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Factors Associated with Antiretroviral Therapy Adherence Among Transgender Women Receiving HIV Medical Care in the United States

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Abstract

Purpose: We examined factors associated with antiretroviral therapy (ART) adherence among transgender women living with HIV (TWLWH).

Methods: We used combined data from the 2009 to 2013 cycles of Medical Monitoring Project (MMP), an HIV surveillance system designed to produce nationally representative estimates of the characteristics of HIV-infected adults receiving HIV medical care in the United States. Rao-Scott chi-square tests and multivariable logistic regression were used to identify factors associated with dose adherence (defined as taking 100% of prescribed ART doses in the past 3 days).

Results: Among TWLWH who reported current antiretroviral therapy use, an estimated 80.5% self-reported dose adherence. Multivariable factors independently associated with lower (<100%) dose adherence were younger age (30-39 vs. 40 and over), not having health insurance coverage, depression, lower self-efficacy to take medication as prescribed, and having greater than one daily ART dose.

Conclusion: Our findings suggest several ways to potentially improve ART adherence of TWLWH including tailoring efforts to address the needs of TWLWH under age 40, increasing access to health insurance coverage, addressing mental health morbidities, building skills to improve medication adherence self-efficacy, and simplifying ART regimens when possible.

Keywords

ART adherence; Medical Monitoring Project; transgender women

Introduction

Transgender women are at high risk for HIV infection. Systematic reviews consistently show high HIV prevalence rates (19.1 - 27.7%) among transgender women in the United States as well as globally.¹⁻³ Antiretroviral therapy (ART) has been proven not only to improve health outcomes for persons living with HIV (PLWH), but also to reduce the risk of transmission to

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HIV-negative partners.⁴ It is important that transgender women living with HIV (TWLWH) access ART and adhere to their ART regimens to ultimately suppress their HIV viral load.

Mizuno and colleagues⁵ analyzed a nationally representative sample of PLWH in HIV care in the United States (U.S.) who were surveyed in the 2009 to 2011 cycles of Medical Monitoring Project (MMP). Their study showed that the percentage of PLWH prescribed ART was similar across gender groups, but transgender women were significantly less likely than cisgender men to report 100% dose adherence (78% vs. 87%), and less likely to achieve sustained viral suppression (i.e., having undetectable viral load or <200 copies/mL at all tests during the past year), 51% vs. 61%. Poor adherence to ART among TWLWH has also been reported elsewhere.⁶⁻⁸ Few studies have sought to identify factors associated with medication adherence among TWLWH, and these studies were limited by small (n=22-59), convenience samples of TWLWH.^{8,9}

To contribute to the sparse literature on ART adherence among TWLWH, we analyzed data from the 2009-2013 cycles of MMP, which include information on more than 250 TWLWH in HIV care in the United States. We sought to characterize the following: the prevalence of ART adherence, the association between adherence and viral suppression, and factors associated with adherence among TWLWH.

Methods

MMP Design and Data Collection

We analyzed combined data from the 2009 - 2013 cycles of MMP, an HIV surveillance system designed to produce annual nationally representative estimates of behavioral and clinical characteristics of HIV-infected adults receiving medical care in the United States. MMP methods, including weighting procedures and response rates, have been described in detail elsewhere.¹⁰ Briefly, the 2009–2013 MMP cycles used a three-stage, probability-proportional-to-size sampling method. First, U.S. states and one territory were sampled, then facilities in those areas providing outpatient HIV care, and finally, eligible HIV-infected patients. Eligible persons were HIV-infected, age 18 years or older, and had received medical care in participating facilities between January and April in the cycle year for which they were sampled. All 23 sampled health jurisdictions participated in every cycle. The facility response rate ranged from 76% to 85% and the patient response rate ranged from 52% to 56%. Matched interview and medical record abstraction data for all respondents were collected June 2009 through May 2014.

Respondents were asked to report their sex at birth and their current self-identified gender. Those who self-identified as transgender or those whose sex at birth and current self-identified gender were discordant were categorized as transgender. Transgender persons were further categorized into transgender women (male-to-female transgender, i.e., sex at birth was male and current gender was transgender or female) and transgender men (female-to-male transgender, i.e., sex at birth was female and current gender was transgender or male). Thirteen persons were excluded because information needed to classify into one of the above categories was missing. Because the number of transgender men was too small (n=35) to conduct comparative analyses, we focused on transgender women. Further,

because assessment of ART adherence was our primary focus, our analytic sample was limited to 258 transgender women who reported current ART use.

Ethics Statement

In accordance with guidelines for defining public health research,¹¹ the Centers for Disease Control and Prevention (CDC) determined MMP was public health surveillance used for disease control, program, or policy purposes. Local institutional review board approval was obtained at participating states, territory, and facilities when required. Written or verbal informed consent was obtained from all interviewed participants.

Analytic Methods

We followed the methods used in Beer et al.¹² that examined MMP data to identify factors associated with ART adherence among all adult PLWH in care. We used self-reported adherence measures developed by the AIDS Clinical Trials Group.¹³ Dose adherence was defined as taking 100% of prescribed ART doses in the past 3 days, schedule adherence was defined as taking all ART doses according to one's prescribed schedule in the past 3 days (e.g., 2 times a day), and instruction adherence was defined as following all special instructions for taking their antiretroviral medicines in the past 3 days (e.g., take with food). Instruction adherence was only measured among persons with special instructions for taking their antiretroviral medicines. We assessed the associations between these adherence measures and a measure of viral suppression abstracted from medical records defined as participant's viral load at last test being undetectable or <200 copies/mL.

We then assessed bivariate associations between dose adherence and many of the same potential correlates assessed in Beer et al.¹² (Table 1), using Rao-Scott chi-square tests.¹⁴ Health insurance coverage in the past 12 months was assessed using patient response about health care coverage and ways for which ART medications were paid, and was defined as "having private or public health insurance or Ryan White/AIDS Drug Assistance Program coverage" versus "uninsured." Depression in the past 2 weeks was measured using patient response to the Patient Health Questionnaire (PHQ-8),¹⁵ which consists of eight of the nine criteria on which the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV-TR)¹⁶ diagnosis of major or other depressive disorders are based. Stimulant use in the past 12 months was defined as self-reporting injection or non-injection use of methamphetamines, other amphetamines, cocaine, or crack. Binge drinking in the past 30 days was defined as self-reporting five or more drinks in one sitting. "One daily ART dose" was defined as self-reporting a single daily ART dose (either a single tablet or multiple tablets taken concurrently). Participants also reported the degree to which they were bothered by side effects. Psychosocial variables included self-efficacy (a person's belief in her own ability) to take medication as prescribed, belief that medication has a positive effect on health, belief that non-adherence will result in resistance to ART, and satisfaction with social support (all single-item measures). Due to small cells in some of the response categories, age was categorized into "18-29" "30-39" and "40 and over" and race was categorized into "black or African American" versus "not black/African American."

Lastly, we conducted multivariable logistic regression analysis to identify factors independently associated with dose adherence, using a backward elimination modeling strategy with $p < 0.10$ inclusion and $p < 0.05$ retention criteria. All analyses accounted for clustering, unequal selection probabilities,¹⁷ and patient and facility nonresponse^{18,19} by using SURVEY procedures in SAS 9.3 (SAS Institute Inc., Cary, NC) and SAS-callable SUDAAN 10.0.1 (RTI International, Research Triangle Park, NC). The SAS and SUDAAN procedures included sampling weights and strata and cluster information to account for the complex survey design of MMP.

Results

Among TWLWH who reported current ART use in the United States, almost half were black or African American (47%) and their mean age was 43.3 years. They were predominantly poor but over 80% had some form of health insurance coverage. About a quarter (24%) reported symptoms consistent with major or other depression, 13% reported stimulant drug use, and 19% reported recent binge drinking. A little over a third (34%) reported taking one daily ART dose (Table 1).

Eighty percent reported dose adherence, 71% reported schedule adherence, 67% reported instruction adherence, and 56% reported being adherent to all three measures (Table 2). All measures of ART adherence were positively associated with viral suppression (Prevalence Ratio [PR] > 1.00) at last test and statistical significance ($p < 0.05$) was observed for all associations except for instruction adherence.

Table 1 reports the results of bivariate analyses of the association between dose adherence and our examined covariates. Factors associated with lower ($< 100\%$) dose adherence were younger age, homelessness, incarceration, no health insurance coverage, depression, stimulant drug use, binge drinking, lower self-efficacy to take medication as prescribed, and not believing the negative effect of non-adherence (i.e., the virus may become resistant to ART) ($p < 0.05$). Having one daily ART dose (vs. 2 or more daily ART doses) was marginally ($p < 0.1$) associated with dose adherence. Race, educational attainment, poverty level, being bothered by side effects, belief that medication has positive effects on health, satisfaction with social support, and time since HIV diagnosis were not associated with dose adherence.

In multivariable analysis (Table 3), TWLWH age 30-39 compared to those age 40 and over (adjusted Prevalence Ratio [aPR] 0.76, 95% Confidence Interval [CI] 0.63-0.92), those with no health insurance coverage (aPR 0.80 [0.66-0.97]), those who were depressed (aPR 0.82 [0.70-0.95]), and those who had lower self-efficacy to take medication as prescribed (aPR 0.59 [0.42-0.84]) were independently less likely to report dose adherence. TWLWH who reported having one daily ART dose were independently more likely to report dose adherence.

Discussion

Among TWLWH who reported current ART use, an estimated 80.5% self-reported dose adherence, and those who were dose adherent were almost 70% more likely to achieve viral suppression at last test than those who were not adherent. Our multivariable analysis

identified correlates of lower (<100%) dose adherence among TWLWH that are consistent with findings from a nationally representative sample of HIV-infected adults in care¹² including younger age (30-39 vs. 40 and over), depression, having greater than one daily ART dose, and lower self-efficacy to take medication as prescribed. Depression and adherence self-efficacy have been found to be strongly associated with ART adherence in studies not specifically focused on transgender women.²⁰ Another study found that transgender women, compared to other HIV-infected persons, reported lower self-efficacy to integrate treatment regimens into their daily lives.⁶ The same study also found that this variable explained the difference in adherence rate between transgender women and others, suggesting that imparting skills to integrate treatment into one's daily routine may be particularly important for TWLWH. Our findings lend further support to the provision of mental health care and medication adherence skills-building as actionable points of intervention for improving adherence among TWLWH. The finding on having one daily ART dose also suggests that health care providers may facilitate improvements in adherence by simplifying ART regimens when possible for their transgender patients.

We also found an association between the lack of health insurance, or medication coverage, and lower dose adherence in the multivariable model. Not having coverage was associated with a 20% reduction (aPR=0.80 [95% CI: 66%-97%]) in the prevalence of dose adherence, suggesting that expansion of health insurance (private or public), or medication coverage through the Ryan White Program or the AIDS Drug Assistance Program, may be needed to improve adherence among TWLWH. Health insurance coverage was not tested in previous studies that examined correlates of adherence among TWLWH,^{6,8,9} however, our finding is reasonable because those who are uninsured are unlikely to be able to afford HIV medications on a consistent basis. Studies of medication adherence for other diseases (e.g., cardiovascular diseases, diabetes, schizophrenia), in other populations, demonstrate associations between adherence and the level of patient out-of-pocket expenses, copayment, prescription drug coverage, and type of insurance plan.²¹⁻²⁷ The data and findings illustrate how financial burden associated with medication might negatively affect adherence.

Limitations

This analysis has several limitations. First, our data were cross-sectional, and thus no causal inference can be made regarding associations between dose adherence and its correlates. Second, we used self-reported adherence measures that could overestimate adherence.²⁸ However, we did find a significant and positive association between dose adherence (in the past 3 days) and the biological measure of viral suppression at last test, and this association supports the validity of the self-reported adherence measure. Third, MMP is not a specific study of transgender persons, and thus did not collect other data that may be relevant for adherence among transgender persons. For example, we could not explore findings from a study reporting how stress appraisal of transphobic experience, importance of gender affirmation, and adherence to hormone therapy were significantly associated with ART adherence among TWLWH.⁹ Fourth, the precision of our estimates was limited due to small sample size. Lastly, we did not conduct analyses for transgender men (female-to-male transgender persons) because sample size was too small, even after combining five cycles of MMP data.

Conclusion

Analysis of MMP data enabled identification of correlates of dose adherence among TWLWH using a large, national sample of HIV-infected adults receiving HIV care in the United States. Our findings support those of a broader study of PLWH,¹² and suggest several potential ways to improve adherence of TWLWH at the population level including tailoring efforts to address the needs of TWLWH under age 40, addressing mental health morbidities, simplifying ART regimens if possible and building skills to improve adherence self-efficacy. In addition, we identified health insurance coverage as a structural factor that might be leveraged to improve adherence among this population. Future research should identify additional specific strategies that will reduce disparities among TWLWH.

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Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the U.S. Centers for Disease Control and Prevention.

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TABLE 1:

Bivariate association between selected characteristics and 100% dose adherence in the past 3 days among transgender women living with HIV and receiving medical care, Medical Monitoring Project, 2009 – 2013

Characteristic	Total (n=258)		100% Dose Adherent (n=209)		Dose Non-adherent (n=44)		Rao-Scott chi-square p-value
	n ^a	Column % ^b (95% CI)	n ^a	Row % ^b (95% CI)	n ^a	Row % ^b (95% CI)	
Mean Age in years (95% CI)		43.3(41.6-44.9)		44.3(42.7-46.0)		38.9(35.7-42.1)	<0.01
Age groups							<0.01
18-29	27	12.9 (8.2-17.6)	19	68.7 (51.6-85.9)	8	31.3 (14.1-48.4)	
30-39	56	23.4 (17.8-28.9)	41	68.9 (56.5-81.3)	15	31.1 (18.7-43.5)	
40 and over	175	63.8 (56.6-71.0)	149	87.3 (81.8-92.9)	21	12.7 (7.1-18.2)	
Race							0.58
Black	114	47.1 (39.7-54.6)	92	79.0 (70.1-87.8)	19	21.0 (12.2-29.9)	
Non-black	144	52.9 (45.4-60.3)	117	81.9 (75.9-87.9)	25	18.1 (12.1-24.1)	
Educational attainment							0.46
<High School	89	35.3 (28.4-42.2)	71	75.6 (63.4-87.9)	17	24.4 (12.1-36.6)	
High School diploma or equivalent	72	26.9 (20.6-33.2)	58	82.9 (73.6-92.2)	12	17.1 (7.8-26.4)	
>High School	97	37.8 (31.5-44.1)	80	83.4 (76.2-90.6)	15	16.6 (9.4-23.8)	
Poverty level ^c							0.16
Above poverty level	94	35.7 (29.1-42.2)	78	86.8 (79.4-94.2)	13	13.2 (5.8-20.6)	
At or below poverty level	153	64.3 (57.8-70.9)	123	78.0 (70.4-85.6)	28	22.0 (14.4-29.6)	
Homelessness in past 12 months							<0.05
No	208	79.8 (74.4-85.2)	175	83.4 (77.3-89.5)	31	16.6 (10.5-22.7)	
Yes	50	20.2 (14.8-25.6)	34	68.4 (54.3-82.5)	13	31.6 (17.5-45.7)	
Incarcerated in past 12 months							<0.01
No	241	92.9 (88.9-96.9)	200	82.5 (76.6-88.3)	37	17.5 (11.7-23.4)	
Yes	17	7.1 (3.1-11.1)	9	53.7 (33.0-74.4)	7	46.3 (25.6-67.0)	
Health insurance coverage in past 12 months							<0.05
No health coverage	47	19.2 (13.9-24.4)	34	67.2 (51.3-83.1)	12	32.8 (16.9-48.7)	

Characteristic	Total (n=258)		100% Dose Adherent (n=209)		Dose Non-adherent (n=44)		Rao-Scott chi-square p-value
	^a n	Column % ^b (95% CI)	^a n	Row % ^b (95% CI)	^a n	Row % ^b (95% CI)	
Insured or had health coverage	211	80.8 (75.6-86.1)	175	83.7 (78.8-88.5)	32	16.3 (11.5-21.2)	
Meets criteria for depression in past 2 weeks ^d							<0.05
Not depressed	191	75.8 (69.8-81.8)	164	85.1 (79.1-91.1)	23	14.9 (8.9-20.9)	
Depressed	65	24.2 (18.2-30.2)	45	69.3 (56.6-81.9)	19	30.7 (18.1-43.4)	
Used any stimulant drugs in past 12 months							<0.01
No	224	87.1 (83.3-90.9)	188	84.4 (79.4-89.4)	32	15.6 (10.6-20.6)	
Yes	34	12.9 (9.1-16.7)	21	54.4 (35.7-73.1)	12	45.6 (26.9-64.3)	
Binge drinking in past 30 days							<0.05
No	209	81.1 (75.1-87.0)	174	83.1 (77.6-88.7)	32	16.9 (11.3-22.4)	
Yes	47	18.9 (13.0-24.9)	33	68.0 (52.9-83.1)	12	32.0 (16.9-47.1)	
Daily ART dose							0.08
One daily ART dose	83	33.9 (27.6-40.3)	73	86.4 (79.3-93.6)	9	13.6 (6.4-20.7)	
Two or more daily ART doses	172	66.1 (59.7-72.4)	136	77.5 (70.7-84.3)	35	22.5 (15.7-29.3)	
Bothered by side effects							0.24
Never/rarely	219	85.1 (79.2-90.9)	182	82.7 (75.9-89.5)	32	17.3 (10.5-24.1)	
More than half the time	37	14.9 (9.1-20.8)	27	72.3 (57.3-87.2)	10	27.7 (12.8-42.7)	
How sure can take medicine as directed							<0.0001
Not at all/somewhat sure	18	7.5 (3.6-11.5)	8	44.5 (24.4-64.6)	10	55.5 (35.4-75.6)	
Very/extremely sure	240	92.5 (88.5-96.4)	201	83.5 (78.1-89.0)	34	16.5 (11.0-21.9)	
Sure medication has positive effect on health							0.17
Not at all/somewhat sure	27	10.4 (4.5-16.2)	19	69.1 (52.3-85.8)	7	30.9 (14.2-47.7)	
Very/extremely sure	229	89.6 (83.8-95.5)	188	81.7 (75.5-87.9)	37	18.3 (12.1-24.5)	
Sure that if do not take medications as instructed HIV in body will become resistant							<0.01
Not at all/somewhat sure	51	19.4 (14.3-24.5)	33	64.6 (49.0-80.2)	16	35.4 (19.8-51.0)	
Very/extremely sure	203	80.6 (75.5-85.7)	172	83.9 (78.5-89.3)	28	16.1 (10.7-21.5)	
Satisfaction with social support							0.23

Characteristic	Total (n=258)		100% Dose Adherent (n=209)		Dose Non-adherent (n=44)		Rao-Scott chi-square p-value
	^a n	Column % ^b (95% CI)	^a n	Row % ^b (95% CI)	^a n	Row % ^b (95% CI)	
Very/somewhat dissatisfied	42	17.1 (10.8-23.4)	32	73.0 (60.4-85.6)	9	27.0 (14.4-39.6)	
Very/extremely satisfied	204	82.9 (76.6-89.2)	166	81.3 (75.1-87.5)	34	18.7 (12.5-24.9)	
Time since HIV diagnosis							0.24
Less than 10 years	108	45.0 (38.0-52.1)	88	77.0 (67.9-86.0)	20	23.0 (14.0-32.1)	
10 or more years	150	55.0 (47.9-62.0)	121	83.5 (77.3-89.7)	24	16.5 (10.3-22.7)	

Note:

^aNumbers might not add to the total because of missing data. Percentages might not sum to 100 because of rounding. N=unweighted sample size

^bAll percentages were weighted.

^cPoverty guidelines as defined by the Department of Health and Human Services (HHS); More information regarding the HHS poverty guidelines can be found at <http://aspe.hhs.gov/poverty/faq.cfm>.

^dResponses to the 8 items on the Patient Health Questionnaire (PHQ-8) were used to define "major depression" and "other depression," according to criteria from the Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV-TR). "Major depression" was defined as having at least 5 symptoms of depression, whereas "other depression" was defined as having 2-4 symptoms of depression. Those who had major or other depression were categorized as "Depressed."

Association between self-reported 3-day adherence and viral suppression at last test among transgender women living with HIV and receiving medical care, Medical Monitoring Project, 2009 – 2013

TABLE 2:

		Total (N=258)	Viral Load<200 at last test (N=199)		
	n	Column % (95% CI)	n	Row % (95% CI)	PR (95% CI)
100% Dose Adherent					
Yes	209	80.5 (75.2-85.8)	175	85.2 (80.2-90.2)	1.69 (1.20-2.38)
No	44	19.5 (14.2-24.8)	21	50.4 (33.1-67.8)	Reference
100% Schedule Adherent					
Yes	186	70.7 (64.0-77.4)	155	83.8 (78.1-89.5)	1.32 (1.09-1.59)
No	72	29.3 (22.6-36.0)	44	63.6 (52.2-75.0)	Reference
100% Instruction Adherent					
Yes	121	66.5 (58.4-74.6)	96	79.6 (70.7-88.6)	1.14 (0.92-1.41)
No	58	33.5 (25.4-41.6)	40	70.0 (58.2-81.7)	Reference
100% Dose, Schedule, and Instruction Adherent					
Yes	144	56.1 (48.8-63.4)	121	85.5 (79.3-91.6)	1.25 (1.08-1.45)
No	105	43.9 (36.6-51.2)	71	68.3 (59.1-77.5)	Reference

Note:

Numbers might not add to the total because of missing data. "Dose adherent" was defined as taking 100% of prescribed ART doses in the past 3 days, "schedule adherent" was defined as taking all ART doses according to one's prescribed schedule in the past 3 days (e.g., 2 times a day), and "instruction adherent" was defined as following all special instructions for taking their antiretroviral medicines in the past 3 days (e.g., take with food). Instruction adherence was calculated only for participants who had special instructions for taking medications. N=unweighted sample size; All percentages were weighted. Abbreviations: PR = prevalence ratio; CI = confidence interval

Factors Associated With Self-Reported 100% Dose Adherence, Past 3 Days Among Transgender Women Living with HIV and Receiving Care, Medical Monitoring Project, 2009- 2013

TABLE 3:

Characteristic	Unadjusted PR (95%CI)	Reduced model ^d aPR (95%CI)
Age groups		
18-29	0.79 (0.61-1.02)	0.81 (0.64-1.03)
30-39	0.79 (0.65-0.96)	0.76 (0.63-0.92)
40 and over	Reference	Reference
Race/Ethnicity		
Black	0.96 (0.84-1.10)	
Non-black	Reference	
Educational attainment		
<High School	0.91 (0.76-1.09)	
High School diploma or equivalent	0.99 (0.86-1.15)	
>High School	Reference	
Poverty level^b		
Above poverty level	1.11 (0.96-1.28)	
At or below poverty level	Reference	
Homelessness in past 12 months		
No	Reference	
Yes	0.82 (0.65-1.03)	
Incarcerated in past 12 months		
No	Reference	
Yes	0.65 (0.44-0.97)	
Health insurance coverage in past 12 months		
No health coverage	0.80 (0.63-1.02)	0.80 (0.66-0.97)
Insured or had health coverage	Reference	Reference
Meets criteria for depression in past 2 weeks^c		
Not depressed	Reference	Reference

Characteristic	Unadjusted PR (95%CI)	Reduced model ^a aPR (95%CI)
Depressed	0.81 (0.67-0.98)	0.82 (0.70-0.95)
Used any stimulant drugs in past 12 months		
No	Reference	
Yes	0.64 (0.46-0.91)	
Binge drinking in past 30 days		
No	Reference	
Yes	0.82 (0.65-1.03)	
Daily ART dose		
One daily ART dose	1.12 (0.99-1.26)	1.19 (1.06-1.33)
Two or more daily ART doses	Reference	Reference
Bothered by side effects		
Never/rarely	Reference	
More than half the time	0.87 (0.68-1.12)	
How sure can take medicine as directed		
Not at all/somewhat sure	0.53 (0.34-0.84)	0.59 (0.42-0.84)
Very/extremely sure	Reference	Reference
Sure medication has positive effect on health		
Not at all/somewhat sure	0.85 (0.64-1.11)	
Very/extremely sure	Reference	
Sure that if do not take medications as instructed HIV in body will become resistant		
Not at all/somewhat sure	0.77 (0.60-0.99)	
Very/extremely sure	Reference	
Satisfaction with social support		
Very/somewhat dissatisfied	0.90 (0.74-1.09)	
Very/extremely satisfied	Reference	
Time since HIV diagnosis		
Less than 10 years	Reference	
10 or more years	1.08 (0.94-1.25)	

Abbreviations: PR = prevalence ratio; aPR = Adjusted prevalence ratio; CI= confidence interval

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Note:

^a Reduced model includes age, health insurance, depression, daily ART dose, and self-efficacy for taking medication as directed

^b Poverty guidelines as defined by the Department of Health and Human Services (HHS); More information regarding the HHS poverty guidelines can be found at <http://aspe.hhs.gov/poverty/faq.cfm>.

^c Responses to the 8 items on the Patient Health Questionnaire (PHQ-8) were used to define “major depression” and “other depression,” according to criteria from the Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV-TR). “Major depression” was defined as having at least 5 symptoms of depression, whereas “other depression” was defined as having 2–4 symptoms of depression. Those who had major or other depression were categorized as “Depressed.”