Published in final edited form as:

AIDS Care. 2015 January ; 27(1): 86–92. doi:10.1080/09540121.2014.959464.

Depression, Substance Use, Viral Load, and CD4+ Count among Patients who continued or left Antiretroviral Therapy for HIV in St. Petersburg, Russian Federation

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Abstract

Antiretroviral therapy (ART) became more widely available in the Russian Federation in 2006 when the Global Fund made a contribution to purchase ART with a mandate to increase numbers of patients receiving it. Funds were distributed to AIDS Centers and selected hospitals, and numbers quickly increased. Though ART is highly effective for adherent patients, dropout has been a problem; thus understanding characteristics of patients who remain on ART vs. those who leave treatment may provide information to facilitate engagement. We retrospectively assessed depression, hopelessness, substance use, viral load, and CD4+ counts of 120 patients who dropped out of ART for >12 months (Lost-to-Care; LTCs) and 120 who continued for >12 months (Engaged-in-Care; EICs). As expected, LTCs had higher viral loads and depression, lower CD4+ counts, and more alcohol, heroin, and injection drug use in the past 30 days. A binary logistic regression with Center for Epidemiologic Studies Depression score, Beck Hopelessness score, whether drugs/alcohol had ever prevented them from taking ART, and past 30 days' alcohol use [$X^2(4)=64.27, p=.0.000$] correctly classified 74.5% of participants as LTC or EIC, suggesting that integrated treatment for substance use, psychiatric, and HIV could reduce dropout and improve outcomes.

Keywords

HIV; AIDS; Retention; Attrition; Russian Federation

INTRODUCTION

Of 1.5 million HIV+ Eastern Europeans and Central Asians, over two-thirds are in the Russian Federation (RF; UNAIDS, 2010). In St. Petersburg, rising heroin addiction in the 1990s led to increased HIV among injecting drug users (IDUs; Krupitsky et al., 2004; 2006a), followed by sexual transmission (Pokrovsky & Ladnaya, 2010). Antiretroviral therapy (ART) was unavailable except for pharmaceutical trials involving patients with no addictions history/low relapse risk. The RF developed testing and counseling programs at hospitals and IDU clinics and established AIDS Centers for testing, counseling, and registration for ART were it to become available. In 2006, Global Fund money was distributed, and requirements of no addiction history or extended remission were relaxed. ART patients increased from a handful in 2005-06 to 125,623/720,014 registered cases in the RF, and 8,571/42,639 in St. Petersburg by late 2012 (Lioznov, 2013). Treatment is available only at specialized hospitals or regional centers for CD4+ count<350 and/or viral load>100,000 and/or opportunistic infection, or maternal transmission prevention (Ministry of Health, 2006; Lioznov, et al., 2011).

Though patients are informed of adherence's importance, dropout is problematic; understanding patients who remain (Engaged-in-Care; EICs) vs. those who leave (Lost-to-Care; LTCs) may guide interventions. Depression and substance use have been shown to negatively impact engagement and adherence in other cultures (e.g., inner-city US, Pecoraro et al., 2013), but few studies have examined attrition in the RF. In a prior St. Petersburg study (Pecoraro et al., 2014), EIC and LTC focus groups identified structural barriers: stigma/discrimination; problems with providers and access; and individual barriers: employment/caring for dependents; inaccurate beliefs about ART (only LTCs); side-effects; substance use (LTCs, present; EICs, past); and depression. In the present study, we compared demographics, depression, hopelessness, drug/alcohol use, trust, and biomarkers on those who dropped out of ART for >12 months (LTCs; n=120) with those who continued for >12 months (EICs; n=120) in St. Petersburg/Leningrad Oblast.

METHODS

Design

Participants were from Leningrad Regional AIDS Center (LRAC), Botkin Hospital for Infectious Diseases (BHID), and St. Petersburg AIDS Center. The University of Pennsylvania's and Pavlov State Medical University's IRBs granted approval.

Participant Selection and Recruitment

Clinic physicians identified potential participants, aged >18 and capable of informed consent. LTCs had begun ART but not attended clinic in the past 12 months or been treated elsewhere and were contacted by phone. EICs kept >90% of appointments and had good

adherence according to records and Adherence Index scores >10 (Mannheimer et al., 2010). Random selection was not used due to recruitment difficulties. Participants received 1,000 rubles (~US \$32) for effort.

Data Collection and Analysis

Participants completed self-reports: demographics, social support, health, adherence, beliefs about HIV, reasons for retention/attrition, and substance use; Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977); Beck Hopelessness Scale (BHS; Beck et al., 1975); Risk Assessment Battery (RAB; Metzger et al., 2001); SF-36 (Ware et al., 1994); Trust in Physician Scale (TIPS; Anderson & Dedrick, 1990). Approved Russian translations of the CES-D, SF-36, and RAB were used. Two Russian physicians translated the BHS and TIPS and checked the translations for consensus. EICs' CD4+ count and VL were obtained from clinic records, and LTCs brought their most recent results from general hospitals or addictions systems¹. All results were dated within 90 days of study intake. Assessments took 45 minutes.

RESULTS

Demographics

Participants were white (99%), male (60%), and heterosexual (96%). More EICs were employed part or full-time (>30 hours/week) [64% vs. 39%; $X^2(1, N=240) = 15.02, p = .000$]. A majority of all (72%), but more LTCs [78% vs. 68%; $X^2(1, N=240) = 4.02, p = .05$] reported infection through needle sharing. Similar proportions (33% vs. 35%) reported sexual transmission (Table 1). EICs' average CASE Adherence Index Score was 14.06(SD=1.95).

LTCs' Reasons for Attrition

Drug and/or alcohol use (63%); depression (38%); anxiety (41%); the belief that ART was not helping (28%) or was not important to health (29%); not knowing that stopping ART is harmful (41%); poor social/familial support (26%); side-effects (42%) were common reasons for attrition. Of the 71% who wanted to return to treatment, it was because: they did not feel well (46%); or had stopped/reduced drug (38%) or alcohol use (36%).

Social Support

LTCs and EICs expressed satisfaction with personal relationships (7.13 vs. 6.74 on a 10-point scale), but EICs perceived more support [2.39(SD=0.87) vs. 1.77(SD=1.04); $t(237)=5.45, p=.000$] and rated friends/family as helping more to remember medications [1.77(SD=1.04) vs. 1.48(SD=1.08); $t(237)=2.18, p=.030$].

Biomarkers and Health

Viral loads (VLs) and CD4+ counts (CD4+) were available for 80% of LTCs and 55% of EICs. EICs had higher CD4+ counts [420.48(SD=189.56) vs. 234.70(SD=158.98); $p=.000$]

¹LTCs did not receive HIV treatment at these facilities.

and lower viral loads [$\log_{10} = 4.22(4.81)$ vs. $\log_{10} = 5.39(5.72)$; $p=.001$] (Table 2). However, even among EICs, the VL was much higher than typical for fully adherent patients. According to the WHO, >5,000 copies is considered virological failure (WHO, 2010), and <1,000 copies indicates suppression in low and middle income countries (Bennett et al., 2008). The RF is a developing, upper-middle income country (World Bank, 2014). Of the 66 EICs on whom VLs were available, 53 (80%) had a viral load <200, and one was undetectable; of 96 LTCs, 17 (18%) had a VL <200, and none were undetectable.

On ratings of current health from 0-100 (worst possible-perfect), EICs rated themselves better (67.4) vs. (51.4) [$t(238)=6.04$, $p=.000$]. On the SF-36 (Ware et al., 1994), EICs rated every aspect of health better (Table 3).

Drugs, Alcohol, and Mental Health Status

Significantly more LTCs used alcohol, benzodiazepines, or heroin in the past 30 days, but oral opiate, amphetamine, and marijuana use were similar. More LTCs reported drinking several times per week or daily [27% vs. 8%; $X^2(1, N=240)=15.56$, $p=.000$] or injecting drugs [25% vs. 10%; $X^2(1, N=240)=9.35$, $p=.002$] in the past 30 days (Table 4). More LTCs [64% vs. 28%; $X^2(1, N=240)=30.99$, $p=.000$] reported that drug/alcohol use had ever prevented them from taking ART.

EICs' average CES-D score, 13.74, was just under the threshold (15) for minor depressive symptoms, but LTCs average score of 21.13 was in the major depression range ($p<.000$). LTCs expressed more hopelessness on the BHS ($p<.000$), but both groups were in the "mild" range (Table 5).

Risk Behaviors

LTCs had higher levels of drug ($p=.012$) and sex ($p=.049$) risk behaviors on the RAB (Metzger et al., 2001) (Table 6).

Punishment Beliefs and Stigma

Participants indicated agreement with statements on HIV as punishment and stigma (Mimiaga et al., 2010) from 1-strongly disagree to 7-strongly agree). LTCs agreed more with two of the three statements on punishment and the statement on shame/stigma ($p=.015-.005$) (Table 7).

Trust in Physician Scale

EICs had higher trust according to the Trust in Physician Scale (TIPS) [40.08(SD=7.47) vs. 36.22(SD=8.67); $t(235)=3.67$, $p=.000$].

Logistic Regression—A logistic regression was performed on LTC/EIC status as the dependent variable and the following predictors, without covariates: CES-D, BHS, whether drugs or alcohol had ever prevented them from taking ART (binary), and drinking in the past 30 days (binary). Analysis was performed using SPSS 19.

A test of the full model against a constant-only model was significant, $X^2(4)=64.27$, $p=.000$. The predictors reliably distinguished LTCs from EICs, with 76.5% of EICs and 72.3% of LTCs correct, for an overall 74.5% success rate. Table 8 shows regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each predictor. According to the Wald criterion, all variables were reliable predictors. The odds ratios for drugs or alcohol ever having prevented them from taking ART and having drunk alcohol in the past 30 days were moderate but weak for the other predictors.

Discussion and Conclusions

Among this group of patients in the Russian Federation, substance use (particularly alcohol and heroin) and depression were more prevalent among LTCs. The high substance use among all participants--and the disproportionate number of LTCs infected through needle sharing, demonstrates IDU's role in the epidemic (e.g., Lioznov et al., 2011). Of great concern is the high VL, even among EICs, since it facilitates transmission and increases chances of treatment failure (Novitsky & Essex, 2012). Finding that 71% of LTCs wanted to return to treatment is promising, but institutional barriers (i.e., long waiting lists) as well as personal barriers should be addressed. Results are commensurate with prior research (Pecoraro et al., 2014) and provide evidence of substance use and depression as factors associated with loss-to-care.

Limitations include retrospectiveness and non-random selection, which prevents the conclusion that the identified factors *cause* attrition. However, they are *associated* with it, and findings should be taken seriously. Future research might involve a prospective study in which substance use and depression are measured at clinic intake, and attrition is tracked. Interventions to prevent attrition should be tested: depression and substance use screening upon clinic intake and co-located psychiatric and substance abuse treatment. Among possible interventions: Cognitive-Behavioral Therapy for depression and inaccurate beliefs about ART; Motivational Interviewing to address ambivalence (Miller & Rollnick, 2012); adherence interventions like Life Steps (Safren, et al. 1999; Safren et al., 2001); and extended-release naltrexone² (e.g., Krupitsky et al., 2006b, 2011, 2012) with psychosocial support to prevent relapse.

Acknowledgments

We would like to thank the participants, Botkin Hospital, and Leningrad Regional AIDS Center. This study was supported by funding from the Office of the U.S. Global AIDS Coordinator through the PEPFAR program.

References

- Anderson LA, Dedrick RF. Development of the Trust in Physician Scale: A measure to assess interpersonal trust in patient-physician relationships. *Psychological Reports*. 1990; 67:1091–1100. [PubMed: 2084735]
- Beck AT, Kovacs M, Weissman A. Hopelessness and suicidal behavior. An overview. *Journal of the American Medical Association*. 1975; 234(11):1146–1149. [PubMed: 1242427]

²Agonist treatments are legally unavailable in the Russian Federation.

- Bennett DE, Bertagnolio S, Sutherland D, Gilks CF. The World Health Organization's global strategy for prevention and assessment of HIV drug resistance. *Antiviral Therapy*. 2008; 13:1–13. [PubMed: 18578063]
- Krupitsky E, Zvartau E, Karandashova G, Horton NJ, Schoolwerth KR, Bryant K, Samet JH. The onset of HIV infection in the Leningrad region of Russia: a focus on drug and alcohol dependence. *HIV Medicine*. 2004; 5:30–33. [PubMed: 14731167]
- Krupitsky EM, Zvartau EE, Lioznov DA, Tsoy MV, Egorova VY, Belyaeva TV, Antonova TV, Brazhenko NA, Zagdyn ZM, Verbitskaya EV, Zorina Y, Slavina TY, Grinenko AY, Samet JH, Woody GE. Co-morbidity of infectious and addictive diseases in St. Petersburg and the Leningrad Region, Russia. *European Addiction Research*. 2006a; 12:12–19. [PubMed: 16352898]
- Krupitsky EM, Zvartau EE, Masalov DV, Tsoy MV, Burakov AM, Egorova VY, et al. Naltrexone with or without fluoxetine for preventing relapse to heroin addiction in St. Petersburg, Russia. *Journal of Substance Abuse Treatment*. 2006b; 31(4):319–328. [PubMed: 17084785]
- Krupitsky E, Nunes EV, Ling W, Illeperuma A, Gastfriend DR, Silverman BL. Injectable extended-release naltrexone for opioid dependence: A double-blind, placebo-controlled, multicentre randomised trial. *The Lancet*. 2011; 377(9776):1506–1513.
- Krupitsky E, Zvartau E, Blokhina E, Verbitskaya E, Wahlgren V, Tsoy-Podosenin M, et al. Randomized trial of long-acting sustained-release naltrexone implant vs oral naltrexone or placebo for preventing relapse to opioid dependence. *Archives of General Psychiatry*. 2012; 69(9):973–981. [PubMed: 22945623]
- Lioznov, DA.; Ruutel, K.; Uuskula, A.; DeHovitz, JA. AIDS in Eastern Europe and Central Asia.. In: Hall, JC.; Hall, BJ.; Cockerell, CJ., editors. *HIV/AIDS in the Post-HAART Era: Manifestations, Treatment & Epidemiology*. People's Medical Publishing House USA; New York: 2011. p. 820-838.
- Lioznov DA. Personal communication. August. 2013; 25:2013.
- Mannheimer SB, Mukherjee R, Hirschhorn LR, Dougherty J, Celano SA, Ciccarone D, Finkelstein R. The CASE adherence index: A novel method for measuring adherence to antiretroviral therapy. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV*. 2006; 18(7):853–861.
- Mimiaga MJ, Safren SA, Dvoryak S, Reisner SL, Needle R, Woody G. “We fear the police, and the police fear us”: Structural and individual barriers and facilitators to HIV medication adherence among injection drug users in Kiev, Ukraine. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS*. 2010; 22(11):1305–1313.
- Ministry of Health and Social Development, R. F. [Guidelines: Indications for Treatment of HIV Infection: Recommendations of the Ministry of Health and Social Development, Russian Federation]. 2006February 14, 2012from http://www.businesspravo.ru/Docum/DocumShow_DocumID_128469.html ПОКАЗАНИЯ К НАЗНАЧЕНИЮ ЛЕЧЕНИЯ БОЛЬНЫХ ВИЧ-ИНФЕКЦИЕЙ РЕКОМЕНДАЦИИ МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ И СОЦИАЛЬНОГО РАЗВИТИЯ РФ 29 декабря 2006
- Miller, WR.; Rollnick, S. *Helping People Change*. Third Edition. The Guilford Press; New York: 2012. Motivational Interviewing.
- Metzger, DS.; Nalvaline, HA.; Woody, GE. Assessment of substance abuse: HIV Risk Assessment Battery.. In: Carson-Dewet, editor. *Encyclopedia of Drugs, Alcohol, and Addictive Behavior*. Macmillan Reference USA.; Farmington Hills, MI: 2001.
- Novitsky V, Essex M. Using HIV viral load to guide treatment-for-prevention interventions. *Current Opinion in HIV and AIDS*. 2012; 7(2):117–124. [PubMed: 22258501]
- Pecoraro A, Royer-Malvestuto C, Rosenwasser B, Moore K, Howell A, Ma M, Woody GE. Factors contributing to dropping out from and returning to HIV treatment in an inner city primary care HIV clinic in the united states. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV*. 2013 DOI: 10.1080/09540121.2013.772273.
- Pecoraro A, Mimiaga MJ, O'Cleirigh C, Safren SA, Blokhina E, Verbitskaya E, et al. Lost-to-care and engaged-in-care HIV patients in Leningrad Oblast, Russian Federation: Barriers and facilitators to medical visit retention. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV*. 2014; 26(10):1249–1257.

- Pokrovsky, V.; Ladnaya, NYB. HIV-infection informational bulletin. Russian Federal AIDS Center; Moscow: 2010.
- Radloff LS. The CES-D Scale: A Self-Report Depression Scale for Research in the General Population. *Applied Psychological Measurement*. 1977; 1(3):385–401.
- Safren SA, Otto MW, Worth JL. Life-steps: Applying cognitive behavioral therapy to HIV medication adherence. *Cognitive and Behavioral Practice*. 1999; 6(4):332–341.
- Safren SA, Otto W, M. Worth JL, Salomon E, Johnson W, Mayer K, et al. Two strategies to increase adherence to HIV antiretroviral medication: Life-Steps and medication monitoring. *Behaviour Research and Therapy*. 2001; 39(10):1151–1162. [PubMed: 11579986]
- UNAIDS. Eastern Europe and Central Asia. Global Report Fact Sheet. 2010
- Ware JE, Gandek B, the IQOLA Project Group. The SF-36® Health Survey: development and use in mental health research and the IQOLA Project. *International Journal of Mental Health*. 1994; 23(2):49–73.
- World Health Organization. Antiretroviral therapy for HIV infection in adults and adolescents: recommendations for a public health approach. 2010 revision. World Health Organization; Geneva: 2010.
- World Bank. [January 28, 2014] Country Classification tables. <http://econ.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20421402~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html>

Table 1

Demographics

		EICs n=120	LTCs n=120	All N=240
Age		33.5(SD=5.9)	33.47(SD=5.9)	33.47(SD=5.9)
Gender	Male	70(58%)	75(63%)	145(60%)
	Female	50(42%)	45(37.5%)	95(40%)
Race	White	119(99%)	118(98%)	237(99%)
	Black	1(<1%)	1(<1%)	2(<1%)
	Asian	0	1(<1%)	1(<1%)
Sexual Orientation	Heterosexual	116(97%)	114(95%)	230(96%)
	Homosexual	2	0	2
	Bisexual	2	6	8
Marital Status	Single-Never Married	31(26%)	42(35%)	73(30%)
	Living with Romantic Partner	36(30%)	31(26%)	67(28%)
	Married	27(23%)	24(20%)	51(23%)
	Separated	10(8%)	10(8%)	20(8%)
	Divorced	13(11%)	11(9%)	24(10%)
	Widowed	3(2.5%)	2 (1.7%)	5(2%)
Education	Full-time Student	6(5%)	4(3%)	10(4%)
	Unemployed	17(14%)	54(45%)	71(30%)
	Employed Part or Full-time	77(64%)	47(39%)	124(52%)
Self-Reported Route of Transmission	Needle Sharing	79(66%)	93(78%)	172(72%)
	Sexual Activity	40(33%)	42(35%)	82(34%)

		EIC n=120	LTC n=120	All N=240
Age		33.5(SD=5.9)	33.47(SD=5.9)	33.47(SD=5.9)
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Table 2

CD4+ Count and Viral Load

	<u>EICs</u>	<u>LTCs</u>	
CD4+ Count	M=420.48(SD=189.56)	M=234.70(SD=158.98)	$t(231)=8.10, p=.000^*$
Viral Load	M=16,545.62(SD=65,072.65) $\log_{10} = 4.22(4.81)$	M=244,901.76(SD=519,499.37) $\log_{10} = 5.39(5.72)$	$t(150)=-3.52, p=.001^*$
Viral Load <1,000	n=54/66 (82%)	n=25/96 (26%)	$\chi^2(1)=48.7, p=.000$
Viral Load<200	n=53/66 (80%)	n=17/96 (18%)	$\chi^2(1)=61.7, p=.000$
Viral Load Undetectable	n=1/66 (1.5%)	n=0/96 (0%)	$\chi^2(1) = 1.46, NS$

Table 3

SF-36 Scores

SF-36 Scale	M(SD)		<i>t</i> Test
	EICs	LTCs	
Physical Component	59.78(12.56)	53.33(14.79)	$t(208)=3.41, p=.001^*$
Physical Functioning	88.55(16.33)	75.63(24.94)	$t(226)=4.65, p=.000^*$
Role-Physical	304.58(109.57)	243.49(118.14)	$t(237)=4.15, p=.000^*$
Bodily Pain	67.15(32.58)	60.75(28.63)	$t(238)=1.62, p=.107, NS$
General Health	60.34(20.64)	46.41(17.39)	$t(231)=5.57, p=.000^*$
Mental Component	63.38(15.35)	55.50(15.74)	$t(208)=3.67, p=.000^*$
Vitality	39.71(11.15)	30.97(11.84)	$t(235)=5.84, p=.000^*$
Social Functioning	75.52(23.28)	60.19(25.05)	$t(237)=4.90, p=.000^*$
Role-Emotional	309.17(103.18)	253.12(106.52)	$t(236)=4.12, p=.000^*$
Mental Health	57.74(13.70)	49.63(13.95)	$t(228)=4.45, p=.000^*$

NS=not significant

* Statistically significant

Table 4

Past 30 days' alcohol and drug use

	n(%)		<i>Chi Square</i>
	EICs	LTCs	
Alcohol use	38(32%)	58(62%)	$X^2 (1, N=240)=9.87, p=.002^*$
Alcohol a few times per week or every day	9(8%)	32(27%)	$X^2 (1, N=240)=15.56, p=.000^*$
Heroin	10(8%)	26(22%)	$X^2 (1, N=240)=8.37, p=.004^*$
Benzodiazepines	4(3%)	12(10%)	$X^2 (1, N=240)=4.29, p=.04^*$
Oral Opiate Painkillers	30(25%)	24(20%)	$X^2 (1, N=240)=0.93, NS^*$
Amphetamines	4(3%)	10(8%)	$X^2 (1, N=240)=2.73, NS^*$
Marijuana	15(13%)	15(13%)	$X^2 (1, N=240)=2.73, NS^*$
Any Injection Drug Use	12(10%)	30(25%)	$X^2 (1, N=240)=9.35, p=.002^*$

Table 5

CES-D and BHS Scores

	M(SD)			<i>t</i> Test
	ETC (n=120)	LTC (n=120)	All (N=240)	
CES-D	13.74(9.30)	21.13(10.78)	5.64(4.14)	$t(229)=5.55, p=.000^*$
Beck Hopelessness Scale	4.09(3.26)	7.36(4.32)	17.35(10.69)	$t(223)=-6.41, p=.000^*$

* Statistically significant

Table 6

RAB Scores

RAB Scale	M(SD)		<i>t</i> Test
	EIC _s (n=120)	LTC _s (n=120)	
Drug Risk	1.64(4.31)	3.26(6.16)	<i>t</i> (235)=2.35, <i>p</i> =.019*
Sex Risk	2.15(1.68)	2.69(2.49)	<i>t</i> (236)=1.98, <i>p</i> =.049*
Total Risk	3.79(5.10)	5.96(7.75)	<i>t</i> (234)=2.54, <i>p</i> =.012*

* Statistically significant;

Table 7

Punishment Beliefs and Stigma

	M(SD)		<i>t</i> Test
	EICs (n=120)	LTCs (n=120)	
Medication is my punishment for getting HIV.	2.95(2.05)	3.39(1.88)	$t(237)=-1.71, p=.088, NS$
It doesn't matter what I am prescribed for HIV because the disease is a punishment.	2.60(1.79)	3.27(1.83)	$t(237)=-2.86, p=.005^*$
I have HIV because I am being punished for things that I have done.	3.13(2.05)	3.75(1.84)	$t(236)=-2.46, p=.015^*$
I feel ashamed that I have HIV.	1.96(0.93)	2.24(0.94)	$t(237)=-2.30, p=.023^*$

NS=not significant

* Statistically significant

Table 8

Logistic Regression Results

					95% Confidence Interval for Odds Ratios	
	<i>B</i>	Wald(df)	Sig.	Odds Ratio	Lower	Upper
CES-D	0.43	5.59(1)	.018 *	1.04	1.01	1.08
Drugs or Alcohol have ever prevented from taking ART	1.02	9.9(1)	.002 *	2.77	2.13	3.41
BHS	0.15	9.7(1)	.002 *	1.16	1.06	1.27
Drank alcohol in the past 30 days	1.01	9.6(1)	.002 *	2.76	2.18	3.40
Constant	-2.57	38.32(1)	.000 *	0.08		

NS=not significant

* Statistically significant