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Behavior change following HIV diagnosis: findings from a Cohort of Los Angeles MSM

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ABSTRACT

The effect of an HIV diagnosis on subsequent behavior of men who have sex with men (MSM) remains unclear. From 2009 to 2012 the NIDA funded Metromates Study enrolled and followed for one year MSM seeking testing for HIV in Los Angeles, assessing those with new HIV diagnoses for acute/recent HIV infection. Behavioral data were collected via Computer-Assisted Self-Interview from 321 men of whom 125 were classified as recently HIV infected, 91 as not recently HIV infected, and 105 as HIV-negative. Differences over time between those with recent HIV infection, not recent HIV infection, and no HIV were evaluated using bivariate and multivariable analyses for repeat measures to assess associations between HIV group, behaviors and condomless receptive (CRAI), insertive (CIAI), or any condomless anal intercourse (CAI). Participants were mostly young (59% < 30 years of age) and minority. Median number of partners reported in past year dropped significantly over time among recently infected MSM (10 to 5) and HIV negative men (5 to 3) but not for not recently HIV infected. No changes comparing baseline to follow-up were noted in reports of CAI within each HIV-group. Based on GEE multivariable analyses adjusting for age, and race/ethnicity after HIV testing recently HIV infected and not recently HIV infected men practiced more CAI within serodiscordant partnerships than HIV negative MSM: more CRAI than the HIV negatives (AOR = 4.90; 95% CI 1.80–13.29 and AOR = 5.01; 95% CI 1.77–14.16 among recently infected and not recently infected, respectively) but only more CIAI among not recently infected (AOR 3.48; 95% CI 1.31–9.24) when compared to HIV negatives. For MSM seeking HIV testing in Los Angeles at that time, there was little indication of behavior change following HIV diagnosis and continued CAI, suggesting that without rapid linkage to care and viral suppression significant transmissions may have been ongoing.

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KEYWORDS

HIV diagnosis; acute HIV infection; behavior change and HIV diagnosis; HIV transmission behaviors

Introduction

The role of early HIV treatment as prevention for partners of those infected and the community (Cohen et al., 2011) by lowering incidence (Tanser, Barnighausen, Grapsa, Zaidi, & Newell, 2013) has led to a shift in prevention from changing behaviors to early identification with rapid linkage to HIV care and adoption of antiretroviral therapy (ART). However, many diagnosed with HIV remain unlinked to care and still infectious in what has been described as the cascade of care (Mugavero, Amico, Horn, & Thompson, 2013). We previously identified decreases in risk behavior and increases in sero-sorting and main partnering soon after HIV diagnosis (Gorbach, Drumright, Daar, & Little, 2006) with a rebound after 9 months of the practice of condomless anal intercourse (CAI) with uninfected partners (Gorbach et al., 2011) – mirroring reports from 10 years earlier (Colfax et al., 2002). To examine continuing transmission potential from those with new infection, we

enrolled a cohort of men who have sex with men (MSM) seeking HIV testing at a community clinic in Los Angeles to understand behavioral patterns post-diagnosis.

Methods

Between 2009 and 2012 328 MSM were enrolled in a cohort study conducted at the Los Angeles LGBT Center. Men at least 18 years of age reporting sex with a man in the past 12 months who sought HIV testing at the LGBT Center were eligible for inclusion. Those testing HIV-positive ($n = 216$) were all verified as newly diagnosed; 125 of these were classified as recently infected by one of these criteria: (1) documentation of a negative HIV test <12 months prior to enrollment; (2) NAAT positive test result on a negative HIV antibody test; (3) recent infection based on detuned serologic assay (Vironostika detuned assay, BioSystems Laboratory, San Francisco), (Kothe et al., 2003; Rawal et al., 2003);

or (4) documentation of recent infection by a referring physician. A remaining 91 who had a positive rapid HIV test were classified as not recently infected and 113 were HIV-negative (additional study detail in (Gorbach, Javanbakht, Bornfleth, Bolan, & Lewis Blum, 2017)). Men were enrolled for a year of quarterly follow up visits but only 55% completed any follow-up after enrollment.

The following were assessed via a Computer-Assisted Self-Interview (CASI): sexual partner type (main partner,¹ exchange partner, and casual partner), serodiscordant partner; condomless receptive anal intercourse (CRAI) and condomless insertive anal intercourse (CIAI); last 12 months reports of binge alcohol drinking, marijuana, cocaine, inhalants, opioids, methamphetamine, and injection drug use; and past 12 months reported use of ART drugs for treatment. All baseline data was collected after a known diagnosis but refer to behavior that occurred before or at the time of infection or negative result.

Differences in CRAI and CIAI or any CAI with serodiscordant partner by demographic characteristics and risk behaviors were evaluated using paired t-tests, and McNemar chi-square tests comparing baseline to follow up. Repeat measures multivariable logistic regression analysis (generalized estimating equations (GEE)) was used to assess the association between characteristics and behaviors reported and the practice of CRAI, CIAI, or CAI at any time during the year of follow-up. Final models included variable significant in univariate analyses or specified *a priori* based on literature such as alcohol and substance use. All analyses were conducted using SAS software, version 9.2 (SAS Institute Inc., Cary, NC). Study procedures were reviewed and approved by the UCLA IRB and the LGBT Center's Research Committee.

Results

Among the 328 men enrolled in the study more than half, 59% ($n = 191$) were less than 30 years of age, with 51% (163) identifying as Hispanic, 15% (47) as African American, and 27% (85) as White (Table 1). Most participants were interviewed within a month of their diagnosis (median 15 days, Interquartile range 7–31 days). More African American men had new diagnosis of long-standing infection than recent infection; the reverse was true for Hispanic and White men. Among 214 who completed a followup interview, fewer recently HIV-infected than not recently infected men reported being on antiretroviral therapy (ART) (72% vs 82%).

Overall, the number of sexual partners in the past 12 months decreased (Table 1); the median number of

partners among those who were recently HIV-infected decreased from 10 partners at baseline to 5 partners at 12 month follow-up ($p < 0.01$). Reports of having a main partner increased for recently infected from 25% ($n = 31$) to 34% ($n = 21$), among not recently infected men from 46% ($n = 41$) to 65% ($n = 33$) but remained around 45% for HIV negative men. No changes were noted in percentages reporting CAI within each HIV-group and across the groups.

There was more substance use during sex reported by those with recent HIV infection (p value = 0.06); at baseline and follow up compared to those not recently infected or HIV negative and follow up (Table 1). Methamphetamine use increased slightly among those who were not recently infected from 17% ($n = 15$) at baseline to 22% ($n = 11$) at follow-up (p value = 0.06) but declined among the recently HIV-infected and HIV-negative groups.

There were differences in initiation of ART with fewer recently infected men reporting being on ART at either baseline or followup than not recently infected men. Among recently infected men CIAI with serodiscordant partner was reported by 17% ($n = 7$) on treatment vs. 6% ($n = 1$) for those not on treatment ($p = 0.28$). It was higher for not recently infected men; CIAI with serodiscordant partner was reported by 25% ($n = 10$) of those on treatment vs. 33% ($n = 3$) of those not on treatment ($p = 0.62$).

Based on GEE multivariable analyses adjusting for age and race/ethnicity during follow-up (i.e., post HIV testing) (Table 2) not recently HIV-infected were 3.5 times more likely to report CIAI with serodiscordant partners (Adjusted Odds Ratio [AOR] = 3.48; 95% confidence interval [CI] 1.31–9.24) and 5 times more likely to report CRAI with serodiscordant partners (AOR = 5.01; 95% CI 1.77–14.16) compared to those who were HIV-negative. Those with recent infection did not report more CIAI but had increased odds of CRAI reports compared to HIV negative testors (AOR = 4.90; 95% CI 1.80–13.29).

Discussion

Our findings suggest MSM with new HIV diagnoses continue to contribute to transmission of HIV in Southern California due to ongoing practice of transmission behaviors before viral suppression. The men in our study came from a site with a relatively high rate of recent infection; 15% of 1082 men with new HIV diagnoses of 66,546 tested were acutely infected (Joseph Davey, Beymer, Roberts, Bolan, & Klausner, 2017) suggesting much potential for continuing transmission in this population. While our sample was limited by high loss to follow-up, it is clear that few men in our study of

Table 1. Changes in sexual risk behaviors and substance use by HIV serostatus for participants in the Metromates study, 2009–2014.

	HIV seropositive-new diagnosis						P value*
	Recently infected (n = 125)		Not recently infected (n = 90)		Tested HIV negative (n = 113)		
	n	%	n	%	n	%	
Took Antiretroviral (ARV), past 12 months							
Baseline	15	12.4	15	16.7	17	16.4	<.01
Follow-up	44	72.1	40	81.6	9	12.9	
p value**		<.01		<.01		0.76	
Number of partners in the past 12 months, median (IQR)							0.91
Baseline	10	(5–23)	5	(1–5)	5	(2–15)	<.01
Follow-up	5	(2–14)	4	(1–8)	3	(1–9)	
p value**		<.01		0.12		<.01	
Main partner							0.13
Baseline	31	25.4	41	45.6	51	46.4	0.40
Follow-up	21	34.4	33	64.7	32	44.4	
p value**		0.08		0.14		0.84	
CIAI, last partner							0.40
Baseline	45	38.1	37	42.5	46	42.2	0.43
Follow-up	19	31.7	25	50.0	33	43.8	
p value**		0.13		0.39		0.81	
CRAI, last partner							0.43
Baseline	58	48.3	42	48.3	40	36.7	0.21
Follow-up	24	40.0	23	47.9	30	41.1	
p value**		0.22		0.99		0.81	
HIV serodiscordant partner, last partner							0.21
Baseline	66	53.6	49	54.4	37	33.3	0.79
Follow-up	38	62.3	32	64.0	22	30.0	
p value**		0.25		0.05		0.48	
Exchanged goods/money for sex, past 3 months							0.48
Baseline	13	10.7	9	10.0	8	7.3	0.69
Follow-up	6	9.8	2	4.0	6	8.1	
p value**		0.99		0.69		0.69	
Incarcerated, past 12 months							0.95
Baseline	11	9.0	8	8.9	9	8.2	0.99
Follow-up	4	6.6	4	8.0	5	6.8	
p value**		0.65		0.45		0.99	
Alcohol use, past 6 months							0.01
≥ 5 drinks at once							0.03
Baseline	24	22.6	12	16.7	13	14.9	
Follow-up	8	20.5	2	9.1	10	45.5	
p value**		0.45		0.32		0.03	
Substance use with sex, past 12 months							0.05
Any substance use							0.06
Baseline	76	61.8	35	38.9	51	45.9	
Follow-up	28	45.9	21	42.0	21	28.0	
p value**		0.11		0.99		0.06	
Methamphetamine use							0.56
Baseline	40	32.5	15	16.7	16	14.4	
Follow-up	13	21.3	11	22.0	5	6.7	
p value**		0.27		0.06		0.56	
Popper use							0.39
Baseline	50	40.7	21	23.3	31	27.9	
Follow-up	19	31.2	14	28.0	14	18.7	
p value**		0.33		0.51		0.39	
Injection drug use, past 12 months							0.98
Baseline	8	6.6	6	6.7	2	1.8	0.56
Follow-up	5	8.2	4	8.0	2	2.7	
p value**		0.63		0.62		0.56	

Abbreviations. CIAI = Condomless Insertive Anal Intercourse; CRAI = Condomless Receptive Anal Intercourse.

*P value indicates whether the change from baseline to exit was significantly different across the three groups.

**Based on McNemar's exact test for paired data; P value indicates whether the change from baseline to followup was significantly different within each group.

community testers were on ART soon after diagnosis and a significant percent remained off therapy during the year of follow-up yet continued to practice transmission behaviors reported at the time of their diagnosis. Relatively low treatment initiation is difficult to interpret because our lack of CD4 data makes assessing those

eligible for treatment impossible as guidelines at the time were for initiation of therapy only if CD4 was < 500. Of particular concern is that within our sample of those with new diagnoses, those most infectious (i.e., recently HIV infected) practiced more transmission behaviors, had more partners, fewer main partners,

Table 2. Factors associated with condomless anal intercourse in the year post HIV diagnosis, among Metromates participants, 2009–2014.

	Condomless IAI with serodiscordant partner		Condomless RAI with serodiscordant partner		Condomless AI with serodiscordant partner	
	Adjusted OR	(95% CI)	Adjusted OR	(95% CI)	Adjusted OR	(95% CI)
Age	1.01	(0.97–1.06)	1.00	(0.95–1.04)	1.00	(0.96–1.04)
<i>Race/ethnicity</i>						
African American	3.45	(1.04–11.53)	1.83	(0.59–5.75)	2.19	(0.79–6.04)
Hispanic	1.96	(0.69–5.56)	1.69	(0.66–4.29)	1.69	(0.75–3.82)
Other	3.22	(0.66–15.78)	2.05	(0.43–9.88)	2.68	(0.69–10.43)
White	1.00	Reference	1.00	Reference	1.00	Reference
<i>Substance use, with sex</i>						
Ongoing	0.95	(0.38–2.39)	0.83	(0.35–1.98)	0.83	(0.38–1.82)
Started	0.41	(0.08–2.07)	1.22	(0.36–4.12)	0.74	(0.22–2.43)
Stopped	1.35	(0.46–3.96)	0.80	(0.26–2.41)	1.40	(0.55–3.56)
Never	1.00	Reference	1.00	Reference	1.00	Reference
<i>HIV status</i>						
Recently HIV-infected	1.79	(0.67–4.82)	4.90	(1.80–13.29)	3.87	(1.70–8.79)
Not recently HIV-infected	3.48	(1.31–9.24)	5.01	(1.77–14.16)	4.18	(1.76–9.92)
HIV-negative	1.00	Reference	1.00	Reference	1.00	Reference

Abbreviations: OR = Odds Ratio; CI = Confidence Interval; IAI = Insertive anal intercourse; RAI = Receptive anal intercourse; AI = anal intercourse.

more used substances and fewer adopted ART than men with longstanding HIV infection.

Our finding that fewer men with recent infection initiated therapy than those with a new diagnosis of a non-recent infection suggests that men who recently acquired HIV may be in a period of erratic behavior such as substance use and high sexual activity that may be barriers to care and require special outreach and support if they are to be linked and maintained in care. These data were collected before the introduction of pre-exposure prophylaxis but the few HIV negative men who reported use of them are likely those who used ART without medical supervision for this purpose; a practice previously documented (Galea, Cook, Pickett, & Gorbach, 2016). Our findings were limited by the few HIV positive men who had initiated therapy at the time of our interview and few during follow-up; prohibiting comparison of CIAI and CAI by treatment state within the recently infected or not recently infected.

We find an HIV diagnosis does not seem to precipitate a rapid change in behavior. Most men reported CAI in the year following diagnosis, regardless of ART. Our finding that more men of color were diagnosed with chronic rather than recent infection is confirmed by national data (“Late HIV testing - 34 states, 1996–2005,” 2009) and reinforces the need to expand HIV testing particularly to African American men. A positive sign is that men with diagnosis of a recent infection seem to reduce their numbers of partners and acquire more main partners after their diagnosis – perhaps accessing social support and stable relationships that may lead to adopting HIV care and adhering to ART, potentially limited transmission. This points to a need at the time of diagnosis to not only counsel men about

the value of uptake of and retention in HIV care but also the social context of their lives to achieve the ultimate goal of reducing ongoing HIV transmission and enhancing the health of those living with HIV.

Note

1. Main partner was defined for participants in the questionnaire as “Someone who is your primary and most important sexual partner such as your boyfriend/ girlfriend or wife/husband or lover.

Disclosure statement

No potential conflict of interest was reported by the authors.

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