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Factors Associated With Poor Linkage to Human Immunodeficiency Virus Care Among Index Clients and Sex Partners Receiving Human Immunodeficiency Virus Assisted Partner Services in Kenya

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Introduction: Human immunodeficiency virus (HIV) assisted partner services (aPS) has been recommended as a strategy to increase HIV care finding. We evaluated factors associated with poor linkage to HIV care among newly diagnosed HIV-positive individuals (index clients) and their partners after receiving aPS in Kenya.

Methods: In a cluster randomized trial conducted between 2013 and 2015, 9 facilities were randomized to immediate aPS (intervention). Linkage to care—defined as HIV clinic registration, and antiretroviral therapy (ART) initiation were self-reported. Antiretroviral therapy was only offered to those with CD4 less than 500 during this period. We estimated linkage to care and ART initiation separately for index clients and their partners using log-binomial generalized estimating equation models with exchangeable correlation structure and robust standard errors.

Results: Overall, 550 index clients and 621 sex partners enrolled, of whom 46% (284 of 621) were HIV-positive. Of the 284, 264 (93%) sex partners returned at 6 weeks: 120 newly diagnosed and 144 whom had known HIV-positive status. Among the 120 newly diagnosed, only 69% (83) linked to care at 6 weeks, whereas among the 18 known HIV-positive sex partners not already in care at baseline, 61% (11) linked. Newly diagnosed HIV-positive sex partners who were younger and single were less likely to link to care ($P < 0.05$ for all).

Conclusion: Only two thirds of newly diagnosed, and known HIV-positive sex partners not in care linked to care after receiving aPS.

The HIV aPS programs should optimize HIV care for newly diagnosed HIV-positive sex partners, especially those who are younger and single.

Globally, significant advances have been made to control the spread of HIV. However, gaps still exist in HIV diagnosis, care and treatment. In sub-Saharan Africa (SSA) an estimated 79% of those living with HIV are diagnosed, 78% of those diagnosed are on antiretroviral therapy (ART), and 86% of these individuals are virally suppressed.¹ Assisted partner services (aPS) is a public health strategy to increase the proportion of persons living with HIV (PLHIV) who know their status and are engaged in care. The HIV aPS involves eliciting contact information for sex partners from newly diagnosed HIV-positive individuals (index clients), then actively tracing and offering HIV testing to these individuals. A critical and understudied component of aPS is ensuring that PLHIV are linked to care and treatment services.²

Linking PLHIV to care is essential to the access of HIV care services, including ART initiation and prophylaxis against opportunistic infection, which result in reduced HIV-associated morbidity and mortality and prevention of new HIV infections. Several studies have shown that early ART initiation can reduce incidence of acquired immune deficiency syndrome (AIDS)-defining events including tuberculosis³ and prolongs life expectancy

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among PLHIV.⁴ In addition, the risk of HIV transmission to sex partners of PLHIV who are on ART is reduced by up to 96%.^{3,5-7}

Assisted partner services has been shown to be effective in HIV linkage to care in the United States and Europe, forming a key strategy in HIV prevention by increasing HIV testing and ART initiation for both index clients and their sex partners.⁸⁻¹¹ In studies conducted in the United States, index clients who received partner services were more likely to enroll in HIV care.^{12,13} Studies conducted in Europe have shown that partner services improve linkage to HIV care, lead to earlier ART initiation, reduce vertical HIV transmission from mothers to infants, and increase life expectancy.¹⁴⁻¹⁷ Though SSA countries bear the highest burden of global HIV infection, experience in implementing aPS is limited. Among aPS implementing programs in SSA, few have reported on linkage to HIV care among sex partners. To our knowledge, only one study on the Cameroon aPS program showed linkage to care among HIV-positive sex partners at 86%.¹⁸⁻²⁰

In a multicenter cluster-randomized controlled trial of aPS in Kenya, we conducted a subset analysis limited to the aPS intervention arm (ie, those who received provider referral) to investigate prevalence and correlates of two key aPS outcomes among newly diagnosed HIV-positive individuals (index clients) and their sex partners: (1) linkage to HIV care and (2) ART initiation.

METHODS

Study Design

The study design and methods are reported in the study protocol article.²¹ Briefly, a multisite cluster-randomized controlled trial was conducted between August 2013 and August 2015 in 18 health care facilities offering HIV testing services (HTS) that were randomized in a 1:1 ratio to receive either immediate aPS (intervention) or aPS delayed for 6 weeks (control). In the intervention arm, aPS was implemented immediately after index enrollment whereby sex partners were immediately notified of HIV exposure. This analysis focuses only on index clients and their sex partners within this aPS intervention arm.

The facilities were urban, periurban, and rural and were located in 5 counties in Kenya: Nairobi, Kiambu, Murang'a, Kisumu, and Siaya.²¹ We conducted restricted randomization of the sites to ensure balance in facility characteristics between the intervention and delayed arms in terms of in terms of county (Nairobi, Kiambu, Murang'a, Kisumu, and Siaya) and proximity to a city (urban, periurban, and rural). The study was unblinded because the protocols and follow-up timelines for the immediate and delayed arms were distinctly different.

Study Participants

We enrolled index clients who tested and were newly diagnosed HIV-positive at the study facilities. They were considered eligible if they were 18 years or older, willing to provide informed consent, and willing to provide information on at least one sex partner from the past 3 years. Clients who were pregnant or had experienced intimate partner violence within the last month were excluded from study participation. Index clients' sex partners from the prior 3 years were traced and invited to enroll in the study. Partners were considered eligible if they were 18 years or older and willing to provide informed consent for the study.

All study participants provided written, informed consent. Ethical approval for this study was obtained from the Kenyatta National Hospital Ethics and Scientific Review Committee and the University of Washington Institutional Review Board. The trial is registered with ClinicalTrials.gov (NCT01616420).

Study Procedures

Index Client Enrollment, Follow-Up and Linkage to Care

At index client enrollment, health advisors (HTS counselors specially trained on partner notification) collected information on demographic characteristics, sex risk behavior, HIV testing history and contact details of sex partners in a standardized interview. The aPS process was explained to the index clients, and they were assured of confidentiality when their partners were being notified. The informed consent form also outlined in detail privacy and confidentiality measures that would be taken to protect the index client. All index clients were encouraged to enroll for HIV care at a health care facility of their convenience. Whenever possible, the health advisors would escort them to the HIV comprehensive care center (CCC) within the same health care facility.

At the 6-week and 3-month follow-up visits for the index clients, health advisors collected information on the primary outcome of linkage to care. Linkage to care was defined as participant-reported enrollment in an HIV CCC. For all clients, we confirmed linkage to care by requesting for their CCC card which is used to record information on clients enrolled at the CCC. Participants also reported information about their initiation of cotrimoxazole prophylaxis, CD4 T-cell blood draws, ART eligibility, and ART use. At the time of this study, Kenya national guidelines recommended ART for all adults with CD4 cell count below 500.

Sex Partner Enrollment, Follow-Up, and Linkage to Care

After index enrollment, health advisors in the aPS intervention arm sites contacted the sex partners immediately. The HIV testing and linkage to care services were offered to these sex partners where they were encouraged to receive HTS either at the health care facility, home, or work place. Sex partners were defined as known positive if they knew their HIV-positive status before study enrollment; those who learnt of their HIV-positive status during the course of the study were defined as newly diagnosed. Newly diagnosed HIV-positive partners were referred and linked to care at a facility of their choice. Partners who had a known HIV-positive diagnosis were encouraged to continue with HIV care and to disclose their status to their sex partners. The HIV-negative sex partners were offered HIV prevention messages including information on condom use.

At sex partner enrollment, health advisors collected information on demographic characteristics, risky sexual behavior and HIV testing history. Partners were encouraged to enroll at the nearest study site; for those who could not come to the study site, the health advisors would arrange to meet at a convenient place and time including the participant's home, workplace, or other available venue. Sex partners were tested for HIV at enrollment (usually within 2 weeks of index client enrollment), and data on linkage to HIV care were collected at the 6-week follow-up visit from their CCC card, similar to the index clients.

Data were collected on predesigned questionnaires programmed into smartphones using Open Data Kit.²² Questionnaires had preset validation checks to ensure accuracy and consistency of data at the point of data entry. Once completed, they were uploaded to the Ministry of Health National AIDS and STI Control Program server.²²

Statistical Analysis

Sociodemographic characteristics at baseline, and linkage to care outcomes at 6 weeks for both index clients and sex partners in the intervention arm were described using medians and interquartile ranges for continuous variables, and proportions

for categorical variables. Linkage to care outcomes was binary and included enrollment in HIV care, CD4 T-cell blood draw, eligibility for ART, and ART initiation. We used the 6-week follow-up visit for consistency in presentation of data for both the index participants and sex partners.

Analyses of linkage to care correlate among the index clients and their sex partners were performed separately. Correlates of linkage to care among index clients and their sex partners were assessed using bivariable, log-binomial generalized estimating equation models with exchangeable correlation structure, and robust standard errors to account for facility and participant correlation. Relative risks (RRs) and 95% confidence intervals (CIs) were calculated. Variables associated with linkage to care in these bivariable analyses ($P < 0.1$) were included simultaneously in 2 separate multivariable models for index clients and their sex partners. All analyses were conducted using Stata 13.0 (StataCorp, College Station, TX).

RESULTS

Baseline Sociodemographic and Sex Behavior Characteristics

In the aPS intervention arm, 550 index clients were enrolled into the study (median age, 30 years; male, 41.5%; currently

married, 61.1%) (Table 1). Approximately 30% (164 of 550) of index clients had at least 1 new sex partner in the prior 3 months; 42.0% (230 of 550) had at least 5 lifetime sex partners; and about one quarter (137 of 550, 24.9%) had used a condom at their last sex contact.

Overall, 621 sex partners were enrolled into the intervention arm (median age, 30 years; male, 50.7%; currently married, 64.6%) (Table 1). Of these sex partners, 35.6% (221/625) had at least 1 sex partner in the prior 3 months, 46.8% (290/625) had at least 5 lifetime sex partners, and 38.9% (241/625) had used a condom at the last sex encounter.

Linkage to Care Outcomes: Index Clients, Sex Partners

Of the 550 index clients in the intervention arm, 472 (85.8%) returned for the 6-week visit, and 439 (93.0%) of these 472 had linked to care before this visit (Fig. 1, Table 2). Only 76.3% (360 of 472) had a CD4 blood draw, and 301 (83.6%) of the 360 clients discussed ART eligibility with their health care provider. Of the 63.1% (190 of 301) meeting criteria for treatment initiation, 91.6% (174 of 190) of the index clients initiated ART. Index clients who returned for 6-week follow-up were more likely to be older than those who did not return for follow-up ($P = 0.041$), but they were similar on all other baseline characteristics.

Among the 621 enrolled sex partners, 284 (45.7%) were HIV-positive. Of the 284, 93.0% (264) returned for their 6-week visit, that is, 120 newly diagnosed and 144 known HIV-positive sex partners (Fig. 1, Table 2). Partners who did not return for 6-week follow-up were more likely to have electricity ($P = 0.001$) and less likely to have used a condom the last time they had sex ($P = 0.031$), but they were similar on all other baseline characteristics.

Among the 120 newly diagnosed HIV-positive sex partners, only 83 (69.2%) had linked to care at 6 weeks, and 63 (52.5%) had a CD4 blood draw, with 53 (63.8%) of the 83 clients discussing their ART eligibility with their health care provider. Of the 53, 30 (56.6%) clients meet the criteria for ART initiation, and 86.7% (26/30) initiated ART by the 6-week visit. Among 144 known HIV-positive sex partners, 126 (87.5%) were already enrolled in HIV care at enrollment and were excluded from the analysis. Among 18 known HIV-positive sex partners who were not previously enrolled in HIV care at enrollment, 11 (61.1%) had linked to care at 6-week follow-up, and 8 (44.4%) had a CD4 blood draw. Among those enrolled in HIV care, 77.8% were eligible for ART, and among those eligible for ART, 100.0% initiated treatment.

Correlates of Linkage to Care: Index Clients and Sex Partners

Among index clients, those who linked to care in the first 6 weeks had similar demographic characteristics to those who did not link to care (Table 3). There was a trend for those who enrolled in care to be more likely to have had at least 1 sex partner in the last 3 months after adjusting for number of lifetime sex partners (adjusted RR [aRR], 1.04; 95% confidence interval [CI], 1.00–1.08) and to have had at least 5 lifetime sex partners after adjusting for number of new sex partners in the last 3 months (aRR, 1.04; 95% CI, 1.01–1.07).

Among the newly diagnosed HIV-positive sex partners, increased age was significantly associated with increased linkage to care (Table 4). We observed a 6% increase in linkage to care for every 5-year age increase (aRR, 1.06; 95% CI, 1.01–1.11), after adjusting for marital status. Those who had a live-in partner were more likely to link to care than those who were single (aRR, 1.42; 95% CI, 1.07–1.89) after adjusting for age. There were no statistically significant differences in other demographic and sex risk behavior characteristics between sex partners enrolled in care

TABLE 1. Baseline Characteristics of Immediate Arm Index Participants and Sex Partners*

	Index Participants, n = 550	Sex Partners, n = 621
	n (%) or Median (IQR)	n (%) or Median (IQR)
Demographic factors		
Age	30 (25–37)	30 (26–37)
Gender: male	228 (41.5)	315 (50.7)
Marital status		
Single	104 (18.9)	135 (21.7)
Currently married	336 (61.1)	401 (64.6)
Divorced/widowed	89 (16.2)	58 (9.3)
Live-in partner	21 (3.8)	27 (4.4)
Has electricity	311 (56.6)	320 (51.5)
Has running water	225 (40.9)	227 (36.6)
Sex risk behavior		
New sex partners in last 3 mo		
0	386 (70.2)	400 (64.4)
1+	164 (29.8)	221 (35.6)
Lifetime sex partners [†]		
<5	317 (58.0)	330 (53.2)
5+	230 (42.0)	290 (46.8)
Used condom at last sex [‡]	137 (24.9)	241 (38.9)
Ever given money for sex	102 (18.6)	156 (25.1)
Ever received money for sex	94 (17.1)	140 (22.5)
Economic factors		
Way to support self	381 (69.3)	—
Stable place to live	496 (90.2)	—
Have children	455 (82.7)	—
HIV status		
Negative	—	337 (54.3)
New positive	550 (100)	128 (20.6)
Known positive	—	156 (25.1)

IQR, interquartile range.

* Excluded 22 in the immediate arm that had been included in the initial study paper due to missing and discrepant data.

[†] Analyzed only among 547 immediate arm index participants and 620 immediate arm partners.

[‡] Analyzed only among 550 immediate arm index participants and 620 immediate arm partners.

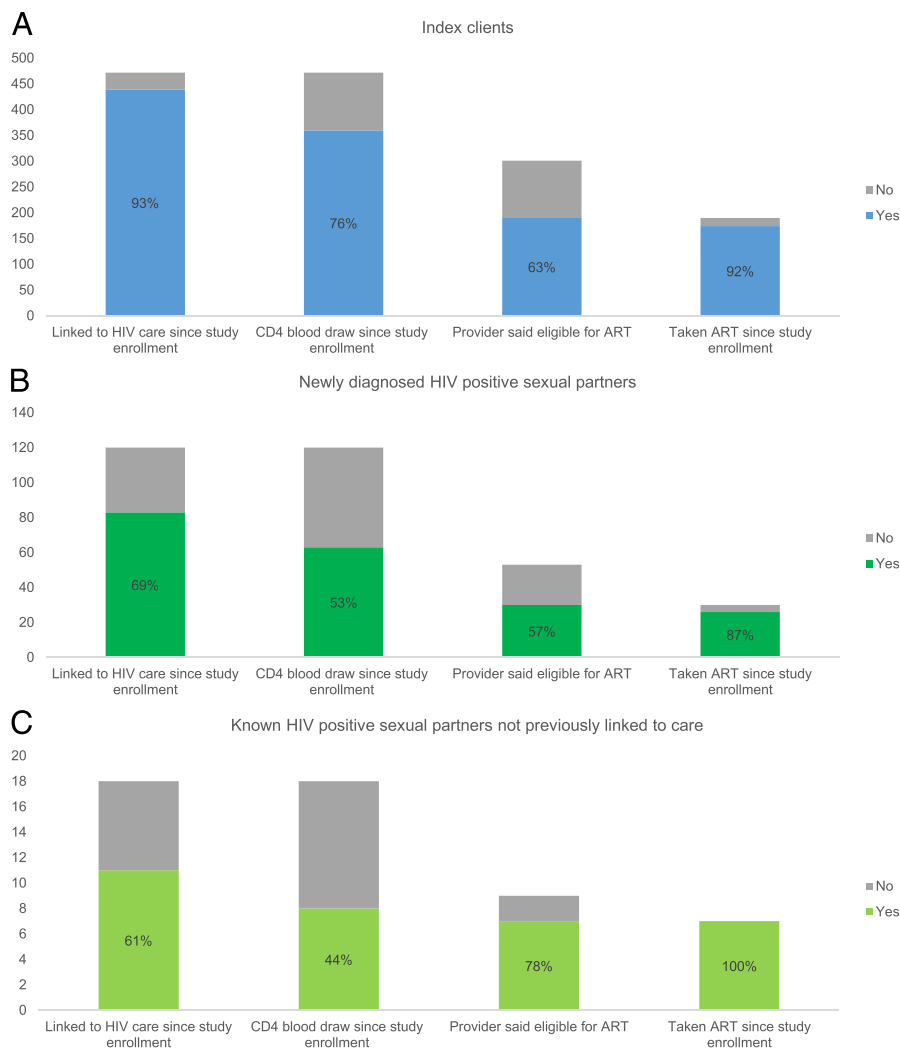


Figure 1. Linkage to care cascade for index participants and HIV-positive sex partners at the 6-week follow-up visit.

compared with those who did not enroll. Among the known HIV-positive sex partners who had not linked to care before study enrollment, there were no statistically significant differences in demographic and sex risk behavior characteristics between sex partners enrolled in care compared with those who did not enroll after adjusting for gender and ever given money for sex (Table 5).

DISCUSSION

Within the aPS intervention arm, 6-week linkage to care was high (>93%) for index clients and known HIV-positive sex partners; however, only 69% of newly diagnosed HIV-positive and 61% of known HIV-positive sex partners not previously linked, enrolled in care. Index clients who linked to care were similar to those who did not link with regard to demographic, sex risk behavior and economic factors. Among newly diagnosed HIV-positive sex partners, those who were younger and single were less likely to link to care. Once linked to care, ART initiation was high (>85%) regardless of whether the participant was an index client, newly diagnosed, or known HIV-positive sex partner not previously linked to care.

Notably, only two thirds of newly diagnosed HIV-positive partners and known HIV-positive partners not previously enrolled in care in the aPS intervention arm linked to care within 6 weeks of

index client HIV testing compared with more than 90% linkage among index clients. One explanation may be that at the time of our study, Kenya had not yet implemented the World Health Organization's (WHO) 2016 *Test and Treat All* recommendation. It is possible that these HIV-positive sex partners did not feel unwell, and thus did not consider themselves likely to be eligible for ART initiation and were, therefore, less likely to seek HIV care. Health care providers were also less inclined to insist on immediate ART initiation among these clients because they did not meet eligibility criteria for treatment. Within universal test and treat trials in SSA, linkage to care results was similar to our study. In the Sustainable East Africa Research in Community Health trial, linkage to care among HIV-positive clients not already in HIV care was 56.6% and 61.3% within 1 and 3 months of testing, respectively.²³ Age was associated with linkage to care with higher likelihood of linkage with each additional year increase in age, similar to our study. Probability of retention to care at 1 year was lower among newly diagnosed compared with previously in care individuals.²⁴ Although we did not evaluate retention to care at 1 year as an outcome variable due to our limited study timeline, these results reinforce the need for more proactive engagement of both newly and previously diagnosed HIV-positive individuals. We did not observe any gender disparity in linkage to care similar to the Sustainable

TABLE 2. Linkage to Care Outcomes for Index Participants and HIV-positive Sex Partners at the 6-Week Follow-up Visit

Immediate Arm Outcomes	n/Total	%
Outcomes for index participants		
Enrolled in HIV care since study enrollment	439/472	93.0
CD4 blood draw since study enrollment	360/472	76.3
Provider said eligible for ART ^{*,†}	190/301	63.1
Taken ART since study enrollment [‡]	174/190	91.6
Outcomes for newly diagnosed partners		
Enrolled in HIV care since study enrollment	83/120	69.2
CD4 blood draw since study enrollment	63/120	52.5
Provider said eligible for ART [§]	30/53	56.6
Taken ART since study enrollment	26/30	86.7
Outcomes for known positive partners not previously linked to care		
Enrolled in HIV care since study enrollment	11/18	61.1
CD4 blood draw since study enrollment	8/18	44.4
Provider said eligible for ART	7/9	77.8
Taken ART since study enrollment	7/7	100.0

* Excluded 138 immediate index cases who did not discuss ART with a provider.

† By WHO staging.

‡ Among those who were eligible for ART.

§ Excluded 30 immediate group partners who did not discuss ART with a provider; among those enrolled in care.

|| Among those who were eligible for ART and enrolled in care.

|| Excluded 2 immediate group partners who did not discuss ART with a provider; among those enrolled in care.

East Africa Research in Community Health trial^{23,24} but unlike other SSA studies that show lower linkage and retention to care among men.^{25,26} This is possibly due to proactive tracing and notification for both male and female sex partners in our study and more streamlined patient-centered care at the health facilities.

Few studies in SSA countries show results on linkage to care among PLHIV who have specifically received aPS. In Cameroon, where aPS has been implemented since 2007, there was high linkage with about 86% of HIV-positive sex partners

linking to HIV care. However, they did not disaggregate their results by new versus known HIV-positive sex partners.¹⁸ They also did not indicate the time point at which they evaluated linkage to care, and we considered linkage at the 6-week visit only. It is possible that linkage would be higher at later time points, assuming additional follow-up of the sex partners. To our knowledge, there are no aPS studies that have evaluated the effect of time on linkage to care; however, we anticipate that aPS models with proactive sex partner engagement and follow-up, especially for newly

TABLE 3. Correlates of Linking to Care in the First 6 Weeks Among Index Participants

	Linked to Care (n = 439), n (%) or Median (IQR)	Not Linked to Care (n = 33), n (%) or Median (IQR)	RR (95% CI)	P	aRR* (95% CI)	P
Demographic factors						
Age	30 (25–36)	27 (24–38)	1.01 (0.99–1.02) [†]	0.315	—	
Gender: male	184 (41.9)	13 (39.4)	1.01 (0.96–1.06)	0.803	—	
Marital status						
Single (reference)	78 (17.8)	7 (21.2)	1.0	—	—	
Currently married	267 (60.8)	24 (72.7)	1.00 (0.94–1.07)	0.998	—	
Divorced/widowed	78 (17.8)	0 (0.0)	—	—	—	
Live-in partner	16 (3.6)	2 (6.1)	0.98 (0.85–1.12)	0.738	—	
Has electricity	242 (55.1)	18 (54.6)	1.00 (0.94–1.07)	0.939	—	
Has running water	176 (40.1)	10 (30.3)	1.03 (0.96–1.10)	0.375	—	
Sex risk behavior						
New sex partners in last 3 mo						
0 (reference)	300 (68.3)	27 (81.8)	1.0	—	—	
1+	139 (31.7)	6 (18.2)	1.05 (1.01–1.09)	0.027	1.04 (1.00–1.08)	0.034
Lifetime sex partners [‡]						
<5 (reference)	245 (56.1)	23 (69.7)	1.0	—	—	
5+	192 (43.9)	10 (30.3)	1.04 (1.01–1.07)	0.011	1.04 (1.01–1.07)	0.017
Condom use at last sex	113 (25.7)	5 (15.2)	1.04 (0.98–1.11)	0.234	—	
Ever given money for sex	87 (19.8)	5 (15.2)	1.02 (0.97–1.07)	0.436	—	
Ever received money for sex	79 (18.0)	5 (15.2)	1.01 (0.94–1.09)	0.714	—	
Economic factors						
Way to support self	304 (69.3)	21 (63.6)	1.02 (0.96–1.08)	0.568	—	
Stable place to live	397 (90.4)	31 (93.9)	0.97 (0.90–1.04)	0.377	—	
Have children	359 (81.8)	29 (87.9)	0.97 (0.91–0.99)	0.410	—	

* aRR is adjusted for number of new sex partners in the last 3 months and number of lifetime sex partners.

† RR is comparing for a 5 year increase in age.

‡ Missing data for 2 participants who enrolled in care.

TABLE 4. Correlates of Linkage to Care for 120 Newly Diagnosed Sex Partners

	Linked to Care (n = 83), n (%) or Median (IQR)	Not Linked to Care (n = 37), n (%) or Median (IQR)	RR (95% CI)	P	aRR* (95% CI)	P
Demographic factors						
Age	31 (26–36)	28 (25, 32)	1.07 (1.01–1.13) [†]	0.024	1.06 (1.01–1.11) [†]	0.019
Gender: male	37 (44.5)	18 (48.7)	0.95 (0.84–1.09)	0.481		
Marital status						
Single (reference)	11 (13.3)	7 (18.9)	1.0		1.0	
Currently married	64 (77.1)	27 (73.0)	1.17 (0.81–1.68)	0.405	1.09 (0.76–1.56)	0.636
Divorced/widowed	2 (2.4)	3 (8.1)	0.72 (0.27–1.91)	0.512	0.67 (0.28–1.59)	0.365
Live-in partner	6 (7.2)	0 (0.0)	1.58 (1.13–2.21)	0.007	1.42 (1.07–1.89)	0.015
Has electricity	43 (51.8)	13 (35.1)	1.14 (0.95–1.36)	0.164	—	
Has running water	29 (34.9)	10 (27.0)	1.03 (0.85–1.24)	0.756	—	
Sex risk behavior						
New sex partners in last 3 mo						
0 (reference)	54 (65.1)	22 (59.5)	1.0			
1+	29 (34.9)	15 (40.5)	0.93 (0.83–1.04)	0.216	—	
Lifetime sex partners						
<5 (reference)	45 (54.2)	17 (46.0)	1.0		—	
5+	38 (45.8)	20 (54.0)	0.94 (0.75–1.17)	0.583	—	
Used condom at last sex	19 (22.9)	9 (24.3)	1.03 (0.82–1.29)	0.817	—	
Ever given money for sex	18 (21.7)	11 (29.7)	0.92 (0.71–1.20)	0.550	—	
Ever received money for sex	18 (21.7)	13 (35.1)	0.84 (0.66–1.06)	0.148	—	

* Adjusted for age and marital status.

[†] RR is comparing those 5 years older to those 5 years younger.

diagnosed HIV-positive sex partners, might be necessary if programs are to successfully link and retain these individuals in care.

Index clients who linked into care were similar to those who did not link into care with regard to demographic, sex risk, and economic factors. Among sex partners, those who were younger and single were less likely to be linked. These results differ from those of a study on linkage to care in South Africa, which found that age was not predictive of linkage to HIV care in HTS clients.²⁷ This finding suggests that it may be useful to tailor messages about linkage to care and condom use to younger, single

HIV-positive partners. Achieving high rates of linkage to care is critically important if partner notification services programs are to be effective at reaching Joint United Nations Programme on HIV/AIDS (UNAIDS) 95:95:95 targets across SSA.¹

In our analysis, once index clients and sex partners in the aPS intervention arm linked to care, ART initiation was high with approximately 90% of all index clients and more than 85% of sex partners who were eligible for ART initiating treatment by the 6-week follow-up visit. These results are very encouraging given the UNAIDS targets. Also, by the close of our study, WHO's 2016 *Test*

TABLE 5. Correlates of Linkage to Care for 18 Known HIV-Positive Sex Partners Who Had Not Enrolled in HIV Care Prior to Study Enrollment

	Linked to Care N = 11 n (%) or Median (IQR)	Not Linked to Care N = 7 n (%) or Median (IQR)	RR (95% CI)	P	aRR* (95% CI)	P
Demographic factors						
Age, y	34 (27–46)	30 (28–33)	1.07 (0.98–1.18) [†]	0.141	—	
Gender: male	4 (36.4)	5 (71.4)	0.48 (0.22–1.06)	0.070	0.51 (0.20–1.31)	0.163
Marital status [‡]						
Single	0 (0.0)	2 (28.6)				
Currently married	10 (90.9)	5 (71.4)	1.75 (0.51–6.01)	0.371	—	
Divorced/widowed	1 (9.1)	0 (0.0)				
Live-in partner	0 (0.0)	0 (0.0)				
Has electricity	5 (45.5)	4 (57.1)	1.05 (0.44–2.55)	0.908	—	
Has running water	4 (36.4)	2 (28.6)	1.23 (0.70–2.17)	0.476	—	
Sex risk behavior						
New sex partners in last 3 mo						
0 (reference)	9 (81.8)	4 (57.1)	1.0		—	
1+	2 (18.2)	3 (42.9)	0.61 (0.29–1.25)	0.176	—	
Lifetime sex partners						
<5 (reference)	9 (81.8)	3 (42.9)	1.0		—	
5+	2 (18.2)	4 (57.1)	0.53 (0.12–2.33)	0.403	—	
Used condom at last sex	4 (36.4)	2 (28.6)	1.11 (0.57–2.14)	0.765	—	
Ever given money for sex	2 (18.2)	2 (28.6)	0.56 (0.34–0.90)	0.018	0.76 (0.38–1.51)	0.433
Ever received money for sex	1 (9.1)	0 (0.0)	—	—	—	

* Adjusted for gender and ever given money for sex.

[†] RR is comparing those 5 years older to those 5 years younger.

[‡] This model only includes the currently married variable.

and Treat All recommendation had not been incorporated into the Kenya HIV Testing Services Guidelines and, therefore, did not affect the proportion of individuals initiating ART.^{2,28} Our findings are consistent with the Kenya AIDS Indicator Survey 2012 where 85% of individuals who knew their HIV status and were ART-eligible, were taking ART,²⁹ therefore showing the potential for aPS to achieve even higher levels of ART initiation among clients. As global policy shifts toward 100% treatment, aPS is an important strategy to address challenges identifying those living with HIV, linking them to care and initiating therapy.

Strengths of this study include conducting the study in urban, periurban, and rural HTS facilities, thus our study results are generalizable to a wide range of settings. Second, we collected data that enabled us to disaggregate results by new and known HIV-positive sex partners. This enabled us to show differences in linkage to care and ART initiation for these subgroups. Third, we followed up clients to ascertain linkage to care status which provided an opportunity for additional support for clients with difficulties in establishing care. Limitations include that our linkage to care outcomes were self-reported and could be subject to social desirability bias with potential overreporting of linkage to care and ART initiation. Second, the time for index client and sex partner follow-up for this analysis was conditional on follow-up at 6 weeks, with both index clients and sex partners who did not return for follow-up having similar characteristics to those who did except for older age (index clients), and lower likelihood of having electricity or using condoms among the sex partners. A longer study would be helpful to evaluate the effect of aPS on linkage and retention in care for both index and sex partners over time. In addition, this study focused on heterosexual relationships in the general population; therefore, results might differ among key populations. Further studies to investigate aPS in key populations in Kenya, including female sex workers, men who have sex with men, and people who inject drugs would be useful.

Overall, aPS is a critical strategy for ensuring linkage to care and ART initiation among HIV-positive sex partners and it is being incorporated as part of routine HIV services. Providing immediate aPS was associated with high linkage to HIV care among index clients. However, this was not observed among newly diagnosed or known HIV-positive sex partners who had not linked to care, or among sex partners who were single or younger, highlighting areas for attention. As aPS programs scale up in Kenya and other parts of SSA, optimization of HIV care for newly diagnosed HIV-positive sex partners will be critical to the achievement of UNAIDS 95-95-95 goals.

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