AIDS Behav (2008) 12:974–977
DOI 10.1007/s10461-007-9356-y

ORIGINAL PAPER

Predictors of Attrition Among High Risk HIV-Infected Participants Enrolled in a Multi-Site Prevention Trial

Mallory O. Johnson · Samantha E. Dilworth · Torsten B. Neilands · Margaret A. Chesney · Mary Jane Rotheram-Borus · Robert H. Remien · Lance Weinhardt · Anke A. Ehrhardt · Stephen F. Morin · NIMH HLP team

Published online: 18 January 2008

Abstract Retaining high-risk individuals is critical for HIV prevention trials. The current analyses examined predictors of trial dropout among HIV-infected men and women in a multi-site HIV prevention trial. Results indicated that dropouts ($n = 74$) were more likely to be younger, depressed, and not taking antiretroviral therapy (ART) than those who continued ($n = 815$). No other background, substance use, or transmission risk differences were found, suggesting no direct evidence of dropout bias on key outcomes. Efforts may be warranted for early detection and treatment of depression and for improving retention of younger participants and those not on ART.

Keywords Clinical trials · Prevention · Retention · Depression

M. O. Johnson (✉) · S. E. Dilworth · T. B. Neilands · M. A. Chesney · S. F. Morin
University of California, 50 Beale Street, Suite 1300, San Francisco, CA 94105, USA
e-mail: Mallory.Johnson@ucsf.edu

M. A. Chesney
National Center for Complementary and Alternative Medicine, National Institutes of Health, Los Angeles, USA

M. J. Rotheram-Borus
University of California, Los Angeles, USA

R. H. Remien · A. A. Ehrhardt
Columbia University, Columbia, USA

L. Weinhardt
Medical College of Wisconsin, Wisconsin, USA

NIMH HLP team
Rockville, USA

Introduction

Recruiting and retaining high risk participants is critical for the implementation of behavioral trials in HIV primary and secondary prevention. Attrition or dropout of participants threatens internal and external validity and, if attrition is associated with levels of risk, can impact study outcomes. Previous studies investigating attrition in HIV related prevention studies have found that attrition is often predicted by such factors as younger age and higher psychological distress (Roffman et al. 1997; Vanable et al. 2002). There is mixed evidence that attrition may be linked to level of sexual risk, with one study finding no relationship between study completion and sexual risk behaviors (Roffman et al. 1997). Another study found a higher likelihood of a recent sexually transmitted infection (STI) diagnosis among psychiatric outpatients who completed an HIV prevention intervention compared to those who dropped out, suggesting higher risk behaviors among completers and/or greater access to STI testing services (Vanable et al. 2002). In one small study of HIV-positive patients with neuropathic pain enrolled in a trial comparing two forms of counseling/psychotherapy, the primary predictor of attrition was baseline level of depression (Davis et al. 2004).

The current analyses explore predictors of attrition in the Healthy Living Project randomized controlled trial of HIV-infected persons at risk for sexual transmission of HIV in four US cities that resulted in an overall decrease in HIV transmission risk (HLP 2007). In this report, we explore whether differences exist between those who failed to return past randomization compared with those who remained in the trial on multiple factors measured at baseline, including demographics, clinical status, depression, substance use, and level of transmission risk.

Method

Participants

Details of trial procedures are provided elsewhere (HLP 2007). A total of 3,818 individuals were screened with 936 meeting inclusion criteria enrolled in the trial: risk for transmitting HIV to uninfected persons through unprotected sexual activity. In-person assessments were conducted at baseline and every 5 months for 25 months (total of six assessment points). Approximately half 467 (49.9%) were randomized to the immediate intervention of 15 individual 90-min sessions and the other 469 (50.1%) were assigned to wait-list control/lagged intervention. Standardized retention procedures were implemented across sites, including monthly phone calls, mailings, and in-person tracking through contacts identified at baseline.

Measures

Assessments included psychosocial (e.g., self-reported depressive symptoms on the Beck Depression Inventory), treatment (e.g., CD4, viral load, receipt of antiretroviral therapy), demographic (race, ethnicity, age, homelessness), and behavioral variables including substance use, number and serostatus of sexual partners, and transmission risk acts (unprotected vaginal or anal intercourse with HIV-negative or unknown status partners).

Data Analysis

A dropout was defined as a participant who did not return past the baseline assessment at which he/she was randomized. Participants who died ($n = 47$) were not included in analyses. Of the remaining 889 participants, 74 (8.3%) did not return past the first assessment and are defined as dropouts. Bivariate logistic regressions of dropout (0 = no; 1 = yes) on explanatory variables were conducted; explanatory variables with $p < .25$ were retained for backward elimination multivariate logistic regression analysis. In multivariate analysis, explanatory variables with $p < .05$ were retained. The Hosmer–Lemeshow goodness-of-fit test was used to evaluate the overall fit of the final model.

Results

The sample was 45% African American, 14% Hispanic, and 21% female with a mean age of 40.3 years at baseline. The majority (70%) were on antiretroviral therapy, the mean CD4 count was 433, and 64% of the sample reported a detectable viral load. Multivariate analysis revealed that dropouts were more likely to be younger, have higher levels of self-reported depressive symptoms, and less likely to be taking antiretroviral therapy (Table 1). There were no differences based on gender, race/ethnicity, clinical status, antiretroviral adherence, housing status, substance use, or level of HIV transmission risk behavior. The Hosmer–Lemeshow goodness-of-fit test showed excellent fit for this model (χ^2 (5) = 1.58, $p = 0.90$).

Discussion

The strongest predictor of dropout was a baseline level of self-reported depressive symptoms consistent with severe depression (Beck et al. 1988). This is consistent with a prior study of HIV testing, in which a history of suicide attempts was associated with failure to return for HIV test results (Brown-Peterside et al. 2001). Given the higher likelihood of mortality and treatment non-adherence associated with depression (Lima et al. 2007; Mykletun et al. 2007) and the higher rates of dropout found in this and other health-related programs (Davis et al. 2004; Roffman et al. 1993; Vanable et al. 2002; Yohannes et al. 2007), early screening for depression in clinical trials is warranted and can provide opportunity for immediate treatment referral and follow-up. While good clinical research practices include maximizing retention in clinical trials, and exclusion of individuals with depression may help meet retention goals, in the absence of safety concerns, fairness considerations would suggest inclusion of such individuals because of the potential for benefit to the individuals in studies like this one. Moreover, inclusion of individuals with depression, to the extent to which they are present in the population of persons living with HIV/AIDS, increases generalizability of findings. Thus, the benefit in terms of knowledge, protection and fair treatment of human participants would outweigh the potential advantages to research design.

That younger age was predictive of dropout is not surprising given previous findings (Roffman et al. 1993; Vanable et al. 2002) and the documented challenges of recruiting and retaining younger participants in research studies (DiFranceisco et al. 1998). The link between antiretroviral therapy (ART) receipt and better retention suggests that individuals receiving stable ongoing medical care may have less chaotic personal circumstances. It is also possible that routine medical appointments associated with ART delivery may facilitate adherence to ancillary services.

Dropout was unrelated to level of transmission risk at baseline and to randomization status. This finding provides

Table 1 Predictors of dropout

	N	Bivariate odds ratio (95% CI)	Multivariate odds ratio (95% CI) $n = 887$
Race χ^2 (*DF*)	887	6.5 (3)*	–
White		–	–
Latino		2.2 (1.1, 4.3)*	–
Black/AA		1.0 (0.6, 1.8)	–
Other		1.2 (0.5, 3.1)	–
Median age	889	0.5 (0.3, 0.9)*	0.6 (0.4, 1.0)*
Female gender	889	0.9 (0.5, 1.6)	–
HS graduate	889	0.8 (0.4, 1.4)	–
Employed	887	1.3 (0.8, 2.1)	–
Years since HIV diagnosis χ^2 (*DF*)	889	2.5 (2)	–
0–7 years		–	–
7–13 years		0.8 (0.5, 1.4)	–
13 + years		0.6 (0.3, 1.2)	–
Biomarker CD4	808	1.0 (1.0, 1.0)	–
Biomarker detectable viral load	860	1.7 (1.0, 3.0)	–
Lagged randomization status	889	0.6 (0.4, 1.0)*	–
Recent homelessness	888	2.0 (1.2, 3.3)**	–
Lifetime homelessness	888	1.0 (0.6, 1.6)	–
ARV use	888	0.5 (0.3, 0.8)**	0.6 (0.3, 0.9)*
100% adherent to ARV medication	620	1.1 (0.6, 2.0)	–
BDI score range χ^2 *(DF)*	888	14.6 (3)**	12.6 (3)**
Minimal		–	–
Mild		1.4 (0.7, 2.6)	1.3 (0.7, 2.5)
Moderate		1.2 (0.6, 2.4)	1.2 (0.6, 2.5)
Severe		3.9 (2.0, 7.5)**	3.6 (1.8, 7.0)**
Site χ^2 (*DF*)	889	5.2 (3)	–
Los Angeles		–	–
Milwaukee		2.4 (1.1, 5.1)*	–
New York		1.1 (0.6, 2.2)	–
San Francisco		1.4 (0.8, 2.6)	–
Transmission risk acts χ^2 (*DF*)	885	1.4 (4)	–
0		–	–
1–5		1.3 (0.7, 2.4)	–
6–10		1.6 (0.7, 3.3)	–
11–20		1.3 (0.5, 3.5)	–
21+		1.2 (0.5, 3.2)	–
2+ HIV−/unknown partners	889	1.2 (0.8, 2.0)	–
Any IDU (past year)	887	1.2 (0.6, 2.3)	–
Alcohol frequency χ^2 (*DF*)	885	0.7 (2)	–
None		–	–
<4–6 times/week		1.2 (0.7, 2.0)	–
≥4–6 times/week		1.4 (0.5, 3.7)	–
Marijuana frequency χ^2 (*DF*)	888	4.3 (2)	–
None		–	–
<4–6 times/week		1.7 (1.0, 2.9)*	–
≥4–6 times/week		1.4 (0.7, 2.7)	–

Table 1 continued

	N	Bivariate odds ratio (95% CI)	Multivariate odds ratio (95% CI) $n = 887$
Drugs frequency χ^2 (*DF*)	884	0.5 (2)	–
None		–	–
<4–6 times/week		1.0 (0.6, 1.7)	–
≥4–6 times/week		1.2 (0.6, 2.4)	–
Lifetime drug seriousness χ^2 *(DF)*	877	0.3 (2)	–
Low–Marijuana/alcohol only		–	–
Med–other drugs, no IDU		1.1 (0.3, 3.8)	–
High–hard drugs or IDU		0.9 (0.4, 1.8)	–

Note. * $p < .05$; ** $p < .01$. For multi-category explanatory variables, multi-parameter Wald chi-square tests, degrees of freedom, and p-values are reported; the first category listed is the reference group

evidence against the possible effects of selective dropout bias on primary risk study outcomes. If those who dropped out were at higher risk for transmitting HIV and this were related to randomization status (e.g., feeling discouraged by the demands of the intervention), there would be concerns regarding the trial outcomes. Instead, the current analyses provide evidence of the feasibility of retaining high-risk participants in behavioral intervention trials of public health significance. However, it is not possible to fully rule out that those with higher depression levels at baseline might have responded differently to the intervention than others, which may have led to an indirect effect on risk outcomes.

Limitations of note in the current analyses include the use of a convenience, non-probability-based sample and the use of self-reported data for several key variables. Of particular note is the reliance on baseline self-reported depressive symptoms using the BDI, which has been shown to fluctuate at enrollment in other programs such as drug treatment (Husband et al. 1996). Finally, given the current data, it is not possible to determine whether depression has a causal role in fostering attrition, or whether depression is a product of other factors, such as lack of access to resources such as HIV treatment and social services, which more directly impede retention in clinical research studies.

In summary, self-reported depressive symptoms, younger age, and non-receipt of antiretroviral therapy were predictive of attrition in a trial of high-risk HIV-infected men and women. Drug use and HIV transmission risk were unrelated to dropout, supporting the focus on high-risk individuals for risk-reduction interventions.

References

Beck, A. T., Steer, R. A., & Garbin, M. G. (1988). Psychometric properties of the Beck depression inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8*, 77–100.

Brown-Peterside, P., Rivera, E., Lucy, D., Slaughter, I., Ren, L., Chiasson, M. A., et al. (2001). Retaining hard-to-reach women in HIV prevention and vaccine trials: Project ACHIEVE. *American Journal of Public Health, 9*, 1377–1379.

Davis, L., Evans, S., Fishman, B., Haley, A., & Spielman, L. A. (2004). Predictors of attrition in HIV-positive subjects with peripheral neuropathic pain. *AIDS Care, 16*, 395–402.

DiFranceisco, W., Kelly, J. A., Sikkema, K. J., Somlai, A. M., Murphy, D. A., & Stevenson, L. Y. (1998). Differences between completers and early dropouts from 2 HIV intervention trials: A health belief approach to understanding prevention program attrition. *American Journal of Public Health, 88*, 1068–1073.

Healthy Living Project Team (2007). Effects of a behavioral intervention to reduce risk of transmission among people living with HIV: The healthy living project randomized controlled study. *Journal of Acquired Immune Deficiency Syndromes, 44*, 213–221.

Husband, S. D., Marlowe, D. B., Lamb, R. J., Iguchi, M. Y., Bux, D. A., Kirby, K. C., et al. (1996). Decline in self-reported dysphoria after treatment entry in inner-city cocaine addicts. *Journal of Consulting and Clinical Psychology, 64*, 221–224.

Lima, V. D., Geller, J., Bangsberg, D. R., Patterson, T. L., Daniel, M., Kerr, T., et al. (2007). The effect of adherence on the association between depressive symptoms and mortality among HIV-infected individuals first initiating HAART. *AIDS, 21*, 1175–1183.

Mykletun, A., Bjerkeset, O., Dewey, M., Prince, M., Overland, S., & Stewart, R. (2007). Anxiety, depression, and cause-specific mortality: The HUNT study. *Psychosomatic Medicine, 69*, 323–331.

Roffman, R. A., Klepsch, R., Wertz, J. S., Simpson, E. E., & Stephens, R. S. (1993). Predictors of attrition from an outpatient marijuana-dependence counseling program. *Addictive Behaviors, 18*, 553–566.

Roffman, R. A., Picciano, J. F., Bolan, M., & Kalichman, S. C. (1997). Factors associated with attrition from an HIV-prevention program for gay and bisexual males. *AIDS and Behavior, 1*(2), 125–135.

Vanable, P. A., Carey, M. P., Carey, K. B., & Maisto, S. A. (2002). Predictors of participation and attrition in a health promotion study involving psychiatric outpatients. *Journal of Consulting and Clinical Psychology, 70*, 362–368.

Yohannes, A. M., Yalfani, A., Doherty, P., & Bundy, C. (2007). Predictors of drop-out from an outpatient cardiac rehabilitation programme. *Clinical Rehabilitation, 21*, 222–229.