Gender, HIV Status, and Psychiatric Disorders: Results From the National Epidemiologic Survey on Alcohol and Related Conditions

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ABSTRACT

Objective: More than 30 years after the onset of the human immunodeficiency virus (HIV) epidemic, there is no information on the prevalence of psychiatric disorders among HIV-positive individuals in the general population. We sought to compare the prevalence of 12-month psychiatric disorders among HIV-positive and HIV-negative adults stratified by sex and to examine the differential increase in risk of a psychiatric disorder as a function of the interaction of sex and HIV status.

Method: Face-to-face interviews were conducted between 2004 and 2005 with participants in the National Epidemiologic Survey on Alcohol and Related Conditions Wave 2, a large nationally representative sample of US adults (34,653). The diagnostic interview used was the Alcohol Use Disorder and Associated Disabilities Interview Schedule–*DSM-IV* Version.

Results: When compared with their HIV-negative same-sex counterparts, HIV-positive men were more likely to have any mood disorder (odds ratio [OR] = 6.10; 95% confidence interval [CI], 2.99–12.44), major depressive disorder/dysthymia (OR = 3.77; 95% CI, 1.16–12.27), any anxiety disorder (OR = 4.02; 95% CI, 2.12–7.64), and any personality disorder (OR = 2.50; 95% CI, 1.34–4.67). In relation to their same-sex HIV-negative counterparts, the effect of HIV status on the odds of any mood disorder (OR = 7.17; 95% CI, 2.52–20.41), any anxiety disorder (OR = 3.45; 95% CI, 1.27–9.38), and any personality disorder (OR = 2.66; 95% CI, 1.16–6.10) was significantly greater for men than women.

Conclusions: HIV status was significantly more strongly associated with psychiatric disorders in men than in women. HIV-positive men had a higher prevalence than HIV-negative men of most psychiatric disorders. By contrast, HIV-positive women were not significantly more likely than HIV-negative women to have psychiatric disorders.

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It is well established that human immunodeficiency virus (HIV) infection is associated with increased prevalence of several psychiatric disorders.[1–3] HIV-positive adults suffer from elevated rates of comorbid psychiatric disorders,[4–6] most often major depressive disorder,[1,7–9] anxiety disorders,[1,5] and substance use disorders.[1] HIV infection is also common among individuals with psychotic disorders.[8,10,11] The importance of these associations is underscored by high rates of HIV transmission,[11] low adherence to antiretroviral treatment,[12] and the poor prognosis for HIV infection among adults with HIV and psychiatric disorders.[82]

The basic epidemiology of mental disorders among HIV-positive adults remains poorly understood. No previous study permits accurate national estimates of the prevalence of psychiatric disorders among HIV-positive adults. Further, prior work has not included HIV-negative individuals drawn from the general population to identify the specific contribution of HIV status to the risk of psychiatric disorders.[1,4] Several studies have been limited by use of psychiatric screening scales rather than *DSM-IV* diagnoses.[1,4] Finally, few studies have stratified their analyses by sex,[1] despite well-established sex differences in the distribution of psychiatric disorders in the general population[13–16] and clinical samples of HIV-positive individuals.[1,17,18]

As the result of these gaps in research on mental disorders in HIV-positive individuals, there is a paucity of accurate national information on the mental health of this population. The current study uses data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) Wave 2, a large, nationally representative sample of the US non-institutionalized population, to fill these gaps in our knowledge. Specifically, we sought to (1) examine sociodemographic correlates of HIV status among men and women and (2) investigate the differences in the prevalence of 12-month *DSM-IV* psychiatric disorders among HIV-positive and HIV-negative adults stratified by sex.

METHOD

Sample

Wave 1 of the NESARC was conducted in 2001–2002 and is described in detail elsewhere.[19,20] The Wave 1 NESARC surveyed a representative sample of the adult population of the United States, oversampling blacks, Hispanics, and young adults aged 18 to 24 years. The target population was the civilian population, 18 years and older, residing in households and group quarters. Face-to-face interviews were conducted with 43,093 respondents, yielding an overall response rate of 81.0%. The Wave 2 NESARC, which was conducted in 2004–2005, involved face-to-face reinterviews with participants in the Wave 1 interview. Wave 2 methods are described in detail elsewhere.[21] Excluding respondents ineligible for the Wave 2 interview because they were deceased (n = 1,403), deported or mentally or physically impaired (n = 781), or on active duty in the armed forces throughout the follow-up period (n = 950), the Wave 2 response rate was 86.7%, reflecting 34,653 completed interviews. The cumulative

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response rate at Wave 2 was the product of the Wave 2 and Wave 1 response rates, or 70.2%. Wave 2 NESARC data were weighted to reflect design characteristics of the NESARC and account for oversampling. Adjustment for nonresponse across sociodemographic characteristics and the presence of any lifetime Wave 2 NESARC substance use disorder or other psychiatric disorder was performed at the household and person levels.[19]

Sociodemographic Correlates

Sociodemographic characteristics were assessed by self-report. These included sex, race-ethnicity (ie, white or nonwhite), sexual orientation (ie, heterosexual or nonheterosexual), US nativity, age, education, marital status, area of residence (ie, urban or rural), region of the country, employment status, personal and family income measured as categorical variables, and insurance type.

DSM-IV Psychiatric Disorders

The diagnostic interview was the Alcohol Use Disorder and Associated Disabilities Interview Schedule—*DSM-IV* Version (AUDADIS-IV),[19] Wave 2 version.[19] This structured interview was designed for administration by experienced lay interviewers. All disorders were assessed in the time frame of the last 12 months preceding the interview at Wave 2 NESARC. Mood disorders included *DSM-IV* major depressive disorder, bipolar I and bipolar II disorders, and dysthymia. Anxiety disorders included *DSM-IV* panic disorder (with and without agoraphobia), social anxiety disorder, specific phobias, generalized anxiety disorder, and posttraumatic stress disorder. All mood and anxiety disorders satisfied the *DSM-IV* clinical significance criterion. Test-retest reliabilities of AUDADIS-IV measures of *DSM-IV* mood and anxiety disorders were fair to good, ranging from $\kappa = 0.42$ to $\kappa = 0.62$.[22,23]

Extensive AUDADIS-IV questions covered *DSM-IV* criteria for substance use disorders, including alcohol and drug-specific abuse and dependence for 10 classes of substances. Good to excellent ($\kappa = 0.70–0.91$) test-retest reliability of AUDADIS-IV substance use diagnoses has been documented in clinical and general population samples.[22–27] Convergent, discriminant, and construct validity of AUDADIS-IV substance use disorder criteria and diagnoses were good to excellent,[28–32] including in the World Health Organization/National Institutes of Health International Study on Reliability and Validity,[33] where clinical reappraisals documented good to excellent validity of *DSM-IV* alcohol and drug use disorder diagnoses ($\kappa = 0.54–0.76$).

Personality disorders assessed on a lifetime basis at Wave 1, which are described in detail elsewhere,[34,35] included avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic, and antisocial personality disorders. Borderline, schizotypal, and narcissistic personality disorders were measured at Wave 2, and test-retest reliability was good ($\kappa = 0.67–0.71$).[27] Test-retest reliabilities of AUDADIS-IV personality disorders compare favorably with those obtained in patient samples using semistructured personality interviews. Convergent validity was good to excellent for all affective, anxiety, and personality disorder diagnoses, and selected diagnoses showed good agreement ($\kappa = 0.64–0.68$) with psychiatrist reappraisals.[21]

Clinical Points

- Psychiatric disorders are highly prevalent in adults with HIV.
- HIV status is significantly more strongly associated with psychiatric disorders in men than in women.
- Routine psychiatric assessments of patients receiving HIV treatment might help to identify psychiatric disorders in HIV-positive individuals.

Twelve-Month HIV Status

HIV status was determined by the respondent's answering yes or no to the question "In the last 12 months, did you test positive for HIV, the virus that causes AIDS?" One hundred forty-nine participants of the NESARC answered affirmatively and were classified as HIV-positive.

Statistical Analyses

Weighted means, frequencies, and odds ratios (ORs) of sociodemographic correlates and prevalence of psychiatric disorders were computed. Adjusted odds ratios (AORs) derived from multiple logistic regressions indicate associations between HIV status (as the outcome) and sociodemographic correlates and presence/absence of psychiatric disorders as the predictors. Due to the cross-sectional nature of the study, AORs are interpreted throughout as measure of association, with no attribution of causality.

To examine the differential association of HIV and psychiatric disorders across sexes, we conducted logistic regressions using sex (with women as the reference group), presence of psychiatric disorders (with absence of disorder as the reference group), and their interaction term as predictors and HIV-positive status as outcome. All analyses were repeated including only the 110 individuals whose HIV status had been confirmed by a physician. Because the pattern of results is the same, we present the results of the larger sample (analyses of the restricted sample are available on request). For all analyses, we consider 2 percentage estimates significantly different from each other if their 95% confidence intervals (CIs) do not overlap. ORs are considered significant if their 95% CIs do not include 1. All standard errors and 95% CIs were estimated using SUDAAN (Research Triangle Institute; Research Triangle Park, North Carolina) to adjust for design characteristics of the survey.

RESULTS

Sociodemographic Correlates of HIV Status by Sex

A total of 0.36% (95% CI, 0.27–0.48) of men and 0.27% (95% CI, 0.20–0.37) of women reported testing positive for

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Table 1. Sociodemographic Characteristics of Men by Past 12-Month HIV Status

Sociodemographic Characteristic	HIV-Positive Status (n = 70), % (SE)	HIV-Negative Status (n = 14,398), % (SE)	OR (95% CI)
Race/ethnicity			
White[a]	55.45 (7.33)	71.36 (1.59)	1.00 (1.00–1.00)
Nonwhite	44.55 (7.33)	28.64 (1.59)	2.00 (1.09–3.68)
Nativity			
US-born[a]	78.49 (7.79)	85.77 (1.38)	1.00 (1.00–1.00)
Foreign-born	21.51 (7.79)	14.23 (1.38)	1.65 (0.66–4.17)
Age			
18–29 y[a]	12.62 (5.93)	17.13 (0.44)	1.00 (1.00–1.00)
30–44 y	39.36 (7.45)	30.31 (0.51)	1.76 (0.58–5.39)
45–64 y	43.28 (7.61)	35.45 (0.50)	1.66 (0.53–5.16)
65 y and over	4.74 (2.62)	17.11 (0.42)	0.38 (0.08–1.73)
Education			
Less than high school	32.47 (8.00)	14.06 (0.50)	3.29 (1.49–7.30)
High school	23.54 (6.30)	23.20 (0.60)	1.45 (0.69–3.03)
College or higher[a]	43.99 (7.86)	62.74 (0.75)	1.00 (1.00–1.00)
Individual income			
$0–$19,999[a]	64.95 (7.01)	27.73 (0.66)	1.00 (1.00–1.00)
≥ $20,000	35.05 (7.01)	72.27 (0.66)	0.21 (0.11–0.38)
Family income			
$0–$19,999[a]	51.45 (7.04)	15.58 (0.48)	1.00 (1.00–1.00)
≥ $20,000	48.55 (7.04)	84.42 (0.48)	0.17 (0.10–0.30)
Employment status			
Employed[a]	46.09 (7.84)	73.00 (0.49)	1.00 (1.00–1.00)
Unemployed or students	53.91 (7.84)	27.00 (0.49)	3.16 (1.69–5.91)
Marital status			
Married or cohabiting[a]	45.25 (7.42)	67.52 (0.56)	1.00 (1.00–1.00)
Widowed, separated, or divorced	17.11 (4.44)	12.74 (0.31)	2.00 (1.00–4.02)
Never married	37.64 (7.35)	19.74 (0.56)	2.84 (1.42–5.70)
Urbanicity			
Urban[a]	84.71 (6.50)	83.95 (0.64)	1.00 (1.00–1.00)
Rural	15.29 (6.50)	16.05 (0.64)	0.94 (0.34–2.58)
Region			
Northeast	17.48 (5.62)	17.67 (1.20)	1.16 (0.43–3.16)
Midwest	21.53 (6.21)	18.42 (1.12)	1.38 (0.52–3.63)
South	39.49 (7.74)	38.58 (1.56)	1.21 (0.50–2.91)
West[a]	21.50 (7.21)	25.32 (0.97)	1.00 (1.00–1.00)
Insurance			
Private[a]	45.83 (7.21)	77.83 (0.60)	1.00 (1.00–1.00)
Public	33.48 (6.90)	9.19 (0.34)	6.19 (3.22–11.89)
No insurance	20.69 (6.47)	12.98 (0.45)	2.71 (1.18–6.20)
Sexual orientation			
Heterosexual[a]	62.90 (7.33)	98.23 (0.14)	1.00 (1.00–1.00)
Non-heterosexual	37.10 (7.33)	1.77 (0.14)	32.74 (17.29–61.98)

[a]Reference group.
Abbreviations: HIV = human immunodeficiency virus, OR = odds ratio.

HIV in the previous year. These figures are broadly consistent with Centers for Disease Control and Prevention (CDC) national estimates of the rate of adults and adolescents living with HIV or acquired immune deficiency syndrome (AIDS) (0.31%).[36] Among HIV-positive men, 63.91% had a psychiatric disorder. Of those, 34.59% (ie, 22.12% of all HIV-positive men) had the onset of the current episode in the last year. Similarly, 37.45% of HIV-positive women had a psychiatric disorder at the time of the interview. In 27.94% of those cases (10.46% of all HIV-positive women), the onset of the current psychiatric episode started before the year preceding the interview.

Sociodemographic characteristics of HIV-positive and -negative men are shown in Table 1. HIV-positive men were significantly more likely than HIV-negative men to have less than a high school education, to have public or no insurance, to be unemployed or students, and to be non-heterosexual. HIV-positive men were significantly less likely than HIV-negative men to be of white race/ethnicity and to have annual personal and family incomes of at least $20,000.

Sociodemographic characteristics of HIV-positive and -negative women are presented in Table 2. Results among women mirrored those among men, with the exception that HIV-positive women were as likely as HIV-negative women to be heterosexual and less likely to live in the South region of the United States.

Clinical Characteristics of Men by HIV Status

HIV-positive men were significantly more likely than HIV-negative men to have any mood disorder, major depressive disorder/dysthymia, bipolar disorder, any anxiety disorder, any drug use disorder, panic disorder, social anxiety disorder, posttraumatic stress disorder, drug abuse, drug dependence, and any personality disorder. The differences in any mood disorder, bipolar disorder, any anxiety disorder, posttraumatic stress disorder, any drug use disorder, and drug dependence remained significant following adjustment for sociodemographic correlates (Table 3).

Clinical Characteristics of Women by HIV Status

No significant differences in the prevalence of psychiatric disorders were found between HIV-positive and -negative women in unadjusted or adjusted models (Table 4).

Clinical Characteristics and HIV Status/Sex Interactions

Table 5 shows the ORs of the differential increase in risk of psychiatric disorders as a function of the interaction of sex with HIV status (using female sex and HIV-negative status as reference groups). The effects of HIV status on the odds of any mood disorder, any anxiety disorder, and any personality disorder were each significantly greater for men than women when compared with their same-sex HIV-negative counterparts. Except for any personality disorder, ORs retained significance following adjustment for sociodemographic characteristics.

DISCUSSION

Consistent with previous clinical research,[1,17,37] we report that psychiatric disorders are highly prevalent in adults with HIV. Somewhat surprisingly, the increased risk of psychiatric disorders was largely confined to HIV-positive men.

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Table 2. Sociodemographic Characteristics of Women by Past 12-Month HIV Status

Sociodemographic Characteristic	HIV-Positive Status (n = 79), % (SE)	HIV-Negative Status[a] (n = 19,880), % (SE)	OR (95% CI)
Race/ethnicity			
White[a]	29.65 (6.83)	70.80 (1.53)	1.00 (1.00–1.00)
Nonwhite	70.35 (6.83)	29.20 (1.53)	5.75 (2.99–11.05)
Nativity			
US-born[a]	76.71 (7.84)	86.67 (1.36)	1.00 (1.00–1.00)
Foreign-born	23.29 (7.84)	13.33 (1.36)	1.97 (0.85–4.59)
Age			
18–29 y[a]	12.81 (5.02)	15.74 (0.37)	1.00 (1.00–1.00)
30–44 y	55.99 (8.16)	29.07 (0.42)	2.37 (0.89–6.27)
45–64 y	20.09 (5.08)	33.92 (0.37)	0.73 (0.28–1.88)
65 y and over	11.11 (4.26)	21.28 (0.40)	0.64 (0.20–2.06)
Education			
Less than high school	28.57 (6.43)	13.82 (0.51)	3.14 (1.55–6.37)
High school	30.73 (5.95)	24.29 (0.46)	1.92 (1.02–3.65)
College or higher[a]	40.70 (7.16)	61.89 (0.60)	1.00 (1.00–1.00)
Individual income			
$0–$19,999[a]	73.98 (7.46)	55.27 (0.66)	1.00 (1.00–1.00)
≥ $20,000	26.02 (7.46)	44.73 (0.66)	0.43 (0.20–0.93)
Family income			
$0–$19,999[a]	55.48 (7.31)	22.95 (0.56)	1.00 (1.00–1.00)
≥ $20,000	44.52 (7.31)	77.05 (0.56)	0.24 (0.13–0.43)
Employment status			
Employed[a]	36.43 (7.37)	58.03 (0.52)	1.00 (1.00–1.00)
Unemployed or students	63.57 (7.37)	41.97 (0.52)	2.41 (1.28–4.53)
Marital status			
Married or cohabiting[a]	33.95 (8.69)	60.58 (0.59)	1.00 (1.00–1.00)
Widowed, separated, or divorced	29.13 (6.46)	24.38 (0.40)	2.13 (0.93–4.91)
Never married	36.92 (7.48)	15.04 (0.48)	4.38 (1.89–10.17)
Urbanicity			
Urban[a]	89.73 (4.52)	83.46 (0.57)	1.00 (1.00–1.00)
Rural	10.27 (4.52)	16.54 (0.57)	0.58 (0.22–1.51)
Region			
Northeast	17.52 (5.43)	17.90 (1.20)	0.59 (0.27–1.31)
Midwest	14.19 (4.84)	18.59 (1.13)	0.46 (0.19–1.10)
South	26.32 (7.16)	38.21 (1.63)	0.42 (0.18–0.95)
West[a]	41.97 (8.03)	25.30 (0.97)	1.00 (1.00–1.00)
Insurance			
Private[a]	38.95 (7.70)	77.54 (0.64)	1.00 (1.00–1.00)
Public	45.97 (7.30)	12.24 (0.43)	7.48 (3.84–14.58)
No insurance	15.08 (4.06)	10.23 (0.41)	2.93 (1.38–6.25)
Sexual orientation			
Heterosexual[a]	96.17 (3.15)	98.04 (0.12)	1.00 (1.00–1.00)
Non-heterosexual	3.83 (3.15)	1.96 (0.12)	2.00 (0.36–11.09)

[a]Reference group.
Abbreviations: HIV = human immunodeficiency virus, OR = odds ratio.

Women with HIV were not significantly more likely than HIV-negative women to have psychiatric disorders. The burden of HIV-associated psychiatric disorders appears to fall disproportionately on men.

The biological and psychological factors that contribute to the association of HIV and psychiatric disorders among men remain poorly defined. HIV can produce neuropsychiatric alterations associated with a variety of psychiatric symptoms.[11,38] At the same time, stress associated with seroconversion may trigger new onset or recurrence of psychiatric disorders. Alternatively, men with preexisting psychiatric disorders may be more likely to engage in substance use[1,39] and high-risk sexual behavior[39,40] that increase the probability of HIV transmission. In one sample of mentally ill adults,[41] 25% had multiple sexual partners and condoms were not used in 75% occasions of sexual intercourse. As a result, men with psychiatric disorders may be at high risk for becoming infected with HIV. Consistent with this explanation, higher rates of personality disorders were observed among HIV-positive than HIV-negative men, suggesting that some of the psychopathology among HIV-positive men predates their infection. HIV stigma may also be greater in men than in women.

These findings highlight the need for effective interventions to address the convergence of HIV and psychiatric disorders. Services are needed to provide mental health treatment to HIV-positive individuals with psychiatric disorders and to provide HIV prevention services to mentally ill populations, regardless of serostatus. Studies have shown that mental health treatment, whether psychotherapeutic,[42] psychopharmacologic,[43] or a combination, can help reduce depressive symptoms among HIV-positive patients. Furthermore, a decrease in psychiatric symptoms is associated with slower disease progression,[44] improved treatment adherence,[12,45] and a reduction in HIV risk behavior.[46,47] Yet, under diagnosis of depression among HIV-positive patients remains common.[48] Routine psychiatric assessments of patients receiving HIV treatment might help to identify psychiatric disorders in HIV-positive individuals that might otherwise pass undetected in community practice.

Although there is extensive evidence for the efficacy of HIV-prevention programs in the general population,[49–54] and among drug users,[55–62] much less is known about the efficacy of interventions to reduce HIV risk behavior among individuals with other psychiatric disorders.[63–68] The interventions[69–71] currently being disseminated focus only on drug use rather than on the full range of common psychiatric disorders. Studies[72,73] also demonstrate a paucity of HIV-prevention programs in community mental health centers, where large numbers of high risk populations receive care. Research is needed to develop optimal strategies for HIV prevention among individuals with the common psychiatric disorders.[74]

In accord with previous clinical studies,[1,6,17] high rates of psychiatric disorders were reported among HIV-positive women. However, mental disorders were not independently and significantly associated with HIV status among women. Similar results for anxiety and depressive disorders have been reported from a clinical sample.[75] Among women, preexisting psychopathology may not be a strong risk factor for HIV infection. Women are less likely than men to negotiate safe sex and insist on condom use[76] and are more likely than men to become infected with HIV from their spouse

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Table 3. Twelve-Month Prevalence of *DSM-IV* Psychiatric Disorders of Men by Past 12-Month HIV Status

Psychiatric Disorder	HIV-Positive Status (n = 70), % (SE)	HIV-Negative Status[a] (n = 14,398), % (SE)	OR (95% CI)	AOR[b] (95% CI)
Any mood disorder	29.86 (7.40)	6.53 (0.29)	6.10 (2.99–12.44)	3.32 (1.32–8.35)
Major depressive disorder or dysthymia	12.47 (6.41)	3.64 (0.20)	3.77 (1.16–12.27)	1.02 (0.36–2.91)
Bipolar I or II	17.40 (5.37)	2.89 (0.17)	7.07 (3.27–15.27)	3.38 (1.55–7.35)
Any anxiety disorder	33.43 (7.11)	11.10 (0.32)	4.02 (2.12–7.64)	2.71 (1.39–5.30)
Panic disorder	6.27 (3.60)	1.70 (0.14)	3.86 (1.13–13.22)	2.37 (0.73–7.66)
Social anxiety disorder	6.65 (3.28)	2.07 (0.14)	3.36 (1.16–9.75)	2.04 (0.62–6.76)
Specific phobia	8.13 (3.73)	4.84 (0.21)	1.74 (0.63–4.77)	1.32 (0.56–3.13)
Posttraumatic stress disorder	24.89 (7.02)	4.02 (0.19)	7.91 (3.69–16.94)	7.07 (2.86–17.47)
Generalized anxiety disorder	5.28 (2.84)	2.38 (0.15)	2.29 (0.75–6.98)	1.13 (0.36–3.53)
Any substance use disorder	38.53 (7.33)	26.56 (0.61)	1.73 (0.93–3.22)	1.27 (0.64–2.51)
Any alcohol use disorder	18.91 (5.45)	14.42 (0.41)	1.38 (0.68–2.83)	1.22 (0.51–2.89)
Alcohol abuse	5.98 (2.97)	8.15 (0.31)	0.72 (0.25–2.07)	1.18 (0.40–3.48)
Alcohol dependence	12.92 (4.71)	6.28 (0.26)	2.21 (0.95–5.18)	1.20 (0.42–3.46)
Any drug use disorder	17.82 (5.22)	3.29 (0.19)	6.38 (3.06–13.32)	2.77 (1.09–7.03)
Drug abuse	10.40 (4.09)	2.45 (0.17)	4.63 (1.90–11.29)	1.91 (0.65–5.62)
Drug dependence	11.77 (4.79)	0.99 (0.11)	13.29 (5.07–34.88)	5.26 (1.55–17.84)
Nicotine dependence	30.09 (6.73)	15.58 (0.49)	2.33 (1.23–4.44)	1.58 (0.81–3.06)
Any personality disorder	43.17 (7.59)	23.28 (0.54)	2.50 (1.34–4.67)	1.62 (0.79–3.30)
Schizotypal	16.23 (5.44)	4.20 (0.23)	4.42 (1.99–9.82)	4.17 (0.84–20.80)
Schizoid	13.86 (6.68)	3.08 (0.19)	5.06 (1.65–15.54)	0.44 (0.04–5.30)
Paranoid	14.60 (6.70)	3.65 (0.21)	4.51 (1.53–13.26)	0.78 (0.28–2.16)
Borderline	19.06 (5.46)	5.55 (0.23)	4.01 (1.96–8.20)	2.78 (0.91–8.50)
Narcissistic	15.18 (4.85)	7.69 (0.30)	2.15 (1.00–4.61)	3.37 (0.79–14.36)
Histrionic	1.63 (1.31)	1.85 (0.15)	0.88 (0.17–4.59)	1.88 (0.86–4.11)
Antisocial	3.90 (2.88)	5.95 (0.28)	0.64 (0.14–2.99)	1.20 (0.57–2.52)
Obsessive-compulsive	7.35 (3.26)	8.14 (0.29)	0.90 (0.34–2.34)	1.70 (0.84–3.46)
Avoidant	12.45 (6.72)	1.86 (0.15)	7.49 (2.18–25.75)	0.27 (0.05–1.63)
Dependant	0.65 (0.65)	0.31 (0.08)	2.11 (0.26–17.23)	0.39 (0.07–2.15)

[a]Reference group.
[b]Adjusted for race, education, individual income, family income, employment status, marital status, urbanity, region, sexual orientation, and sexually transmitted disease.
Abbreviations: AOR = adjusted odds ratio, HIV = human immunodeficiency virus, OR = odds ratio.

Table 4. Twelve-Month Prevalence of *DSM-IV* Psychiatric Disorders of Women by Past 12-Month HIV Status

Psychiatric Disorder	HIV-Positive Status (n = 79), % (SE)	HIV-Negative Status[a] (n = 19,880), % (SE)	OR (95% CI)	AOR[b] (95% CI)
Any mood disorder	10.78 (3.71)	12.45 (0.30)	0.85 (0.39–1.84)	0.69 (0.32–1.47)
Major depressive disorder or dysthymia	5.87 (2.85)	8.08 (0.23)	0.71 (0.25–1.99)	0.72 (0.26–2.01)
Bipolar I or II	4.92 (2.24)	4.36 (0.20)	1.13 (0.43–2.96)	0.75 (0.28–1.99)
Any anxiety disorder	23.74 (6.23)	21.05 (0.43)	1.17 (0.59–2.32)	0.90 (0.45–1.83)
Panic disorder	1.36 (0.80)	3.37 (0.17)	0.40 (0.12–1.29)	0.32 (0.10–1.06)
Social anxiety disorder	4.81 (2.61)	2.94 (0.16)	1.66 (0.53–5.27)	1.49 (0.49–4.55)
Specific phobia	10.85 (4.08)	9.99 (0.31)	1.10 (0.47–2.55)	1.00 (0.43–2.32)
Posttraumatic stress disorder	15.07 (4.93)	8.77 (0.27)	1.85 (0.85–4.00)	1.58 (0.72–3.49)
Generalized anxiety disorder	3.58 (1.87)	5.08 (0.22)	0.70 (0.23–2.07)	0.67 (0.23–1.98)
Any substance use disorder	19.66 (5.81)	16.30 (0.48)	1.26 (0.60–2.61)	1.26 (0.63–2.51)
Any alcohol use disorder	6.30 (3.30)	5.30 (0.22)	1.20 (0.39–3.66)	1.21 (0.38–3.89)
Alcohol abuse	0.83 (0.83)	2.65 (0.16)	0.31 (0.04–2.31)	0.40 (0.05–3.07)
Alcohol dependence	5.47 (3.21)	2.65 (0.15)	2.12 (0.61–7.37)	1.75 (0.48–6.43)
Any drug use disorder	1.52 (1.61)	1.55 (0.13)	0.98 (0.11–8.46)	0.77 (0.10–6.06)
Drug abuse	0.00	1.01 (0.09)	…	…
Drug dependence	1.52 (1.61)	0.62 (0.09)	2.46 (0.28–21.46)	1.86 (0.24–14.31)
Nicotine dependence	15.28 (4.84)	12.39 (0.41)	1.28 (0.60–2.70)	1.29 (0.64–2.60)
Any personality disorder	19.00 (4.55)	19.96 (0.41)	0.94 (0.52–1.70)	0.73 (0.40–1.33)
Schizotypal	7.70 (3.71)	3.66 (0.18)	2.19 (0.77–6.26)	1.31 (0.27–6.21)
Schizoid	5.66 (3.13)	3.03 (0.15)	1.92 (0.59–6.24)	0.94 (0.12–7.20)
Paranoid	5.60 (3.08)	4.92 (0.21)	1.15 (0.36–3.69)	1.65 (0.70–3.89)
Borderline	9.76 (3.93)	6.18 (0.25)	1.64 (0.67–4.00)	0.75 (0.22–2.51)
Narcissistic	7.25 (2.98)	4.81 (0.22)	1.55 (0.63–3.79)	1.39 (0.43–4.49)
Histrionic	4.26 (2.95)	1.75 (0.11)	2.50 (0.58–10.77)	1.44 (0.50–4.10)
Antisocial	0.70 (0.71)	1.93 (0.12)	0.36 (0.05–2.71)	0.94 (0.38–2.33)
Obsessive-compulsive	11.17 (4.33)	8.03 (0.27)	1.44 (0.60–3.43)	1.26 (0.51–3.13)
Avoidant	4.00 (2.90)	2.71 (0.16)	1.50 (0.33–6.76)	2.16 (0.48–9.79)
Dependant	0.70 (0.71)	0.53 (0.06)	1.33 (0.17–10.30)	0.24 (0.03–1.80)

[a]Reference group.
[b]Adjusted for race, education, individual income, family income, employment status, marital status, urbanity, region, sexual orientation, and sexually transmitted disease.
Abbreviations: AOR = adjusted odds ratio, HIV = human immunodeficiency virus, OR = odds ratio.

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Table 5. *DSM-IV* Disorders as Function of the Interaction of Gender and HIV Status[a]

Psychiatric Disorder	OR (95% CI)	AOR[b] (95% CI)
Any mood disorder	7.17 (2.52–20.41)	5.34 (1.74–16.40)
Any anxiety disorder	3.45 (1.27–9.38)	3.15 (1.15–8.63)
Any substance use disorder	1.38 (0.50–3.81)	0.99 (0.36–2.74)
Any personality disorder	2.66 (1.16–6.10)	2.16 (0.88–5.28)

[a]Female sex and HIV-negative status were considered as reference groups.
[b]Adjusted for race, education, individual income, family income, employment status, marital status, urbanity, region, sexual orientation, and sexually transmitted disease.
Abbreviations: AOR = adjusted odds ratio, HIV = human immunodeficiency virus, OR = odds ratio.

or partner[77–80] or by trading sex for money and drugs.[81] It is also possible that for women resiliency or protective factors, such as supportive networks and the quality of their interpersonal attachments, attenuate seroconversion stress–related onset or recurrence of psychiatric disorders. As compared with men, women facing adversities related to HIV infection may have a greater capacity to adjust to the environment, tolerate negative affect, seek social support, and cope with adversities of HIV.[18] An understanding of how women successfully cope with HIV may offer insights into the mental health care of HIV-positive men following seroconversion.

This study has several limitations. First, information on HIV status was based on self-report and was not independently verified by a physician or laboratory testing. Independent verification is not feasible for a large, nationally representative epidemiologic study. However, our self-report HIV rates are consistent with national CDC estimates, suggesting that potential bias in the estimates is likely to be limited. Second, the number of HIV-positive subjects in this sample is relatively small. This is a function of the prevalence of HIV in the general population. To our knowledge, there are no larger epidemiologic studies with information on psychiatric diagnoses and HIV status. Nevertheless, even after stratifying by gender, we were able to detect several statistically significant differences between HIV-positive and -negative individuals. Third, although the NESARC includes information on age at onset of psychiatric disorders, it does not include information regarding the onset of HIV-positive status, preventing temporal sequencing of psychiatric disorder and HIV onset. Fourth, some HIV-positive individuals diagnosed prior to the 12 months preceding the interview may have misunderstood the question and erroneously responded that they were HIV-negative. However, because our estimates of HIV prevalence closely match those of the CDC, we doubt that such misclassification was widespread and therefore we believe it is unlikely to have significantly altered the findings of this study. Fifth, the survey did not include some groups at high risk for HIV infection and psychiatric disorder including persons in prisons, hospitals, and those without stable housing.

Despite these limitations, the NESARC constitutes the largest nationally representative survey to include information of HIV status and a wide range of psychiatric disorders. Psychiatric disorders are highly prevalent among HIV-positive adults, especially HIV-positive men. Effective evidence-based pharmacologic and psychosocial treatments exist for several of the common psychiatric disorders reported by HIV-positive men and women, although information about their efficacy in these populations remains limited. Early mental health treatment could reduce the persistence of these disorders and has the potential to decrease HIV transmission. Increased clinical and public health attention is clearly needed to improve the detection and treatment of psychiatric disorders among HIV-positive adults.

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