

Antiretroviral Use Among Active Injection-Drug Users: The Role of Patient–Provider Engagement and Structural Factors

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Abstract

HIV-seropositive, active injection-drug users (IDUs), compared with other HIV populations, continue to have low rates of highly active antiretroviral therapy (HAART) use, contributing to disparities in their HIV health outcomes. We sought to identify individual-level, interpersonal, and structural factors associated with HAART use among active IDUs to inform comprehensive, contextually tailored intervention to improve the HAART use of IDUs. Prospective data from three semiannual assessments were combined, and logistic general estimating equations were used to identify variables associated with taking HAART 6 months later. Participants were a community sample of HIV-seropositive, active IDUs enrolled in the INSPIRE study, a U.S. multisite (Baltimore, Miami, New York, San Francisco) prevention intervention. The analytic sample included 1,225 observations, and comprised 62% males, 75% active drug users, 75% non-Hispanic blacks, and 55% with a CD4 count <350; 48% reported HAART use. Adjusted analyses indicated that the later HAART use of IDUs was independently predicted by patient–provider engagement, stable housing, medical coverage, and more HIV primary care visits. Significant individual factors included not currently using drugs and a positive attitude about HAART benefits even if using illicit drugs. Those who reported patient-centered interactions with their HIV primary care provider had a 45% greater odds of later HAART use, and those with stable housing had twofold greater odds. These findings suggest that interventions to improve the HIV treatment of IDUs and to reduce their HIV health disparities should be comprehensive, promoting better patient–provider engagement, stable housing, HAART education with regard to illicit drug use, and integration of drug-abuse treatment with HIV primary care.

Introduction

ALTHOUGH HIGHLY ACTIVE antiretroviral therapy (HAART) is highly effective among injection drug users (IDUs), persistent disparities in their access to or use of HAART contribute to their more-rapid HIV progression and higher mortality rates as compared with other HIV risk

groups.^{1–6} Prior research has focused on clinic samples and patients' individual-level barriers to HAART use.⁸ However, interpersonal and structural factors have been found to be more consistent predictors of vulnerable populations' HAART use.^{9,10} Research on community-sampled as compared with clinic-sampled IDUs may allow greater understanding of their structural barriers to treatment access.

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Identifying multilevel factors associated with HAART use will inform the development of more powerful, multilevel interventions to improve this vulnerable population's HIV treatment and to reduce HIV health disparities.

Individual-level factors

Injection drug use, and particularly active drug use, is associated with lower HAART use, even among those in medical care.^{3-6, 11-13} Study findings from 10 U.S. HIV primary care sites indicate that IDUs compared with non-IDUs have a lower likelihood of receiving HAART.¹³ Yet current U.S. public health guidelines recommend not excluding patients from HAART based on clinician perception of patient risk for nonadherence.⁷ (Rather, it is recommended that health care providers monitor and promote HAART adherence in vulnerable populations.⁷)

In the U.S., HAART use also has been found to be negatively associated with female sex, depressive symptoms, and African American race.^{3, 13-20} In one study, women patients were less likely than men to receive HAART or preventive services despite their more frequent clinic visits.¹⁵ Research indicates the importance of favorable attitudes to medication use; attitudes about HAART in the context of substance use may be especially important to the HAART use of IDUs.^{21, 22}

Interpersonal factors

Prior studies indicate that engagement with primary care providers is important to medical treatment and quality of care across a range of health conditions and patient populations.²³⁻³¹ In a U.S. sample representative of individuals in HIV medical care, having a primary care provider was associated with access to HAART.²³ Moreover, relationship-focused interactions with primary care providers have been associated with treatment use and outcomes, including for HIV/AIDS.²³⁻³¹ It has been postulated that patient-provider interactions affect treatment outcomes in part by improving patient knowledge of treatment options and treatment decision making, and by enhancing patient motivation or self-efficacy to adhere to treatment regimens.³²

The engagement of IDUs with primary care providers may be especially important to their HAART use, given that many IDUs are disadvantaged, minority populations who may be distrustful of the medical system.³³ In a representative sample of U.S. individuals in HIV medical care, drug users were less likely than were non-drug users to have a primary care provider.²³ In an urban HIV primary care clinical cohort, of whom half were IDUs and 86% were African American, better perceived quality of the patient-provider relationship was associated with a greater likelihood of both receiving HAART and having an undetectable viral load.³⁰

Social support has been associated with medical adherence and treatment outcomes in prior studies.^{10, 34, 35} In a cross-sectional study of IDUs receiving HAART, social support and patient-provider interactions were independently associated with having an undetectable HIV viral load.¹⁰ However, less is understood about the role of social support in the access of IDUs to or uptake of HAART.

Structural factors

Stable housing, drug-abuse treatment, and medical coverage have been associated with HAART use.³⁶⁻⁴² IDUs with

HIV/AIDS are often economically disadvantaged and challenged by homelessness or unstable housing, which have been associated with lower HAART use, as well as worse HIV-treatment outcomes and higher mortality rates.^{10, 41-43} Among a national sample of newly HIV-diagnosed individuals, homeless persons had worse health status and were less likely to be using HAART as compared with housed persons.⁴³ A study of public health clinics in Florida revealed that homeless patients were less likely to be using HAART compared with housed clients (20% vs. 52%), which was associated with a 10-fold increased risk of mortality.⁴²

In this study, we sought to identify multilevel factors associated with HAART use among a community sample of active IDUs recruited from U.S. urban epicenters.

Methods

Study population

The sample comprised participants of the Intervention for Seropositive Injectors- Research and Evaluation (INSPIRE) study. The INSPIRE project was a secondary HIV-prevention intervention study conducted in Baltimore, Miami, New York City, and San Francisco, from 2001 to 2005.⁴⁴ Participants were recruited by using active and passive strategies in a variety of community venues, including street-based recruiting as well as advertisement at shelters, AIDS service organizations, medical clinics, and methadone maintenance clinics.⁴⁴ Eligibility criteria included confirmed HIV-positive serostatus, self-reported IDU in the prior year, sex with an opposite-sex partner in the prior 3 months, and willingness to engage in group educational sessions and provide oral and blood specimens.

Assessments were administered by audio computer-assisted self-interview (A-CASI) before attending the first intervention session.⁴⁴ Oral and blood specimens were obtained at the time of the baseline assessment for local testing to confirm HIV serostatus (OraSure; OraSure Technologies, Inc., Bethlehem, PA) and for CD4 and viral assays, which were conducted at the Centers for Disease Control and Prevention (CDC) in Atlanta. The CDC and local institutional review boards approved the study protocol. Participants were fully informed of the study and consented to participate; they were reimbursed \$30 for their time and effort at baseline, \$45 at 6-month follow-up, and \$50 at 12-month follow-up.

Measures

The outcome was currently taking HAART, defined as self-report of having a prescription for and taking at least 1 day in the prior month any HAART regimen from among a list recommended by current U.S. Department of Health and Human Services guidelines.⁴⁵

Individual-level variables. Baseline CD4 lymphocyte count was dichotomized as $<350 \times 10^6/L$ or $\geq 350 \times 10^6/L$. Current illicit drug use was defined as use of any of a list of substances in the past 3 months, including heroin and cocaine, and excluding marijuana. Depressive symptoms were defined as the continuous measure of the seven items of the Brief Symptom Inventory-Depression (BSI-D), which has demonstrated high validity and reliability, including among HIV-seropositive IDUs.^{46, 47} The Cronbach alpha for internal reliability for this sample was 0.88. Attitude about antiretrovirals was assessed

by degree of agreement (on a 4-point scale) with the statement, "Even if [people are] using street drugs, taking HIV medications can keep them healthy." The item was recoded as strongly agree (1) versus strongly disagree, disagree, or agree (2–4).

Interpersonal-level variables. Engagement with primary care providers was measured by the Engagement with Healthcare Provider Scale²⁹ among the subset of the sample who reported any HIV primary health care visit (see definition later) in the 2 years before the baseline interview. The measure comprises theorized dimensions of access to the health care provider, and aspects of patient-centered care (specifically, information sharing, patient involvement in decision making and self-care activities, providers' respect and support of the patients' decisions, and management of client concerns).²⁹ In a seven-site study of individuals in HIV medical care, the scale demonstrated association with patients' adherence to their HIV therapeutic regimen, including medications, provider advice, and medical appointments; injection drug use was associated with lower engagement with provider.²⁹ The 13-item scale includes such questions as, "My healthcare provider or doctor . . . listens to me, answers my questions, involves me in decisions, respects me, supports my decisions, spends enough time with me." The Cronbach alpha for this sample was 0.95. Results of factor analysis indicated that all items loaded onto a single factor. Responses were highly skewed, with a median score of 3.56 of a possible range of 1 to 4 (4, perfect). Thirty-seven percent of the sample reported perfect engagement with their primary care provider. Therefore, the measure was recoded as perfect versus less than perfect engagement.

Social support was defined as perceived emotional support (assessed as the degree of certainty of having someone to talk to about something personal or private), and/or instrumental assistance (defined as having someone to care for you if you are sick in bed); which was found to predict maintaining viral suppression among a similar sample of IDUs receiving HAART.³⁵ Responses were based on a 4-point scale and recoded as a binary score of very certain (4) or less than very certain (1–3).

Structural-level variables. Self-reported HIV primary healthcare service use was measured by the number of HIV primary health care visits in the prior 6 months. HIV primary health care visits were defined as "a visit to a doctor or medical provider to have a check up on how you're doing with your HIV or AIDS, discussion about HIV or AIDS medications, or blood test results." Engagement in HIV primary care was defined as at least one such medical visit in the 2 years before enrollment.

Current enrollment in methadone maintenance treatment was assessed, as was medical coverage, defined as having any of a list of private health insurance or public sources of health care coverage (1) versus none (0). Unstable housing was defined as a negative response to the question, "Do you currently have a place where you stay at least 5 nights a week?"; it was negatively associated with viral suppression among a similar sample of active IDUs taking HAART.¹⁰

Statistical analyses

Separate analyses identified baseline or 6-months assessment predictors of the HAART use 6 months later (*i.e.*, at the

six- or 12-months assessments, respectively) among the full sample, and among the subsample that reported HIV primary care in the prior 2 years. All modeling procedures were repeated separately for the full sample and the subsample in HIV care. All independent variables of interest were regressed on the outcome by using unadjusted logistic regression and the general estimating equation (GEE) method to adjust for the potential correlation of repeated observations over time. Independent variables significant at $p < 0.10$ in the unadjusted analysis were chosen for the forward stepwise logistic regression analysis using GEE. In the final model, the odds ratios represent the adjusted relative odds of taking HAART 6 months later comparing the group with the characteristic of each independent variable with those without the characteristic. Analyses used STATA 9.2 (StataCorp, College Station, TX) and SAS statistical software (SAS Institute, Inc., Cary, NC).

Results

Description of the sample

Of the 1,161 participants in the study, 807 had data for at least two consecutive assessments and were included in the analytic sample. An additional 104 (12.9%) had missing data and were omitted from analyses. The greatest sources of missing data were loss to follow-up and inability to determine medication regimen. The analyses included 1,225 observations of the remaining 703 participants, with 522 participants having more than one observation. Among the 640 participants who had an HIV primary care visit in the 2 years before the baseline or 6-month assessment, 1,040 observations were included in the analyses.

The full analytic sample comprised 62% males, 75% current drug users, 75% non-Hispanic blacks, and 55% with a CD4 count < 350 . The median age was 42.5 years. The vast majority (91%) reported stable housing, and 36% reported four or more HIV primary health care visits in the 6 months before the interview. Among those engaged in HIV primary medical care, participants rated their engagement with their care provider very highly; on a scale of 1 to 4, 86% rated their engagement as 3 or higher, and only 0.4% rated it as 1. More than one third (36%) reported perfect engagement with their HIV primary health care provider.

For almost half (48%) of the observations, participants reported taking HAART at baseline or at the 6-month assessment; an additional 7.5% were taking suboptimal or non-HAART regimens, and 44% were not taking HIV medications. For 48% of all observations, the participant was taking HAART 6 months later (*i.e.*, the associated 6- or 12-month follow-up assessment). No statistically significant differences in HAART use were found among the three assessment points. Therefore, the data for all three time points were combined, and GEE was used.

Unadjusted analysis

In unadjusted analysis, factors associated with taking HAART 6 months later were as follows: greater education, older age, not currently using illicit drugs, lower CD4 count, fewer depressive symptoms, favorable attitude about HIV medication, medical coverage, stable housing, greater number of HIV primary care visits, and methadone maintenance treatment (Table 1).

TABLE 1. UNADJUSTED PREDICTORS OF TAKING HAART 6 MONTHS LATER AMONG HIV-SEROPOSITIVE INJECTION DRUG USERS (LOGISTIC GENERAL ESTIMATING EQUATIONS; INSPIRE STUDY, 2001–2005)

Characteristics	Full sample (n = 1,225)			Participants in HIV primary care [#] (n = 1,040)		
	%	Unadjusted Odds Ratio	95% CI	%	Unadjusted Odds Ratio	95% CI
Individual-level factors						
Sex: male	62.2	1.13	0.85, 1.51	62.4	1.15	0.85, 1.56
Education: ≤8th grade	14.2	0.57**	0.38, 0.84	13.8	0.53**	0.35, 0.80
Race: non-Hispanic Black	75.4	1.11	0.81, 1.53	74.6	1.19	0.85, 1.66
Age, baseline	42.5 ^a	1.03**	1.01, 1.05	42.7 ^a	1.03*	1.00, 1.05
Drug use, current	74.6	0.63**	0.53, 0.87	74.7	0.64**	0.48, 0.85
CD4 count: <350	54.7	1.72**	1.31, 2.25	56.4	1.61**	1.21, 2.13
Depression (BSI): mean ^b	1.97 ^a	0.83*	0.72, 0.97	1.96 ^a	0.85*	0.72, 0.99
Positive attitude: health benefits of HAART even if using drugs: strongly agree ^c	79.3	1.55**	1.15, 2.09	79.5	1.53**	1.11, 2.11
Structural factors						
Health care coverage	79.3	3.00**	2.08, 4.33	83.5	2.64**	1.75, 3.97
Stable housing	90.7	2.76**	1.73, 4.43	93.3	2.71**	1.53, 4.78
Methadone treatment, current	31.7	1.52*	1.13, 2.04	34.1	1.34 ⁺	0.99, 1.82
HIV primary care visits: >4 in past 6 months	36.1	2.14**	1.65, 2.77	42.2	1.67**	1.28, 2.18
Interpersonal factor						
Patient-provider engagement: perfect	—	—	—	36.2	1.42*	1.08, 1.87
Social Support, emotional and/or instrumental assistance	63.4	1.13	0.88, 1.46	66.4	1.04	0.79, 1.37

[#]At least one visit in the prior 2 years.

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, by the Wald statistic.

^aMean.

^bOdds of being on HAART for each additional increase in one unit on scale.

^cVersus strongly disagree, disagree, or agree.

Among the subsample with recent HIV primary care visits, unadjusted analysis indicated that the same variables were predictive of later HAART use as in the full sample, with the exception that methadone maintenance was only marginally significant (Table 1). In addition, better patient-provider engagement was significant.

Adjusted analysis

Adjusted logistic regression analysis indicated that HAART use was independently predicted by higher education level, older age, not currently using illicit drugs, lower CD4 count, a positive attitude about HIV medications, medical coverage, stable housing, and greater number of HIV primary care visits (Table 2). Among those with recent HIV primary care, adjusted analysis indicated that later HAART use was associated with the same factors as in the full sample, as well as better patient-provider engagement (Table 2).

Discussion

The study findings indicate the critical role that interpersonal and structural factors, as well as individual-level factors, play in the HIV treatment of IDUs, and which may contribute to their disparities in HIV health outcomes. The results revealed that greater frequency of HIV primary care visits, better engagement with HIV primary care providers, and

stable housing were associated with higher odds of their later HAART use. Indeed, those with better engagement with their HIV primary care providers had a 45% higher odds (AOR, 1.45; 95% CI, 1.09–1.93) of HAART use 6 months later compared with those with low provider engagement, and those with stable housing had double the odds of later HAART use as compared with those without stable housing (AOR, 2.05; 95% CI, 1.11–3.77), above and beyond the adverse effects of lacking health care coverage (AOR, 2.13; 95% CI, 1.57–3.34) and individual-level drug use (AOR, 0.67; 95% CI, 0.05–0.90) and a positive attitude regarding the health benefits of HAART among active drug users (AOR, 1.48; 95% CI, 1.06–2.06).

Patient-provider engagement

Our findings underline the major role that HIV primary care providers play in patients' HAART use, and in particular, in patient-centered interactions (*e.g.*, providers' information sharing, patient involvement in decision making, and providers' respect for and support of the patients' decisions) emphasized in the patient-provider engagement measure used.²⁹ The findings are consistent with the growing literature indicating the importance of patient-centered provider interactions in patients' access and adherence to treatments, engagement and retention in primary care, and health outcomes

TABLE 2. MULTIVARIATE REGRESSION MODELS OF PREDICTORS OF TAKING HAART 6 MONTHS LATER AMONG HIV-SEROPOSITIVE INJECTION DRUG USERS (LOGISTIC GENERAL ESTIMATING EQUATIONS; INSPIRE STUDY, 2001–2005)

Characteristics	Full sample (n = 1,225)		Participants in HIV primary care [#] (n = 1,040)	
	Adjusted OR	95% CI	Adjusted OR	95% CI
Individual-level factors				
Education: ≤8th grade	0.55**	0.36, 0.83	0.54**	0.35, 0.85
Age, baseline	1.02*	1.00, 1.05	1.03*	1.00, 1.05
Drug use, current	0.65**	0.50, 0.86	0.67**	0.50, 0.90
CD4 count: <350	1.70***	1.28, 2.50	1.65**	1.23, 2.22
Positive attitude: health benefits of HAART even if using drugs: strongly agree ^b	1.45*	1.07, 1.98	1.48*	1.06, 2.06
Structural factors				
Health care coverage, any	2.29***	1.57, 3.34	2.13***	1.40, 3.25
Stable housing	1.90*	1.15, 3.15	2.05*	1.11, 3.77
HIV primary care visits: >4 in past 6 months	1.77***	1.35, 2.32	1.44*	1.09, 1.91
Interpersonal factor				
Patient-provider engagement: perfect	—	—	1.45*	1.09, 1.93

[#]At least one visit in the prior 2 years.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, by the Wald statistic.

^aOdds of taking HAART for each additional increase in 1 unit on scale.

^bVersus strongly disagree, disagree, or agree.

across a range of health conditions and populations, in addition to those with HIV/AIDS.^{24–32} In prior studies, patient-centered HIV patient-provider engagement was associated with not missing medical appointments and adherence to medications and provider advice among a multisite heterogeneous sample in HIV medical care, and was associated with viral suppression among a similar sample of IDUs taking HAART and among an urban sample in HIV primary care.^{10,29,30}

Given that current or former IDUs as compared with non-IDUs have lower access to and retention in HIV primary care,²³ worse patient-centered engagement with their providers,²⁹ and that the majority are African Americans, which compounds their disparities in quality of HIV medical care and HAART outcomes,^{48–51} interventions are needed to promote IDUs' and HIV primary care providers' patient-centered interactions. The U.S. Institute of Medicine and others have called for interventions to improve patient-provider interactions as a strategy to reduce disparities in patient care and outcomes.⁵²

Promoting better patient-provider communication may also potentially facilitate current drug users' drug-abuse treatment. In one study, HIV primary care patient-provider discussion about drug use was associated with patients' greater likelihood of substance-abuse treatment.⁵³

Attitudes about HAART vis-à-vis drug use

Although active substance use is often associated with worse HIV treatment outcomes, an estimated half of individuals in HIV medical care in the United States are former or current substance abusers,⁵⁴ and many, including a sizeable number of IDUs, are able to achieve successful HIV treatment.^{1,10} In the present sample, endorsing that using HIV medications keeps the patient healthy even if using illicit

drugs was associated with HAART use. Research supports the perspective of drug addiction as a chronic condition, with intermittent periods of abstinence and relapse to drug use not uncommon among HIV-seropositive IDUs.⁵ Thus, greater effort is needed in training HIV-seropositive individuals and HIV primary care providers in the importance of continuity of engagement in HIV primary care and HAART use in the context of substance use. HIV clinician training regarding drug abuse as a chronic condition, and the linkage of primary care and substance-abuse treatment is also merited, given the extent of substance abuse within the HIV population and the tendency of some clinicians to base treatment decisions on non-medical considerations despite current recommendations.^{7,55}

Limitations

By including multilevel factors in the analysis of HAART use, the findings likely pertain to patients' uptake of or adherence to HAART, as well as to barriers to HAART access, including provider-prescribing patterns. Indeed, 7.5% of participants reported taking nonrecommended regimens. The extent to which a given study finding pertains to each of these issues cannot be fully discerned. Research assessing HIV primary care providers and their interactions with IDU patients is needed to determine the extent to which provider perceptions or patient or provider interactions can explain study findings. For example, it is plausible that providers' lower perceived engagement with patients and concerns about nonadherence affect their reluctance to prescribe HAART to individuals in the sample. Alternatively, patients who perceive greater engagement with their provider may be more likely to take the HAART that has been offered or prescribed. Similarly, attitudes about use of HAART when actively using drugs may pertain to notions of the

appropriateness or willingness of using HAART while using drugs, or they may pertain to the IDUs' experiences of providers' having denied HAART prescription when they were actively using drugs.

The study findings are subject to potential selection bias, as participants were recruited from urban U.S. epicenters, where HIV care may differ from that available to IDUs elsewhere. Participants may not be representative of all IDUs, as they were heterosexually active and had volunteered for an HIV-prevention intervention.

Implications for intervention

These findings suggest that interventions to improve IDUs' HAART use must be comprehensive, promoting their access to HIV primary care and engagement with HIV primary care providers, with potential implications for their quality of HIV care and disparities in HIV health outcomes.^{49–51} The findings also indicate the need for programs and policies to improve IDUs' access to stable housing and to integrate drug-abuse treatment services in HIV primary care. Interventions ought to target HIV primary care providers as well as IDUs to train them in patient-centered communication skills⁴⁹ and in the importance of engagement and continuity in HIV primary care and HAART use in the context of substance use and addiction. HIV clinician training to promote patient-focused interactions may be especially important in improving the quality of care and HIV treatment for substance-using, African-American patient populations.^{23,33,49–52}

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