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HIV PATIENTS' PREFERENCE FOR INTEGRATED MODELS OF ADDICTION AND HIV TREATMENT IN VIETNAM

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Abstract

Background—Integrated care models for HIV and substance use disorders (SUD) care are proposed as a strategy for closing gaps in the HIV care continuum and reaching decreasing HIV transmission. We examined attitudes regarding integration of HIV and SUD treatment among HIV-infected patients with illicit drug and unhealthy alcohol use.

Method—We conducted a cross-sectional survey of HIV-infected patients receiving care at 5 HIV clinics in Hanoi, Vietnam, regarding substance use and attitudes toward HIV and SUD treatment integration. We used multivariate logistic regression to identify correlates of integrated care preference.

Result—Among 312 participants with current or past illicit drug use or unhealthy alcohol use, 81.4% preferred integrated treatment for HIV and SUD. In multivariate analysis, completing a college education (aOR 0.22, 95% CI 0.08, 0.65), risk of depression (aOR 3.51, 95% CI 1.57, 7.87), ever having received medication-assisted treatment for opioid use disorder (aOR 4.20, 95% CI 1.65, 10.69), being comfortable discussing substance use with counselors/nurses (aOR 3.86, 95% CI 1.38, 10.81) and having discussed alcohol use with their health providers (aOR 2.34, 95% CI 1.09, 4.99) were associated with patients' preference for integrated care, after adjusting for age and gender.

Conclusion—Most, but not all, HIV-infected patients with substance use preferred integrated HIV and SUD treatment. Our findings suggest that policies to expand integration of HIV and SUD treatment will be well received by most patients, and that stand-alone treatment options should be preserved for a significant minority.

Keywords

HIV; integrated model; injection drug use; alcohol abuse; Vietnam

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1. Introduction

Vietnam has a concentrated HIV epidemic in which people who inject drugs have the highest prevalence of HIV (Nguyen, Nguyen, Pham, Vu, & Mulvey, 2012). Since the first diagnosed case of HIV in 1990, Vietnam has scaled up a free antiretroviral therapy (ART) program, nationwide, that began in 2005 through a network of outpatient HIV clinics and has greatly expanded access to HIV care (Nguyen et al., 2013). International momentum is building to reach the World Health Organization 90–90–90 goal of closing gaps in the HIV continuum by 2020: 90% of people living with HIV know their HIV status; 90% of people who know their status are on HIV treatment; and 90% of people on treatment will have undetectable levels of HIV, known as viral suppression (UNAIDS, 2014a). In September 2015, Vietnam became the first country in Asia to commit to these ambitious targets with the goal of ending its AIDS epidemic by 2030 (UNAIDS, 2014b). Responding to this commitment, the Ministry of Health 2016 HIV/AIDS plans calls for the goal of retaining 82% of patients in treatment and achieving 86% viral suppression within 12 months of starting antiretroviral during 2016 (Ministry of Health, 2016). However, the most recent data show that while an estimated 80% of people living with HIV in Vietnam are aware of their infection, only 42% receive ART (Vietnam Authority of HIV/AIDS Control, 2016) and, in one study, 72% of these achieved viral suppression within 12 months (Cuong et al., 2012). Effective interventions to address these gaps are greatly needed in order to achieve the 90-90-90 goal in Vietnam, and globally.

Substance use is a major contributor to gaps in the HIV care continuum. HIV-infected patients who acquire HIV through injecting drugs have a higher risk of late presentation to HIV care, delayed initiation of antiretroviral treatment, and poorer treatment outcomes than those who acquire HIV through sexual transmission (Suárez-García et al., 2016). Substance use and abuse are common among HIV-infected individuals internationally and in Vietnam, with about 50% of people living with HIV reporting current or past history of drug or alcohol use disorders (Tran et al., 2013) (Samet, Horton, Traphagen, Lyon, & Freedberg, 2003) (Korthuis et al., 2008) (Erickson, Becker, Shaw, Kasper, & Keynan, 2015) (Korthuis et al., 2008). Moreover, the prevalence of alcohol consumption among people who use drugs is higher than among those who do not use drugs (Tran et al., 2013) (Tran, Nguyen, Do, Nguyen, & Maher, 2014). Substance use is associated with increased HIV risk-taking behaviors (Scott-Sheldon, Walstrom, Carey, Johnson, & Carey, 2013), delays in HIV diagnosis, decreased receipt of ART, adherence to treatment (Azar, Springer, Meyer, & Altice, 2010) (Nicholas et al., 2014) (Erickson et al., 2015) (Lucas, 2011) (Hinkin et al., 2007) (Lucas, Gebo, Chaisson, & Moore, 2002) (Jordan et al., 2013), mental health comorbidities (Gupta, Kumar, & Garg, 2013), treatment outcomes including viral suppression (Azar et al., 2010) (Lucas et al., 2002) and quality of life (Tran et al., 2014) (Korthuis et al., 2008).

Mental disorders, mostly depression, are among the most common comorbidities in patients with substance use disorders and/or HIV. Current literatures reported a high prevalence of depression among substance-abusing adults with HIV/AIDS (Berger-Greenstein et al., 2007; Chander, Himelhoch, & Moore, 2006; Durvasula & Miller, 2014). Studies also suggested that clinical management of HIV must account for the "triple diagnosis" of HIV, psychiatric

diagnosis, and substance use disorders and required integrated treatment services to provide comprehensive interventions (Durvasula & Miller, 2014; Willenbring, 2005). Another study in Vietnam also indicated that patients reporting anxiety/depression problems were more likely to select integrative models for more comprehensive health care services (Tran, Nguyen, Phan, Nguyen, & Latkin, 2015).

Integrating treatment for HIV and substance use disorders (SUD) has the potential to close these gaps in care. Substance abuse treatment for people living with HIV occurs on a continuum of individuals (1) becoming aware of their HIV status, (2) engaging in HIV, psychiatric and substance use related care, (3) preventing relapse and adhering to treatment (Lucas, 2011), and improving SUD and HIV treatment outcomes (Korthuis et al., 2008) (Howe et al., 2014) (Altice, Kamarulzaman, Soriano, Schechter, & Friedland, 2010) (Palepu, Horton, Tibbetts, Meli, & Samet, 2004). Existing models of SUD treatment can improve many steps in this continuum (Durvasula & Miller, 2014), however, previous studies suggest they may be more effective and cost-efficient when integrated with HIV care (Esposito-Smythers et al., 2014) (Bouis et al., 2007) (Wolfe, Carrieri, & Shepard, 2010) (Lucas et al., 2007) (WHO, 2013) (Bruce & Altice, 2007) (Celentano & Lucas, 2007) (Kamarulzaman & Altice, 2015). Vietnam health policy consequently prioritizes development of integrated models of HIV and SUD treatment.

In Vietnam, with support from donors such as PEPFAR and Global Fund, outpatient HIV clinics and Methadone Maintenance Therapy (MMT) clinics were traditionally established as two parallel systems that are independent from the general health care system. However, over the past five years, partly because of substantial decline in donor funding, Vietnam health policy increasingly supports development of integrated models of HIV and SUD treatments and integration of these services into the existing health care system. A number of models for integration have been tested. At the time of this study, co-located and co-staffed MMT and ART clinics were preferred. In this study, the preference of integration refers to the model of co-located and co-staffed ART and MMT clinics. Most recently, the government is looking to move ART clinics into the hospital system whereas MMT clinics remain with preventive medicine system. Furthermore, both dispensing of ARV and Methadone for patients who are stable are pushed to take place at the commune health centers instead of ART and MMT clinics.

Understanding patient views of integrated care models is essential for developing patient-centered approaches to addiction and HIV care and for predicting the feasibility of implementing integrated care models. Studies of patient attitudes in the United States suggest that HIV infected patients appreciate the increased convenience and efficiency of integrating care for medical and substance use disorders (Drainoni et al., 2014) (Samet, Friedmann, & Saitz, 2001) (Egan et al., 2011) and view co-located models of HIV and addiction care as more patient-centered (Korthuis et al., 2010). In Vietnam, one study suggests patients enrolled in methadone treatment prefer integrated HIV and methadone service delivery models, despite some concerns about stigma and privacy (Tran, Nguyen, Phan, Nguyen, et al., 2015). However, little is known about the attitudes of patients engaged in HIV care regarding integrated models of substance use and HIV treatment. Our study aims to assess patient attitudes toward integrated models of HIV and addiction care and to

assess correlates of patient preference for integrated care among patients engaged in HIV treatment.

2. Methods

2.1. Setting

We conducted a cross-sectional survey from May to December 2013 among HIV-infected patients receiving treatment in HIV clinics in Hanoi, Vietnam. From 17 HIV clinics in Hanoi, 5 HIV clinics were selected purposively for participation based on the level of HIV and SUD treatment integration: 3 clinics provided integrated HIV and methadone maintenance treatment and 2 clinics were non-integrated care with HIV and methadone maintenance being provided by separate staff and separate locations.

2.2. Subjects

Participants were eligible if they were (1) over 18 years old; (2) enrolled in the HIV clinic for at least 6 months; (3) able to understand and voluntarily complete informed consent. Six hundred patients were selected randomly from a comprehensive list of a total 2,091 patients active in care across the five participating HIV clinics (861 integrated; 1,230 non-integrated). Out of those patients who were approached, 573 consented to participate in this study.

Participants were included in the current analysis if they met one of the following criteria: (1) past illicit drug use; (2) current illicit drug use in the past 3 months; (3) unhealthy alcohol use in the past 12 months. Current illicit drug use in the past 3 months and unhealthy alcohol use in the past 12 months was assessed using survey data. Past illicit drug use was assessed by survey and abstracted from patient medical records. 137 participants were identified only from medical record data. In total, survey and medical record data, combined, identified an analytic sample of 312 participants of the larger study (see Diagram).

2.3. Data source/collection

When patients came to the clinic to pick up their monthly medication, a research staff explained the study to eligible patients and invited them to participate. If the patients agreed, they signed a voluntary consent form to enroll. Following enrollment, participants completed face-to-face interviews with a research assistant lasting 30 to 45 minutes in a separate room to ensure privacy. Interviewers were trained on the research questionnaires and interviewing skills, to help interviewees understand questions. All interviews were conducted in Vietnamese language. After being interviewed, patients completed their medical appointment and picked up their medications before going home.

Research assistants abstracted information from patient medical records on past illicit drug use (routinely recorded at intake for patients enrolling in HIV care in Vietnam), time since antiretroviral treatment initiation, and last CD4 count.

2.4. Measures

Demographic and social characteristics included gender (male, female), age in years, education level, marital status, employment. Risk of depression was assessed using the

Center for Epidemiologic Studies (CESD)-20 scale (Radloff, 1977). The score ranged from 0 to 60 by sum of the 20 questions. A score of 16 points or more was considered having risk of depression. The length of ARV treatment of patients was measured since the first day they started ART. CD4 counts were collected regularly (every six months for most participants) during the treatment process. These two information were extracted from medical records.

Illicit drug use was assessed using the ASSIST (Humeniuk et al., 2008). Illicit drugs included sedatives, amphetamines, analgesics, marijuana, cocaine, inhalants, lysergic acid diethylamide (LSD) or hallucinogens, and heroin, or non-medically used prescription opioids. Current drug use was considered if patients used these drugs in the past 3 months. We also abstracted medical records for mention of any history of any illicit drug use.

Alcohol behaviors were assessed using AUDIT which has previously been validated in Vietnam (Giang, Spak, Dzung, & Allebeck, 2005). The scale contained 10 items scored 0–4. We defined unhealthy alcohol use as a total score more than 7. We also asked about drinking and alcohol-use related problems in the past 30 days. For tobacco, the survey asked whether participants had smoked at least 100 cigarettes over their lifetime (binary variable), and how often they had smoked in the past 30 days prior to the survey (four categories included no smoking, several days a month, daily smoking and being not sure).

To assess receipt of opioid addiction treatment, participants were asked if (1) they had ever been in a compulsory detoxification (“06”) center; (2) they had ever been treated for opioid addiction with medications (methadone, buprenorphine, naltrexone or traditional remedies...); and (3) they were currently receiving methadone treatment.

Participant attitudes towards HIV and SUD treatment were assessed by self-report of 1) patient-provider discussions of substance use (illicit drug and alcohol) (Korthuis et al., 2008), 2) comfort discussing substance use with health providers (doctors, peer educators and counselors/nurses) (Ray et al., 2013), 3) satisfaction with HIV and SUD health services, and 4) preference for integrated model of HIV and SUD treatment. Patient-provider (doctors, counselors or peer educators) discussion of substance use was measured as a series of binary variables. Patients’ comfort in discussing substance use with health providers was assessed by a series of ordinal variables with 4 categories (1. Absolutely uncomfortable; 2. Not really comfortable; 3. Fairly comfortable; 4. Very comfortable). These variables were then dichotomized as fairly comfortable vs. less than fairly comfortable. Patient satisfaction were assessed using a 5-point Likert scale about their assessment of the quality of treatment (1. Bad; 2. Average; 3. Good; 4. Very good; 5. Perfect). High satisfaction means their answers were very good or perfect. Preference for integrated model was defined by the combination of two questions about the agreement level of patients with these statements 1. “I prefer to receive treatment for alcohol and drug problems at the same clinic where I receive treatment for HIV” and 2. “I prefer to receive treatment for alcohol and drug problems from the same provider who treats me for HIV”. Each question had 5-point Likert scale answer. If the answers were 4 or 5, we defined “yes” with the preference for being treated at the same clinic (co-located) and with the same doctor (co-staffed) (respectively for two questions). Then we combined two answers and defined their preference for integrated model = yes if they answered “yes” with preference for co-located or co-staffed model.

2.5. Data analysis

Analyses were limited to 312 participants with current illicit drug use or unhealthy alcohol use. To examine bivariate associations between participants' preference for integrated model and other characteristics, we performed χ^2 test, T-test and simple logistic regression. Factors that were associated with preference for integrated model in bivariate analyses (Chi-square p value < 0.20) were included in a multivariate logistic regression model (education, risk of depression, received medication-assisted treatment for opioid addiction, discussion and feeling comfortable to discuss with health providers about substance use and treatment model) with additional adjustment for age continuous and gender. Prior compulsory rehabilitation ("06") experience and current receipt of methadone treatment were eliminated due to collinearity with receiving medication-assisted treatment for opioid addiction.

3. Results

Of 600 sampled patients approached, 573 agreed to participate (95.5%). Of those, 312 (54.5%) had past or current illicit drug use or unhealthy alcohol use. The majority of participants were male (95.5%) with a mean age of 36.3 years (SD 6.5). More than half live with a spouse or partner (60.3%) and were employed (78.5%). About half total had less than a high school education. Participants receiving care in an integrated model of care were more educated than those in receiving non-integrated care. Among patients in integrated care, 47.2% had high school education level and 10.2% had pursued college/university, compared to 35.5% and 6.2% among patients in non-integrated care, respectively (p=0.034). Approximately one third (35.6%) of participants were at risk for depression. The average length of time on antiretroviral treatment was 3.7 years (SD 2.1) and 90.4% of participants were in treatment for more than 1 year; average of CD4 count was 387.1 (SD 216.1). Participants in integrated care clinics had greater mean length of time on antiretroviral treatment and higher mean CD4 count compared with participants in non-integrated clinics. (Table 1)

Recent alcohol use was prevalent, with 43.0% reporting unhealthy alcohol use in the past 12 months. Fourteen percent of participants reported illicit drug use in last 3 months. In the last 30 days, 70.8% reported daily smoking, 65.4% reported drinking alcohol, and 42.9% reported alcohol-use related problems. Patients reported receiving treatment for opioid use disorder in a compulsory rehabilitation ("06") center (39.7%), any medication-assisted treatment (30.5%) and current methadone maintenance treatment (15.1%). Patients receiving care in integrated HIV and SUD treatment settings were more likely to report receiving all types of SUD treatment compared with those receiving care in non-integrated model. (Table 2)

More than half of participants reported feeling comfortable discussing substance use issues with doctors (69.6%), peer educators (62.1%) and counselors/nurses (56.9%). However, less than half of participants reported discussing illicit drug use (30.1%) or alcohol use (49.0%) with any health provider in last 6 months. About one-third of patients reported high satisfaction with general health care services and HIV treatment in particular. Among 37 patients who responded to the question about how they rated SUD treatment that they received in the last 6 months, 8 (21.6%) reported high satisfaction with SUD treatment.

Participants receiving integrated care more frequently reported being comfortable discussing substance use with counselors (61.1% vs. 47.4%, $p = 0.024$) and high satisfaction with HIV treatment services (38.4% vs. 24.0%, $p = 0.013$). Most patients (81.4%) preferred integrated models of SUD and HIV treatment, and this preference was greater for participants currently receiving care in an integrated HIV-SUD clinic compared with those in non-integrated clinics (85.7% vs. 71.9%, $p = .004$). (Table 3)

Associations between preference for integrated models of HIV and SUD care and patient characteristics are reported in Table 4. In multivariate models, participant preference for integrated HIV and SUD treatment was associated with ever having received medication-assisted treatment for opioid addiction (aOR 4.20, 95% CI 1.65, 10.69), being comfortable discussing substance use with counselors/nurses (aOR 3.86, 95% CI 1.38, 10.81), having discussed alcohol use with their health providers in the past six months (aOR 2.34, 95% CI 1.09, 4.99), and having risk of depression (aOR 3.51, 95% CI 1.57, 7.87). Participants who had completed a college/university education were less likely to prefer integrated HIV and SUD care compared with those with less than high school education (aOR 0.22, 95% CI 0.08, 0.65).

4. Discussion

Integrated care models demonstrate potential for improving treatment of chronic comorbid illnesses such as HIV and substance use disorders and may be an efficient means of addressing these overlapping epidemics in Vietnam and internationally. In this study, HIV-infected patients voiced a strong preference for integrated HIV and SUD care. This preference was associated with education level, addiction treatment experience, depression, feeling comfortable discussing drug use and having discussed substance use with care providers. Moreover, we also found that patients in integrated models reported greater comfort and satisfaction with treatment. These findings support healthcare policies that promote integrated care delivery models for patients with HIV and substance use.

Substance use was prevalent in this sample of HIV-infected patients in Vietnam, where injection drug use is a main driver of HIV transmission (Nguyen & Scannapieco, 2008) and alcohol use is widespread (Tran et al., 2013, 2014). The high prevalence of substance use concurs with previous studies in HIV infected populations in Vietnam (Giang, Ngoc, Hoang, Mulvey, & Rawson, 2013; Tran et al., 2013) and the U.S. (Korthuis et al., 2008)(Howe et al., 2014). Current illicit drug and unhealthy alcohol use adversely impacts HIV care engagement, treatment, retention, and outcomes (Celentano & Lucas, 2007; Korthuis et al., 2008; Lucas, 2011) and highlights the need for interventions that efficiently address substance use in HIV clinic settings.

While the majority of patients were comfortable discussing substance use issues with their providers, less than a half of HIV-infected patients with illicit drug or alcohol use reported discussing substance use with their health providers in the last six months. This is similar to previous reports from HIV infected patients in the United States (Ray et al., 2013) (Metsch et al., 2008) (Korthuis et al., 2008). There is currently no formal screening for substance use during HIV clinic visits. Educational interventions to train providers to discuss substance

use and implementation of validated substance use screening instruments for all HIV clinic patients might help improve identification of substance use HIV clinics and engage people in treatment.

In addition to the need for substance use screening in Vietnam HIV clinics, options for referral to treatment are currently limited. Methadone maintenance therapy for opioid use disorder is the only evidence-based treatment currently available in Vietnam. No behavioral or medication-assisted treatment for unhealthy alcohol use or stimulant use exist, though alcohol use is widespread and the prevalence of methamphetamine use is doubling every two years (MOLISA, 2014) (Giang et al., 2013). While methadone maintenance therapy is increasing in Vietnam, the government estimates that 80% of people using opioids do not access treatment (Vietnam Authority of HIV/AIDS Control, 2015). Improving treatment availability will require expansion of the scope of addiction treatment to not only cover opioid use disorder but also alcohol and stimulant abuse (L. M. Giang et al., 2013), which will require develop behavioral components that complement routine medical treatment. Behavioral interventions are also key in bettering treatment outcomes and patients' satisfaction with integrated care (Bouis et al., 2007; Drainoni et al., 2014; Egan et al., 2011; Zaller, Gillani, & Rich, 2007). When quality SUD treatments become available, patients may be more likely to disclose their drug use and seek care.

Despite limited options for treatment of substance use disorder in Vietnam, most participants in our study preferred an integrated model for SUD and HIV treatment. This preference was strongly associated with ever having received medication-assisted treatment for opioid addiction. This awareness may result from their experience of treatment. We also found the collinearity between receiving medication-assisted treatment, especially currently on methadone treatment and history of being in "06" centers. This correlation perhaps due to methadone maintenance treatment criteria at early phase of the methadone maintenance treatment expansion in which patients who have been in "06" centers were prioritized to get in treatment.

The results also showed that participants with risk of depression were more likely to prefer integration. Another study about preference of patients on methadone treatment reported the same finding (Tran, Nguyen, Phan, Nguyen, et al., 2015). While the reason of this preference remains unclear, this provides an opportunity to integrate mental health management within SUD/HIV care, which has improved outcomes for patients with HIV and depression (Bouis et al., 2007; Zaller et al., 2007), especially when depression risk occurred among one third of our population and depression predicted increased risky drug and alcohol use (Tran et al., 2016) (Palfai et al., 2014) and decreased adherence to antiretroviral treatment (Nakimuli-Mpungu et al., 2012).

A preference for integrated care was also greater among respondents receiving treatment in a clinic that offered both methadone and HIV treatment, indicating these consistent with high patient satisfaction with methadone treatment previously reported in Vietnam (Tran, Nguyen, Phan, & Latkin, 2015). Furthermore, our study shows that patients feel comfortable discussing use with counselors/nurses about their drug use and/or ever discussed with health providers about alcohol use were more likely to prefer integrated model. This is consistent

with the findings of Tran et al. (2015) who noted that among methadone patients, the ones who had ever disclosed their health status were twice as likely to prefer integrated care (Tran, Nguyen, Phan, Nguyen, et al., 2015).

However, our study found that not all participants in our study preferred care integration, suggesting value in preserving diversity in treatment options for HIV and SUD. For example, participants with higher educational level (college/university) were less likely to prefer integrated care. This could be explained by fear of lost privacy, which could have severe negative effects that could impact employment. In a previous study, the major reason that methadone participants chose stand-alone treatment was the fear of losing privacy, even though they did not differentiate between higher and lower education (Tran, Nguyen, Phan, Nguyen, et al., 2015). The finding that not all patients prefer integrated care is especially important given the trend to integrate HIV and SUD services in Vietnam and other countries. In Hanoi, for examples, since data collection for this study was completed in 2013, six methadone maintenance treatment clinics were opened and three clinics were integrated (co-located or co-staffed) with HIV clinics. Those clinics that were not integrated were due to lack of space. Among factors driving the move towards integration is the decline in international funding (from PEPFAR, Global Fund and others) which have supported the establishment of the two parallel systems of HIV and methadone maintenance treatment services. As the government is increasingly looking for ways to fill in gaps in funding, making the best use of staff time by having them work in both services and saving clinical spaces by co-locating services are common strategies for integration. However, our study findings suggested that not all HIV-infected patients who use drugs or alcohol prefer this complete integration. It is important to preserve SUD stand-alone services that might suit the needs of these patients.

The results of this study should be interpreted in light of several limitations. First, we limited the population to people who reported illicit drug or unhealthy alcohol use engaged in HIV care. The results may not generalize to HIV-infected patients not engaged in care and those without substance use. Second, self-reported measures of substance use may introduce misclassification bias. Third, we cannot infer causality in associations with preference integrated model given the cross-sectional observational design study design.

5. Conclusion

HIV patients in our study voiced a strong preference for integrated HIV and SUD treatment but a minority of patients preferred separate care for HIV and SUD. Although patient – healthcare provider discussion about drug use was uncommon, this action had strong associations with patient’s likelihood of choosing integrated care. Additional studies should explore the reasons why some patients do not prefer integrated care, how integrated models of care might be implemented most effectively and their effectiveness in meeting WHO 90-90-90 goals for controlling the HIV epidemic. Integrated HIV and SUD treatment models appear to be consistent with the majority of patient care preferences in Vietnam, but policymakers should maintain stand-alone treatment options for a significant minority of patients leery of integrated treatment.

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Highlights

- 81.4% preferred integrated treatment for HIV and SUD
- Associations: Depression, MAT, comfort discussing & discussing use with providers
- Integrated care models will be well received by most, but not all, patients

Table 1

Participant Characteristics, overall and by currently receiving integrated or non-integrated HIV and SUD treatment (N = 312)

Characteristics	Non-integrated treatment (n = 96)		Integrated treatment (n = 216)		Total		p-value
	n	%	n	%	n	%	
Male	92	95.8	206	95.4	298	95.5	0.855
Age	35.5 ± 7.1		36.7 ± 6.1		36.3 ± 6.5		0.112
20 – 29	14	14.6	21	9.7	35	11.2	0.336
30 – 39	65	67.7	146	67.6	211	67.6	
>= 40	17	17.7	49	22.7	66	21.2	
Education							
Less than high school	56	58.3	92	42.6	148	47.4	0.034
High school	34	35.5	102	47.2	136	43.6	
College/University	6	6.2	22	10.2	28	9.0	
Marital status							
Single	27	28.1	63	29.2	90	28.9	0.661
Live with partner	2	2.1	12	5.5	14	4.5	
Live with spouse	58	60.4	116	53.7	174	55.8	
Divorced	7	7.3	20	9.3	27	8.6	
Widowed	2	2.1	5	2.3	7	2.2	
Employment							0.854
Unemployed	20	20.8	47	21.8	67	21.5	
Employed	76	79.2	169	78.2	245	78.5	
Risk of depression							0.115
No	68	70.8	133	61.6	201	64.4	
Yes	28	29.2	83	38.4	111	35.6	
Length of time in ART (year)	3.1 ± 1.8		3.9 ± 2.2		3.7 ± 2.1		0.001

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Characteristics	Non-integrated treatment (n = 96)		Integrated treatment (n = 216)		Total	p-value
	n	%	n	%	n	
Last CD4 count	321.5 ± 184.3		416.3 ± 223.0		387.1 ± 216.1	0.0002

Table 2

Substance Use and Opioid Addiction Treatment, by Treatment Model (N = 312)

Characteristics	Non-integrated model (n = 96)		Integrated model (n = 216)		Total		p-value
	n	%	n	%	n	%	
Illicit drugs in last 3 months	14	14.6	30	13.9	44	14.1	0.871
Unhealthy alcohol use	38	39.6	96	44.4	134	42.9	0.458
Drinking in last 30 days	64	66.7	140	64.8	204	65.4	0.751
Alcohol-use related problems in last 30 days	43	44.8	91	42.1	134	42.9	0.661
Daily smoking in last 30 days	69	71.9	152	70.4	221	70.8	0.787
Ever been in rehabilitation center	24	25.0	100	46.3	124	39.7	<0.001
Ever received medication-assisted treatment for opioid addiction	19	19.8	76	35.2	95	30.5	0.006
Current methadone treatment	7	7.3	40	18.5	47	15.1	0.011

Table 3

Participant Attitudes Towards HIV and SUD Treatment (N = 312)

Characteristics	Non-integrated model (n = 96)		Integrated model (n = 216)		Total		p-value
	n	%	n	%	n	%	
Discussed with health provider in last 6 months:							
Drug use	26	27.1	68	31.5	94	30.1	0.435
Alcohol use	43	44.8	110	50.9	153	49.0	0.317
Comfortable discussing substance use with:							
Doctors	74	77.1	143	66.2	217	69.6	0.054
Peer educators	54	56.8	139	64.4	193	62.1	0.209
Counselors/nurses	45	47.4	132	61.1	177	56.9	0.024
High satisfaction with health services received in last 6 months	30	31.3	74	34.3	104	33.3	0.603
High satisfaction with HIV treatment services received in last 6 months	23	24.0	83	38.4	106	34.0	0.013
High satisfaction with SUD treatment services received in last 6 months (n=37)	2	25.0	6	20.7	8	21.6	0.565
Preference for integrated SUD and HIV treatment	69	71.9	185	85.7	254	81.4	0.004

Table 4

Bivariate and Multivariate Associations between Patient Characteristics and Preference for Integrated HIV and SUD treatment

Characteristics	Preference for integrated model	Bivariate analysis OR (95%CI)	Multivariate analysis aOR (95% CI)
Age	NA	0.99 (0.95–1.04)	0.98 (0.93–1.03)
Gender	P=0.326		
Male	224 (81.9)	1.0 (ref)	1.0 (ref)
Female	10 (71.4)	0.55 (0.17–1.83)	0.24 (0.05–1.04)
Education level	p=0.034		
Less than high school	120 (81.1)	1.0 (ref)	1.0 (ref)
High school	116 (85.3)	1.35 (0.72–2.54)	1.29 (0.63–2.67)
College/University	18 (64.3)	0.42 (0.17–1.01)	0.22 (0.08–0.65) **
Ever received medication-assisted treatment for opioid addiction	p=0.001		
No	166 (76.5)	1.0 (ref)	1.0 (ref)
Yes	88 (92.6)	3.86 (1.68–8.87) ***	4.20 (1.65–10.7) **
Risk of depression	p=0.003		
No	154 (76.6)	1.0 (ref)	1.0 (ref)
Yes	100 (90.1)	2.77 (1.37–5.60) **	3.51 (1.57–7.87) **
Discussed drug use with provider	p=0.082		
No	172 (78.9)	1.0 (ref)	1.0 (ref)
Yes	82 (87.3)	1.83 (.92–3.63)	0.98 (0.42–2.28)
Discussed alcohol use with provider	p=0.061		
No	123 (77.4)	1.0 (ref)	1.0 (ref)
Yes	131 (85.6)	1.74 (.97–3.13)	2.33 (1.09–4.99) *
Comfortable discussing substance use with doctors	p=0.170		
No	73 (76.8)	1.0 (ref)	1.0 (ref)
Yes	181 (83.4)	1.52 (.83–2.75)	0.47 (0.20–1.13)
Comfortable discussing substance use with peer educators	p<.001		
No	83 (70.3)	1.0 (ref)	1.0 (ref)
Yes	170 (88.1)	3.12 (1.73–5.61) ***	2.21 (0.73–6.25)
Comfortable discussing substance use with counselors/nurses	p<.001		
No	94 (70.2)	1.0 (ref)	1.0 (ref)
Yes	159 (89.8)	3.76 (2.04–6.93) ***	3.86 (1.38–10.8) *
Treatment model	P=0.004		
Non-integrated	69 (71.9)	1.0 (ref)	1.0 (ref)

Characteristics	Preference for integrated model	Bivariate analysis OR (95%CI)	Multivariate analysis aOR (95% CI)
Integrated	185 (85.7)	2.34 (1.30–4.19) **	1.04 (0.68–1.59)

*
p<.05;

**
p<.01;

p<.001