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Authors

Kiriazova, T
Cheng, DM
Coleman, SM
et al.

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Factors Associated With Study Attrition Among HIV-Infected Risky Drinkers in St. Petersburg, Russia

T. Kiriazova[1,2], **D.M. Cheng**[3], **S.M. Coleman**[4], **E. Blokhina**[5], **E. Krupitsky**[5,6], **M.C. Lira**[7], **C. Bridden**[7], **A. Raj**[8], and **J.H. Samet**[1,9]

[1]Department of Medicine, Section of General Internal Medicine, Clinical Addiction Research and Education (CARE) Unit, Boston University School of Medicine/Boston Medical Center, Boston, MA, USA

[2]Future Without AIDS Foundation, Odessa, Ukraine

[3]Department of Biostatistics, Boston University School of Public Health, Boston, MA, USA

[4]Data Coordinating Center, Boston University School of Public Health, Boston, MA, USA

[5]First Pavlov State Medical University of St. Petersburg, St. Petersburg, Russian Federation

[6]St. Petersburg Bekhterev Research Psychoneurological Institute, St. Petersburg, Russian Federation

[7]Department of Medicine, Section of General Internal Medicine, Clinical Addiction Research and Education (CARE) Unit, Boston Medical Center, Boston, MA, USA

[8]Division of Global Public Health, Department of Medicine, University of California - San Diego School of Medicine, San Diego, CA, USA

[9]Department of Community Health Sciences, Boston University School of Public Health, Boston, MA, USA

Abstract

Background—Participant attrition in HIV longitudinal studies may introduce bias and diminish research quality. The identification of participant characteristics that are predictive of attrition might inform retention strategies.

Objective—The study aimed to identify factors associated with attrition among HIV-infected Russian risky drinkers from the secondary HIV prevention HERMITAGE trial. We examined whether current injection drug use (IDU), binge drinking, depressive symptoms, HIV status nondisclosure, stigma, and lifetime history of incarceration were predictors of study attrition. We also explored effect modification due to gender.

Address for correspondence: Jeffrey H. Samet, MD, MA, MPH, Chief, Section of General Internal Medicine, Boston Medical Center, 801 Massachusetts Avenue, 2nd Floor, Boston, MA 02118; phone: 617-414-7288; jsamet@bu.edu.

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Methods—Complete loss to follow-up (LTFU), defined as no follow-up visits after baseline, was the primary outcome, and time to first missed visit was the secondary outcome. We used multiple logistic regression models for the primary analysis, and Cox proportional hazards models for the secondary analysis.

Results—Of 660 participants, 101 (15.3%) did not return after baseline. No significant associations between independent variables and complete LTFU were observed. Current IDU and HIV status nondisclosure were significantly associated with time to first missed visit (adjusted hazard ratio [AHR], 1.39; 95% CI, 1.03–1.87; AHR, 1.38; 95% CI, 1.03–1.86, respectively). Gender stratified analyses suggested a larger impact of binge drinking among men and history of incarceration among women with time to first missed visit.

Conclusions—Although no factors were significantly associated with complete LTFU, current IDU and HIV status nondisclosure were significantly associated with time to first missed visit in HIV-infected Russian risky drinkers. An understanding of these predictors may inform retention efforts in longitudinal studies.

Keywords

HIV; IDU; longitudinal studies; loss to follow-up; Russia

HIV clinical researchers pursuing longitudinal studies in diverse settings often struggle to minimize participant attrition.[1–3] Loss to follow-up (LTFU) introduces substantial bias[4,5] and remains one of the most common study limitations, reducing the quality and generalizability of research results.[3,6–8] Minimizing attrition among substance-using populations is a particular challenge, given the chaotic lifestyle that often accompanies addiction.[3,4,9,10] Some authors describe study attrition as a complex and largely unpredictable phenomenon,[4,8] however most recognize that attrition in longitudinal research is not random[11–13] and that knowing the characteristics of dropouts may inform follow-up strategies.[1,14] Focusing retention efforts on those participants who are at the highest risk for attrition is one strategy to enhance the quality of clinical research.[5,8]

Although particular emphasis has been given to defining correlates of retention in HIV clinical care,[15–19] less is known about the risk of attrition in HIV clinical research. Of the studies exploring attrition and retention of HIV-infected persons in longitudinal research,[7,8,12,13,20] some have examined substance using populations[1,3,6,10,21]; however the focus has not been in Eastern Europe, where injection drug use (IDU) is highly prevalent[22,23] and an increasing amount of HIV-related research is being conducted.

Factors commonly related to attrition in longitudinal studies include younger age[7,24] and male gender,[13,25] however this characterization is not as useful in Russia where most HIV-infected persons are both young and male. Depression, poor mental health,[1,3,7] and alcohol abuse[26] have also been associated with attrition. Although it is generally accepted that IDU predicts study attrition,[6,24] some studies have not found this association,[2,7,21] and successful study retention with substance using respondents has been achieved.[4,10,27] These conflicting findings on IDU suggest the need for a better understanding of local or cultural issues that may impact retention in longitudinal research. To date, attrition's possible associations with

HIV serostatus nondisclosure, HIV stigma, and incarceration history have not received much attention by researchers. Although most attrition studies have been conducted in other regions of the world, we hypothesized that similar factors would be associated with attrition in the HIV's Evolution in Russia – Mitigating Infection Transmission and Alcoholism in a Growing Epidemic (HERMITAGE) study in St. Petersburg, Russia. We sought to identify subject factors associated with attrition that were identifiable at baseline among HIV-infected persons by examining participants in a secondary HIV prevention intervention study among Russian risky drinkers with risky sex behaviors. Based on studies from outside Eastern Europe,[9,15,21,24,28] specific factors of interest included current IDU, binge alcohol drinking, depressive symptoms, HIV status nondisclosure, HIV stigma, and lifetime history of incarceration. In addition, a secondary aim was to explore whether the effects of these factors differed for women compared to men. Findings from this work may inform efforts to improve participant retention in HIV research in Russia and elsewhere in Eastern Europe, thereby improving the quality of such research in the region.

METHODS

Study Design and Participants

We performed a secondary data analysis of data from the HERMITAGE study, which involved 700 HIV-infected participants. The HERMITAGE study was a single-blind, randomized controlled trial conducted to determine whether the adapted Healthy Relationship Intervention, an efficacious US secondary HIV prevention intervention, decreased sexually transmitted infections (STIs), unprotected sex, needle sharing, and alcohol use among Russian HIV-infected risky drinkers. The study participants, HIV-infected risky-drinking patients, were recruited from 4 inpatient and outpatient HIV and addiction clinical sites in St. Petersburg (Botkin Infectious Disease Hospital, St. Petersburg State Drug Treatment Clinic, St. Petersburg AIDS Center, and First St. Petersburg Pavlov State Medical University clinics), as well as from a needle exchange program and through "snowball" recruitment.

Eligibility for study participation included being HIV-infected, 18 years and older, reporting any risky alcohol consumption in the past 6 months per the US National Institute on Alcohol Abuse and Alcoholism "at risk" drinking levels (defined as >14 drinks per week or >4 drinks on a single occasion for men, and >7 per week or >3 on a single occasion for women)[29] and any unprotected vaginal or anal sex in the previous 6 months. Other inclusion criteria were the provision of contact information (eg, name, home address, telephone number) of 2 relatives or friends who could provide information to assist with follow-up, a stable address within 150 km of St. Petersburg, and possession of a home telephone or cell phone. Persons with anticipated incarceration or with severe cognitive impairment, as judged by a clinician, were excluded from the study. The study was evaluated in accordance with the ethical principles delineated by the Belmont Report and subsequently approved for implementation by the Institutional Review Boards of Boston Medical Center and First St. Petersburg Pavlov State Medical University.

Of 921 patients screened for eligibility, 29 refused to participate, 1 person was too ill to participate, and 189 did not meet inclusion criteria. Of those who did not meet inclusion

criteria, 2 persons did not have confirmed HIV infection, 30 lacked contact information, 4 were trying to conceive, 17 had pending legal issues, and 110 and 134 persons did not meet alcohol and unsafe sex inclusion criteria, respectively. Of the 732 eligible persons, 702 were randomized. However, 2 participants were incorrectly randomized, as they were unable to complete the baseline assessment. The final study group included 700 participants who were assigned to an intervention or attention-control comparison group. All participants signed informed consent forms. Figure 1 depicts the disposition of the study participants. The baseline assessment took place prior to randomization at a private place in the participating recruitment sites. Subjects returned to their recruitment site or First St. Petersburg Pavlov State Medical University for follow-up assessments. Baseline and follow-up data were collected via structured interviews, conducted in Russian by a trained research associate (RA).

Strategies to Minimize Attrition in the Study

Based on prior studies,[3,27,30] extensive efforts were made by the HERMITAGE investigators to minimize attrition and to maximize participant follow-up at both 6- and 12-month study visits. Follow-up interview times included evenings and weekends. If face-to-face interviews were not possible, then RAs attempted to complete assessments over the phone. To maximize the period during which subjects could have been contacted, the 6- and 12-month assessment windows included months 5 through 8 and months 9 through 15, respectively. Reminder calls were made at 3 and 9 months after baseline assessment. Subjects were contacted again 2 weeks prior to their appointment.

The assessors called to remind participants about their upcoming assessment appointment and to confirm or schedule a time for them to come for their interview. If the assessors were not able to speak directly to the participant, they would try to contact a designated contact person. The assessors left a message with the subject or, if not reached directly, with the contact saying that they were trying to get in touch with the person about an appointment at Pavlov. Assessors asked the participant and contact to call them back regarding this appointment. All such contacts and attempts were recorded by assessors in the contact log book. RAs made at least 3 call attempts to reach the subject for a reminder or to reschedule if they did not show up for their appointment. The second contact was called if RAs could not reach the subject or other contact.

If the RA did not directly speak with the subject, they would make calls to them on a weekly basis within the interview window. All subjects received compensation for their time and travel expenses: 800 and 1000 rubles (equivalent of US$28 and US$35) for the 6-month and 12-month follow-up assessments, respectively. Subjects' follow-up clinical visits and re-hospitalizations at one recruitment site, Botkin Infectious Diseases Hospital, were used to perform follow-up research assessments.

Participant Assessments: Measurements

Outcome Measures—Complete LTFU, defined as no follow-up visits after baseline, was the primary outcome variable. Consistent with other studies exploring participant attrition and retention in research,[1,6–8,28] we defined complete LTFU as no follow-up visits after

baseline assessment, that is, nonattendance at both the 6- and 12-month follow-up assessments, but not known to have died.

As a secondary outcome, we explored the time to first missed visit (ie, 6 or 12 months), with censoring at death or end of study. The secondary outcome is a confirmatory analysis of the primary outcome and considers all participants including those who died during the course of the study.

Independent Variables—The independent variables in this study included the following: any binge drinking in past 30 days assessed by Timeline Followback and defined as more than 4 drinks on a single occasion for men and more than 3 on a single occasion for women[31,32]; any past 30-day IDU measured by the Risk Behavior Survey modified for drug use in Russia[33,34]; greater HIV stigma as defined by the 75th percentile on the abbreviated Berger scale (a 10-item questionnaire that assesses stigma felt by HIV-infected persons, with higher scores reflecting greater stigma)[35,36]; HIV status nondisclosure to any sex partner in the past 3 months[37,38]; moderate or severe depressive symptoms as assessed by the Russian version of the Beck Depression Inventory II (score of 20 or above)[39]; and lifetime history of incarceration determined by a single question.

Covariates—The following factors were included in the regression analyses as potential confounders based on the existing literature: age, gender, marital status at time of inclusion into the study (married/partnered vs other), and past 3-year unemployment (ie, not employed, not a student, and not in a controlled environment during the majority of the past 3 years). We also controlled for less social support, defined as less than the 75th percentile on the Medical Outcomes Study Social Support Scale (a 19-item questionnaire that gives an overall functional social support index, with lower scores reflecting less social support),[40] lifetime history of overdose (yes/no), and randomization group. Secondary analyses also adjusted for time since HIV diagnosis (dichotomized at the median, 3.8 years).

Data Analysis

We used descriptive statistics to characterize the study sample at baseline and to estimate the prevalence of the outcomes of interest. Multiple logistic regression models were used to examine the association between each independent variable and complete LTFU (yes vs no), the primary outcome. In preliminary analyses, separate unadjusted and adjusted models were fit for each of the potential predictors of interest. A final adjusted model was then fit that included all of the independent variables of interest (ie, binge drinking, current IDU, depressive symptoms, HIV stigma, HIV status non-disclosure, and lifetime history of incarceration) in a single model and also controlled for gender, age, employment, marital status, social support, lifetime history of overdose, and randomization group. Adjusted odds ratios (AOR) and 95% confidence intervals are reported for the logistic regression models. To avoid potential collinearity, Spearman correlation coefficients were calculated for each pair of independent variables and covariates prior to regression modeling. We verified that no pair of variables had a correlation greater than 0.40.

The secondary outcome, time to first missed visit, was analyzed using Cox proportional hazards models with the use of the exact method for handling tied event times.[41] Similar to

the primary analysis, the adjusted model included all of the independent variables of interest and the specified covariates. Adjusted hazard ratios (AHR) and 95% confidence intervals are reported for the Cox proportional hazards model. Analyses were conducted using 2-sided tests, and a $P < .05$ was considered statistically significant.

Secondary exploratory analyses were also conducted excluding depressive symptoms from the multivariable models to assess whether it may be a variable in the causal pathway between other predictors and study attrition. In addition, post hoc analyses were conducted excluding depression, gender, and marital status, as these factors did not appear to be predictors of attrition, and also controlling for time since HIV diagnosis. To evaluate possible effect modification by gender, exploratory analyses were conducted testing interactions between gender and each of the independent variables of interest. If the *P* value for the interaction was < .15, subsequent stratified analyses were conducted to describe how effects differed by gender. No adjustments were made for multiple comparisons due to the exploratory nature of the analyses. All analyses were performed using SAS software (version 9.3; SAS Institute, Cary, NC).

RESULTS

Of 700 participants assessed at baseline, 523 (74.7%) returned for the 6-month assessment and 492 (70.3%) for the 12-month assessment. In total, 40 subjects (5.7%) died during the study period; these individuals were excluded from the primary analyses but were included in the secondary time to event analyses. The current study documented sizable attrition. Of the 660 included in the primary analysis, 168 (25.5%) did not return for 12-month assessment and 101 (15.3%) had the primary outcome of interest, complete LTFU (ie, nonattendance at both the 6- and 12-month follow-up assessments) (Figure 1). Of the original 700 subjects, 254 had any missed visit.

Participants included in the primary analysis were 59.4% men, with a mean age of 30 years (Table 1). About one-third of participants (35.5%) were married or living with partner, and 26.7% reported being unemployed in past 3 years. In the past 30 days, 41.7% reported IDU and 77.1% reported binge alcohol drinking. Additionally, 1 in 5 participants (21.2%) perceived high stigma, 40.5% reported depressive symptoms, 38.0% had lifetime history of incarceration, and 45.5% reported HIV status nondisclosure to at least one sex partner in the past 3 months. Descriptive statistics suggested that the groups (complete LTFU vs no LTFU) were similar on all the baseline characteristics except that those with attrition appeared to have higher proportions of past 30-day IDU (50.5% vs 40.1%; $P = .05$) and of low social support (83.2% vs 72.3%; $P = .02$).

Table 2 presents the results of the multivariable logistic regression model of factors associated with study attrition. No statistically significant associations between independent variables and complete LTFU were observed, though a borderline significant association was seen between past 30-day IDU and attrition (AOR, 1.53; 95% CI, 0.96–2.44). Analyses of the secondary outcome, time to the first missed assessment visit, revealed significant associations for past 30-day IDU (adjusted hazard ratio [AHR], 1.39; 95% CI, 1.03–1.87), as well as HIV status nondisclosure (AHR, 1.38; 95% CI, 1.03–1.86).

Secondary analyses excluding depression from the multivariable models were conducted to assess the possibility that this variable was in the causal pathway. The results were similar to the main models, suggesting depression is not in the causal pathway (data not shown). In post hoc analyses, we fit a more parsimonious multivariable model excluding depression, gender, and marital status – the 3 factors that did not appear to be associated with attrition. The results were generally consistent with the primary analyses except IDU reached significance for the complete LTFU outcome (AOR, 1.62; 95% CI, 1.03–2.55). Post hoc analyses controlling for time since HIV diagnosis and excluding depression also produced results similar to the primary analyses.

Exploratory analyses examined gender as a potential effect modifier by testing the interaction between each of the independent variables and gender. Potential effect modification ($P < .15$) was seen for history of incarceration ($P = .11$) for the primary outcome – complete LTFU. Gender-stratified analysis suggested potentially different associations between incarceration history and complete LTFU among women (AOR, 1.77; 95% CI, 0.84–3.70) compared to men (AOR, 0.86; 95% CI, 0.48–1.53) (Table 3). For the secondary outcome time to first missed visit, interactions with gender were seen for binge drinking ($P = .02$) and incarceration history ($P = .01$). Gender-stratified analyses revealed a positive association between binge drinking and time to first missed visit for men (AHR, 2.23; 95% CI, 1.26–3.97) but not among women (AHR, 0.90; 95% CI, 0.56–1.45) (Table 3). For history of incarceration, an association with time for first missed visit was observed for women (AHR, 1.77; 95% CI, 1.11–2.80) but not for men (AHR, 0.84; 95% CI, 0.59–1.21).

DISCUSSION

This analysis explored predictors of research study attrition in HIV-infected Russian drinkers in the HERMITAGE intervention evaluation study. We were unable to detect statistically significant associations between any potential factors and complete LTFU in the primary analysis. However, those reporting current IDU and nondisclosure of HIV status to sex partners missed their first study visit at faster rates (AHR, 1.39; 95% CI, 1.03–1.87, and AHR, 1.38; 95% CI, 1.03, −1.86, respectively). This finding is consistent with similar studies describing current or past IDU as associated with attrition,[6,20,24,42] but it is particularly disconcerting in Russia, as the majority (59%) of new HIV cases in the country remain attributable to risky drug injecting practices.[23] Targeted and innovative follow-up procedures that take into account such risk factors might improve retention in these longitudinal studies.

To our knowledge, nondisclosure of HIV status to sex partners has not previously been identified as a risk for attrition in research studies, possibly due to a lack of focus on this association. Such nondisclosure was common in the HERMITAGE study participants.[43] Nondisclosure is an individual characteristic that may well identify individuals who have ambivalence about their diagnosis and willingness to acknowledge the HIV diagnosis in a variety of spheres of life. Accordingly, disclosure of HIV infection to sexual partners and social networks is associated with safer sex behaviors,[44] retention in HIV care,[45] patient adherence to antiretroviral treatment, and health service utilization in general.[46,47] Thus, disclosure and non-disclosure have been identified with desirable and undesirable outcomes,

respectively, now including research study attrition.[45] Neither HIV stigma nor depression was associated with complete LTFU. Prior research from outside of Russia has documented a significant association of both stigma and depression with attrition.[3,7] Lack of findings in this study was surprising but may have been due to the high prevalence of stigma and depression.

Although analyses did not reveal significant associations between binge drinking or history of incarceration with complete LTFU, secondary exploratory analyses found potential effect modification of these factors by gender. Among men, those who reported past 30-day binge alcohol drinking were twice as likely to miss a study visit compared to nonbinge drinkers, however we did not detect any increased association among women. A positive association was observed between lifetime history of incarceration and time to first missed study visit among women but not men. Our finding of a potential association between binge drinking and time to first visit among men may suggest that such individuals are a subgroup requiring enhanced efforts to retain them in research studies, but further research is needed to determine why the association is not seen for women. The incarceration finding for women may be helpful in identifying those research subjects to be most concerned about achieving good research follow-up. Women, who constitute about 8.0% of the total Russian prison population,[48] often face stigmatization, victimization, and alienation from their families during their postrelease reintegration.[49]

Based on the identification of specific subject characteristics associated with more research study attrition, namely recent IDU, nondisclosure to sex partners, binge alcohol use in men, and past incarceration in women, Eastern European HIV research studies with such participants might argue for enhanced resources to aggressively pursue follow-up. Additional efforts to successfully follow-up subjects could include making additional contacts, directly or by text messaging or social media, or increasing the compensation for follow-up. Possible approaches to enhance follow-up include collecting more locator and contact information, checking the legitimacy of named alternative contacts, updating locator information at every contact for high-risk subjects, and using incentives for participants updating their contact information (eg, phone number or address changes).

Our study has several limitations. First, the observational nature of this study design limits our ability to make causal inferences based on the association of the independent variables and study attrition. Second, we did not analyze or collect data on every potential factor that has been demonstrated to be associated with attrition – such as smoking as a known predictor of early study discontinuation.[12,13,25,26] Poverty and distance from the study site could represent potential confounders influencing study results. However, we believe this effect was potentially mitigated by reimbursement for participant time and travel cost during follow-up study visits. The power of this study was inadequate to detect a statistically significant effect for some factors. For example, in this study, the observed odds ratio for complete LTFU was 1.34 for binge drinkers versus those without binge drinking. In post hoc power calculations, assuming 12% of the subjects without binge drinking had complete LTFU (based on the observed data), our study would have approximately 80% power to detect an odds ratio as small as 2.13. Thus, the study may have been under-powered to detect associations of the observed magnitude. Finally, risky alcohol drinking was an

inclusion criterion for our study, so the results may not be generalizable to nondrinking HIV-infected persons; however in Russia such individuals are a minority.

CONCLUSION

This study documents important factors that could affect participant attrition in HIV trials in Russia and other similar resource-limited settings. IDU and non-disclosure of HIV status were significantly associated with time to first missed visit in the HERMITAGE study. Additionally, some gender differences in risk factors were seen, specifically binge drinking for men and incarceration history for women. These characteristics could be identified at the time of initial study assessment so that intensive follow-up procedures might be targeted at individuals who are at greatest risk for attrition, thus improving participant retention. Comprehensive tracking strategies and a systematic approach to prevent attrition among high risk for LTFU study participants could be beneficial to retention in the research studies. Understanding and addressing potential predictors of attrition may improve participant retention in longitudinal clinical research studies of HIV-infected persons.

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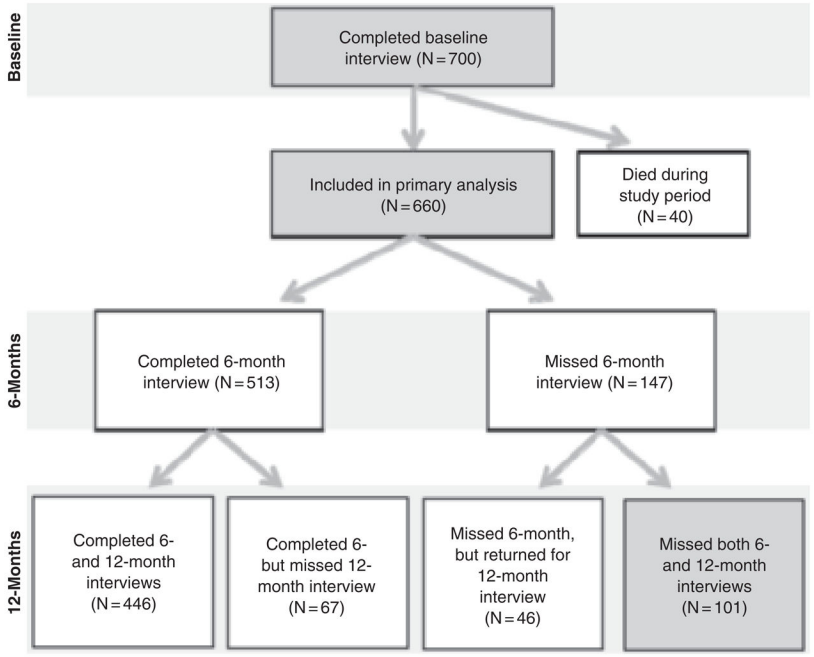

Figure 1.
HERMITAGE study participation.

Table 1

Baseline characteristics of Russian HIV-infected risky drinkers with or without complete loss to follow-up (LTFU)

Characteristic	Overall (*N* = 660)	Complete LTFU[a] (*n* = 101; 15.3%)	No complete LTFU (*n* = 559; 84.7%)	*P*
Mean age (*SD*)	30.0 (5.2)	30.7 (5.7)	29.9 (5.1)	.19
Male	392 (59.4%)	60 (59.4%)	332 (59.4%)	.99
Married/living with partner	234 (35.5%)	29 (28.7%)	205 (36.7%)	.12
Unemployed, past 3 years	176 (26.7%)	22 (21.8%)	154 (27.5%)	.22
Mean years since HIV diagnosis (*SD*)	4.4 (3.6)	3.8 (3.7)	4.5 (3.5)	.08
CD4 count <350[b]	217 (47.5%)	36 (50.7%)	181 (46.9%)	.55
Mean SF-12 mental component summary score (*SD*)	37.9 (10.8)	36.8 (11.2)	38.1 (10.7)	.28
Mean SF-12 physical component summary score (SD)	45.0 (9.1)	45.2 (9.7)	45.0 (9.0)	.84
IDU, past 30 days	275 (41.7%)	51 (50.5%)	224 (40.1%)	.05
Binge drinking, past 30 days	509 (77.1%)	83 (82.2%)	426 (76.2%)	.18
Stigma > 75th percentile	140 (21.2%)	21 (20.8%)	119 (21.3%)	.91
Any HIV status nondisclosure, past 3 months	300 (45.5%)	37 (36.6%)	263 (47.0%)	.14
Lifetime history of incarceration	251 (38.0%)	40 (39.6%)	211 (37.7%)	.72
Moderate/severe depressive symptoms	267 (40.5%)	47 (46.5%)	220 (39.4%)	.17
MOS social support < 75th percentile	484 (74.0%)	84 (83.2%)	400 (72.3%)	.02
Lifetime history of overdose	441 (66.8%)	62 (61.4%)	379 (67.8%)	.20
Randomization group (control)	327 (49.5%)	56 (55.4%)	271 (48.5%)	.19

Note: Values given as *n* (%) unless otherwise indicated. MOS = Medical Outcomes Study; SF = short-form.

[a] No follow-up visits after baseline, ie, nonattendance at both the 6- and 12-month follow-up assessments.

[b] *n* = 457.

Table 2

Logistic regression model and Cox proportional hazard model to evaluate the associations between independent variables and study attrition

	Primary outcome: Complete LTFU[a] (*n* = 660)		Secondary outcome: Time to first missed visit[b] (*n* = 700)	
	AOR (95% CI)	***P***	**AHR (95% CI)**	***P***
Main independent variables				
IDU, past 30 days	1.53 (0.96–2.44)	.07	1.39 (1.03–1.87)	**.03**
Binge drinking, past 30 days	1.34 (0.75–2.37)	.32	1.30 (0.91–1.87)	.15
Stigma > 75th percentile	0.84 (0.48–1.48)	.55	1.09 (0.78–1.53)	.61
Moderate/severe depressive symptoms	1.16 (0.72–1.87)	.54	1.04 (0.77–1.40)	.80
HIV status disclosure	1.00		1.00	
Nondisclosure	1.43 (0.89–2.31)	.14	1.38 (1.03–1.86)	**.03**
No sex past 3 months	1.31 (0.64–2.68)	.46	1.01 (0.63–1.62)	.97
Lifetime history of incarceration	1.01 (0.63–1.62)	.97	1.01 (0.75–1.36)	.93
Covariates				
Age	1.03 (0.99–1.07)	.20	1.01 (0.98–1.03)	.69
Female gender	1.20 (0.74–1.95)	.47	1.08 (0.79–1.47)	.64
Unemployed, past 3 years	0.62 (0.36–1.07)	.08	0.57 (0.40–0.81)	.002
MOS social support < 75th percentile	1.62 (0.90–2.92)	.10	1.18 (0.84–1.66)	.35
Married/living with partner	0.81 (0.49–1.35)	.42	0.98 (0.72–1.33)	.87
Lifetime history of overdose	0.72 (0.45–1.13)	.15	0.64 (0.48–0.85)	.002
Randomization group (control)	1.34 (0.87–2.07)	.19	0.97 (0.74–1.27)	.80

Note: AHR = adjusted hazard ratio; AOR = adjusted odds ratio; IDU = injection drug use; LTFU = loss to follow-up; MOS = Medical Outcomes Study.

[a] No follow-up visits after baseline, ie, non-attendance at both the 6- and 12-month follow-up assessments, occurred in 101 of 660 participants.

[b] Event occurred in 212 of 700 participants.

Table 3

Association between lifetime incarceration, risky drinking, and study attrition stratified by gender

	Primary analysis: Complete LTFU[a] (*n* = 660)				Secondary analysis: Time to first missed visit[b] (*n* = 700)			
	Men (*n* = 392)		Women (*n* = 268)		Men (*n* = 415)		Women (*n* = 285)	
	AOR (95% CI)	*P*	AOR (95% CI)	*P*	AHR (95% CI)	*P*	AHR (95% CI)	*P*
Lifetime history of incarceration	0.86 (0.48– 1.53)	.60	1.77 (0.84–3.70)	.13	0.84 (0.59– 1.21)	.34	1.77 (1.11–2.80)	**.02**
Binge drinking, past 30 days[c]	–	–	–	–	2.23 (1.26– 3.97)	**.01**	0.90 (0.56–1.45)	.67

Note: AHR = adjusted hazard ratio; AOR = adjusted odds ratio; LTFU = lost to follow-up.

[a] No follow-up visits after baseline, ie, non-attendance at both the 6- and 12-month follow-up assessments, occurred in 101 of 660 participants.

[b] Event occurred in 212 of 700 participants.

[c] Stratified analyses were not performed for the primary analyses as the interaction between gender and binge drinking was not significant ($P > .15$).