the Coptic Hope Centers for Infectious Diseases which includes 3 HIV clinics, 2 in Nairobi and

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1 in Maseno, a rural site in western Kenya.⁷ Clinic procedures and data collection procedures have been described.⁷ During counseling sessions at enrollment, adults were asked standardized questions regarding sex in the past 3 months, condom use at last sex, and whether they were a member of a serodiscordant couple. Response options to the latter were “Yes,” “No,” and “Don’t Know.” Criteria for inclusion in this analysis were as follows: enrollment from 2005 to 2008, age >15 years, had a counseling session 30 days from enrollment, provided information on sexual activity, condom use, and partner HIV serostatus, and reported sexual activity in the last 3 months. Institutional Review Boards at the University of Washington and Kenyatta National Hospital approved use of data for this analysis.

Correlates of awareness of partner’s HIV serostatus were analyzed using χ^2 and rank-sum tests for dichotomous and continuous variables, respectively. χ^2 tests and logistic regression were used to examine correlates of reported condom use. Significant correlates in univariate analyses were evaluated in multivariate models; gender was also evaluated due to potential confounding by gender. Statistical interactions between partner’s HIV serostatus and both antiretroviral therapy (ART)-experience and site of clinic attendance were evaluated. Analyses were performed using Stata 10.0 (College Station, TX).

Of 3013 sexually active adults enrolling in HIV care, 58.0% were female; the median age was 34.3 years, and the median CD4 count was 215 cells/mL. In all, 12% patients accessed care at the rural clinic (“rural clinic attendees”). Most (83.5%) had not yet started ART (“ART-naïve”). A total of 1163 adults (38.6%) did not know their partner’s HIV serostatus, 412 (13.7%) reported an HIV-seronegative partner, and 1438 (47.7%) reported an HIV-seropositive partner.

Adults who knew their partner’s HIV serostatus had a higher CD4 count (median, 233 vs. 181 cells/mL; $P < 0.0001$) and a higher body mass index (BMI) (median, 23.0 vs. 22.1; $P < 0.0001$) compared to those who were unaware. Urban clinic attendees and adults who were already on ART at enrollment (“ART-experienced”) were each more likely to know partner’s HIV serostatus than rural clinic attendees (62.9% vs. 50.7%; $P < 0.001$) and ART naïve adults (72.7% vs. 59.2%; $P < 0.001$), respectively. Among patients who knew their partner’s HIV serostatus, patients with HIV-seronegative partners had a lower CD4 count (median, 192 vs. 244 cells/mL; $P = 0.0003$) but a higher BMI (median, 23.6 vs. 22.9; $P = 0.02$) than patients with HIV-seropositive partners. This seemingly contradictory result may reflect a significantly lower prevalence of BMI <18.5 at the urban site ($P < 0.001$). Urban versus rural clinic attendance and being ART-experienced versus -naïve were each significantly associated with having an HIV serodiscordant partner (23.7 vs. 10.1%; $P < 0.001$) and (27.1% vs. 21.1%; $P = 0.02$), respectively. Neither gender nor age was associated with partner’s HIV serostatus.

In all, 43% (1298) of adults reported using a condom at last sex (Table 1). In univariate analyses, age >30 years, urban clinic attendance, ART experience, and healthier clinical status, as indicated by CD4 count >200 cells/mL, and BMI >18.5 were each significantly associated with condom use. Similar findings have been reported in previous studies.^{3, 8–12} There was no significant association between gender and condom use.

As compared with individuals who did not know partner’s HIV status, those with either an HIV-seronegative or an HIV-seropositive partner were each significantly more likely to report using a condom at last sex (24.3% vs. 65.8%; $P < 0.001$ and 24.3% vs. 51.8%; $P < 0.001$, respectively) (Table 1). This pattern was evident regardless of previous ART or clinic site. Among ART-experienced patients, 80.6% with HIV-seronegative partners and 79.2% with HIV-seropositive partners versus 60.3% with partners of unknown HIV serostatus, had

used a condom at last sex ($P = 0.001$ and $P < 0.001$, respectively). There was a significant interaction between ART experience and partner's HIV serodiscordance ($P = 0.01$): ART-experienced adults who had HIV-seronegative partners were 17 times more likely to use a condom than ART-naïve adults who were unaware of their partner's HIV serostatus (adjusted odds ratio [aOR] = 17.12, 95% confidence interval [CI], 10.18, 29.08). Among rural clinic attendees, 47.1% of those with HIV-seronegative partners and 33.5% of individuals with HIV-seropositive partners compared with 17.9% of adults who were unaware of their partner's HIV serostatus ($P = 0.003$ and $P = 0.001$, respectively) used a condom at last sex. There was no significant interaction between clinic site and partner's HIV serostatus.

In a multivariate model, individuals with an HIV-seronegative partner were 6 times more likely to use a condom at last sex than those who did not know their partner's status (aOR = 5.99, 95% CI, 4.56, 7.86; Table 1). Individuals with HIV-seropositive partners had a 3-fold increased likelihood of using a condom at last sex (aOR = 3.35, 95% CI, 2.76, 4.03). Some patients may have learned their HIV status within the window of sexual behavior ascertainment; therefore, we performed a similar analysis in those with documentation of HIV before the past 3 months ($N = 921$). In this subset results remained similar, adults with HIV-seronegative partners and with HIV-seropositive partners were each more likely to report recent condom use than those unaware of their partner's status (aOR = 7.36, 95% CI, 4.36, 12.41 and aOR = 2.62, 95% CI, 1.90, 3.61, respectively).

Our finding that knowing a sexual partner was HIV-uninfected was associated with increased condom use is consistent with 2 previous studies.^{3,4} We found that only 24% of adults who were unaware of their partner's HIV serostatus reported recent condom use—lower than was found previously (46%–49%),^{3,4} although one study³ included adults without regular partners. We used HIV test date to identify a subset of patients with confirmed HIV diagnosis before the ascertainment of time frame of sexual risk behavior. In this subgroup, adults unaware of their partner's HIV status still reported relatively low condom use (43%).

The strengths of our study include the large sample size, inclusion of ART-experienced and -naïve patients, inclusion of urban and rural sites, and ability to compare condom use among adults who lack awareness of partner's HIV serostatus to those with HIV-serodiscordant partnerships. A limitation is that partner's HIV serostatus was not directly ascertained and timing of partner testing was unknown. Patients reported on recent sexual activity which may have occurred before their own or their partner's HIV test. As a cross-sectional study, there are constraints on inferring causality, and it is possible that condom-using individuals more often sought partner testing. In addition, we did not measure other potential correlates of condom use including forced sex, alcohol, having a casual partner,⁶ and use of denial as a coping behavior,⁴ all of which may be associated with lack of partner testing. We did not discern whether a patients' last sex occurred with a steady or a casual partner. We also did not assess whether last sex occurred with a partner of known or unknown HIV serostatus. Self report of condom use among patients who stated their partner was HIV-seronegative may have been the socially desirable or expected answer.

Our data indicate that over one-third of sexually active adults who enrolled in HIV care lacked knowledge of their sexual partner's HIV serostatus, and most of these (76%) had engaged in unprotected sex in the months preceding care. Our results suggest that partner testing in HIV care programs could protect substantial numbers of HIV-uninfected partners at risk for HIV simply by revealing discordant status, which in turn may increase condom use. In addition, 34% of patients with HIV-uninfected partners had unprotected sex. Thus, interventions that target self efficacy and skills regarding HIV prevention may complement

partner testing. In Nigeria, a video-based cognitive behavioral intervention to increase HIV risk reduction resulted in increased condom use.¹³ In Kenya, a program to deliver messages on partner testing, condom use, and sexually transmitted infections was launched in HIV clinical settings in 2009.¹⁴ Such interventions should continue to be prioritized within HIV care programs, including evaluations to determine their impact on HIV prevention.

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TABLE 1
Correlates of Reported Condom Use at Last Sex Among HIV-Positive Sexually Active Adults

Characteristic*	Used a Condom at Last Sex N (%)		Univariate Analyses [†] (N = 3013)		Multivariate Analyses [‡] (N = 2689)	
	Yes 1298 (43.1)	No 1715 (56.9)	OR (95% CI)	P	OR (95% CI)	P
Gender						
Female	731 (42.0)	1008 (58.0)	1		1	
Male	567 (44.5)	707 (55.5)	1.11 (0.96, 1.28)	0.2	1.01 (0.85, 1.21)	0.9
Age						
<30 yr	333 (39.0)	521 (61.0)	1		1	
30 yr	965 (44.7)	1194 (55.3)	1.26 (1.08, 1.49)	0.004	1.15 (0.95, 1.41)	0.2
Site [§]						
Rural	99 (26.5)	274 (73.5)	1		1	
Urban	1199 (45.4)	1441 (54.6)	2.30 (1.81, 2.93)	<0.001	1.82 (1.35, 2.47)	<0.001
ART experience						
Naïve	927 (36.9)	1586 (63.1)	1		1	
Experienced	371 (74.3)	128 (25.7)	4.95 (3.98, 6.14)	<0.001	4.66 (3.63, 6.99)	<0.001
Partner's serostatus						
Doesn't know	282 (24.3)	881 (75.8)	1		1	
Seronegative	271 (65.8)	141 (34.2)	6.01 (4.71, 7.66)	<0.001	5.99 (4.56, 7.86)	<0.001
Seropositive	745 (51.8)	693 (48.2)	3.36 (2.84, 3.99)	<0.001	3.34 (2.76, 4.03)	<0.001
Baseline CD4 count						
<200 cells/mL	498 (39.0)	778 (61.0)	1		1	
200 cells/mL	670 (46.3)	776 (53.7)	1.35 (1.16, 1.57)	<0.001	1.16 (0.97, 1.38)	0.1
Baseline BMI						
<18.5 kg/m ²	98 (29.0)	240 (71.0)	1		1	
18.5 kg/m ²	1178 (44.8)	1452 (55.2)	1.98 (1.55, 2.54)	<0.001	1.75 (1.31, 2.35)	<0.001

* Correlates examined in logistic regression analyses were as follows: gender, age, clinic site, year of enrollment in care, ART experience, partner's HIV serostatus, baseline CD4 count, baseline BMI, and statistical interactions between ART experience and partner's HIV serostatus and between clinic site and partner's HIV serostatus.

[†] n equals 3011 for univariate analysis of ART experience; n = 2722 for univariate analysis of baseline CD4 count; n = 2968 for univariate analysis of baseline BMI; for each covariate, univariate analyses including only the 2689 adults with available data on ART experience, CD4 count and BMI gave similar results.

*The final model included gender, age, clinic site, ART experience, partner's HIV serostatus, baseline CD4 count, and baseline BMI. Analyses adjusted for year of enrollment in care and for statistical interactions between ART experience and partner's HIV serostatus gave similar results.

§In analyses including indicator variables for each urban site compared to the rural site, OR = 2.54, 95% CI, 1.99, 3.25 and OR = 1.61, 95% CI, 1.21, 2.1.

OR indicates odds ratio; CI, confidence interval.