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Use of Outpatient Mental Health Services and Psychotropic Medications among HIV-Infected Patients in a Multisite, Multistate Study

Seth Himelhoch, M.D., M.P.H.[1], **Joshua S. Josephs, B.A.**[2], **Geetanjali Chander, M.D., M.P.H.**[2], **P. Todd Korthuis, M.D.**[3], **Kelly A. Gebo, M.D., M.P.H.**[2], and **the HIV Research Network**

[1]Department of Psychiatry, University of Maryland, Baltimore, MD

[2]Department of Medicine, Johns Hopkins University, Baltimore MD

[3] Department of Medicine, Oregon Health and Science University, Portland, OR, USA

Abstract

Objective—Although co-occurring psychiatric disorders are highly prevalent among those with HIV, little is known about use of outpatient mental health services (MHS) and psychotropic medication in the HAART era.

Methods—During 2003, 951 patients were interviewed at 14 sites in the HIV Research Network. Patients were questioned about use of MHS and psychotropic medications. Logistic regression was used to identify socio-demographic and clinical factors associated with MHS and psychotropic medication utilization

Results—The sample characteristics were: 68% male, 52% Black, 14% Hispanic, median age 46 years (range 20-85), 69% were on HAART. Approximately 34% reported at least one MHS within 6 months and 37% reported use of psychotropic medication for a mental health condition. In multivariate logistic regression, MHS was greater among disabled patients (AOR: 2.39[1.53 – 3.72]), current (2.26[1.53 - 3.35]) and former drug users (1.84[1.24 - 2.73]) and those with more than seven primary care visits in the past 6 months. Blacks (0.61[0.41 – 0.92]) were significantly less likely to use MHS compared to Whites. Similarly, usage of psychotropic medications was greater among disabled patients (AOR:1.79[1.14- 2.82]), women (AOR 1.66[1.13-2.43]),]) and those with more than seven primary care visits. Blacks (0.37[0.24-0.58)]), and Hispanics (0.39[0.22-0.72]) were less likely to use a psychotropic medication. HAART utilization was not associated with MHS or psychiatric medication use

Conclusions—In the HAART era, self reported rates of mental health service and psychotropic medication utilization are high. Blacks continue report lower use of MHS and psychotropic medication compared to Whites.

Correspondence to: Seth Himelhoch, M.D., M.P.H. University of Maryland School of Medicine 737 West Lombard St. Suite 560 Baltimore, MD 21201 Phone: 410-706-3421 Fax: 410-706-0022 shimelho@psych.umaryland.edu.

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Background

Psychiatric disorders are common among those infected with the Human Immunodeficiency Virus (HIV). The HIV Cost and Utilization of Care Study (HCSUS) found that nearly 40% of HIV infected people receiving HIV related medical care screened positive for a psychiatric disorder(1], 30% utilized psychotropic medication (2] and 26% utilized individual or family treatment from an outpatient specialty mental health care provider.(3] Disparities in receipt of mental health services were noted. Specifically, African-American individuals were significantly less likely to use psychotropic medication or utilize outpatient mental health treatment compared to Whites.

Whether the HCSUS findings are still consistent with current HIV service patterns is largely unknown. Thus we examined the utilization of outpatient psychiatric services and psychotropic medications among a sample of HIV infected individuals receiving HIV related medical care at sites affiliated with the HIV Research Network. We also sought to determine patient characteristics associated with utilization of outpatient psychiatric services and of utilization of psychotropic medications.

Methods

Sites

The HIVRN is a consortium of 21 sites that provide primary and subspecialty care to HIV-infected adult and pediatric patients. Sites abstract specified data elements from patients' medical records; abstracted data are assembled into a uniform database[4;5] The 14 participating sites that treat adult patients are located in the Eastern (6), Midwestern (3), Southern (2), and Western U.S.(3). Seven of the sites have academic affiliations; 7 are community-based.

Subjects

Interviews were administered to a sample of 951 adult (≥18 years old) HIV-infected patients who volunteered when asked to participate in an interview [6]. The median sample size per site was 59 patients (range: 38 to 172 patients). Gender, race/ethnicity, and HIV transmission distributions were similar in the larger population of patients at these sites and in the interviewed sample (Sex: 70% vs. 68% Male [chi-square p=.153]; Race/Ethnicity: 29% vs. 31% White, 48% vs. 52% Black, 20% vs. 14% Hispanic [chi-square p=.213 for race]; HIV transmission: 16% vs. 16% injection drug use (IDU), 38% vs. 34% men who have sex with men (MSM), 3% vs. 3% MSM/IDU, 32% vs. 30% heterosexual (HET), 6% vs. 8% HET/IDU) [chi-square p=.220 for HIV risk].

Data Collection

Face-to-face interviews were conducted between December 2002 and December 2003 by professional interviewers trained and supervised by Battelle Corporation (Columbus, Ohio, USA). The interviews assessed a wide range of HIV and mental health related topics. For comparability, interview questions were taken from the interview developed for the HIV Cost and Services Utilization Study (HCSUS).[7;8]

HIPAA waivers and IRB approval/exemption of the project, including the interview, were obtained by the data coordinating center and each site. Additionally, informed consent was obtained from each participant before the start of the interview. Participants were reimbursed $30 for the approximately one-hour interview.

Measures

All data are from the patient interview except CD4 count and HIV-1 RNA, which were obtained from the clinical database. Age as of July 1, 2003 was calculated from self-reported month and year of birth; full date of birth was not collected to protect confidentiality. We categorized age as 18-45 and greater than 45 years old or older. Respondents reported their main racial/ethnic group as White (non-Hispanic), Black (non- Hispanic), Hispanic, or other. Respondents reported the number of years of regular school or college they completed (<high school, high school or junior college, college or more) and whether they were employed (either part-time or full-time, disabled by self definition, or retired) at the time of the interview. Disability was defined by a participant self reporting they were receiving disability and answering yes to the question “Are you currently receiving social security disability payments?”

Utilization of outpatient psychiatry services was collected from the following question, “Now let's talk about treatment for mental or emotional problems, or for problems with stress or nerves. Did you visit a mental health provider on an individual or family basis for emotional or personal problems during the past 6 months? Include any visits to a psychiatrist, psychologist, psychiatric social worker, psychiatric nurse, or marriage or family counselor.” Medication use was collected by asking, “Over the past six months have you regularly taken any medication for depression, anxiety, or emotional problems?” Patients were also asked if they were on any other prescription medications. We checked responses to abstract psychiatric medications and categorized them as antidepressants, antipsychotics, and anxiolytics.

CD4 count and HIV-1 RNA were extracted from medical records using the first value obtained in calendar year 2003. CD4 count was categorized as 0-49, 50-199, 200-499 and greater than 499 cells/mm^3. HIV-1 RNA was categorized as <400 copies, ≥400 copies per/mL or as missing.

Highly active antiretroviral therapy (HAART) was defined as use of: (1) three or more nucleosides; (2) ≥1 protease inhibitors [PI] or a non-nucleoside reverse transcriptase inhibitor [RTI] in combination with other antiretrovirals; or (3) use of a fusion inhibitor. Patients were considered to be on HAART if they received any of these combinations during the calendar year. This definition includes triple nucleoside regimens, which were still the standard of care in 2003. We opted to be as inclusive as possible in our definition of HAART in order to maximize the sensitivity of the analysis; this definition is unlikely to exclude any preferred drug combinations.

Alcohol use was ascertained, as in HCSUS [8]from a series of questions asking (1) how many days in the past four weeks the respondent drank alcohol, (2) how many drinks the person consumed on a typical day when drinking, and (3) the number of days the person consumed more than five drinks. We defined hazardous drinking as greater than 14 drinks per week for men and greater than 7 drinks per week for women according to National Institute on Alcohol Abuse and Alcoholism (NIAAA) guidelines.[9] Binge drinking was defined as 5 or more drinks on at least 1 day in the past 4 weeks. We combined hazardous and binge drinkers into one category, with the reference group being non-drinkers or those who drank in moderation.

Illicit drug use was assessed by asking respondents whether they had ever used illicit drugs in their lifetime, and, if so, whether they had used it in the past 6 months. The exact question was “The next questions are about your use of drugs on your own. By “on your own” we mean either without a doctor's prescription, in larger amounts than prescribed, or for a longer period than prescribed.” We asked about use of sedatives, sleeping pills,

tranquilizers, amphetamines, analgesics, marijuana, cocaine, inhalants, LSD, and heroin. Current substance use was defined as using illicit drugs within 6 months of the interview. Former substance use was defined as using illicit drugs greater than 6 months prior to the interview, but not within the 6 months prior to the interview.

Data Analysis

Univariate distributions included percentages for dichotomous variables and means for continuous variables. Comparisons of means were made using the Wilcoxon rank-sum test, while comparisons of percentages were made using the chi-square method.

Multivariate logistic regression analyses were used to evaluate patient characteristics associated with: (1) having at least one outpatient mental health visit versus none, and (2) utilization of psychotropic medications versus not. These models were used to estimate the relative odds ratios and 95% confidence intervals. All regression models were sequentially built using the variable selection method described by Hosmer and Lemeshow. [10] An apriori decision was made to include site of care in all adjusted models in order to account for variations in practice patterns and demographic differences across sites. Analyses were conducted using STATA 10.0, (College Station, Texas, USA). All reported p-values are two-sided.

Results

Sample Characteristics

The majority of study participants were non-White (52% Black and 14% Hispanic), males (68%), with a median age of 45 years (range 20-85). Nearly 70% were on HAART. The median CD4 count was 376 cells/mm^3 (range 0-2040 cells/mm^3) and the median HIV-1 RNA was 461 copies/ml (range 0-750,000 copies/ml). Nearly half had non-detectable viral loads. (Table 1)

Utilization of Outpatient Mental Health Services

Approximately one third (33.9%) of patients reported at least one outpatient mental health visit for individual or family treatment in the six months preceding the interview. The mean number of reported visits in six months was 8.4 (standard deviation 9.8). The median and modal number of reported mental health visits was 6.

Table 2 reports patient characteristics associated with receipt of outpatient mental health services. In multivariate logistic regression adjusting for care site, utilization of outpatient mental health services for individual or family treatment was greater among disabled patients (AOR 2.39 [1.53 – 3.72]), current (2.26 [1.53 – 3.35]), and former drug users (1.84 [1.24 – 2.73]), those with 3-5 primary care visits (1.57 [1.00 – 2.46]) and those with more than seven primary care visits (2.46 [1.56 – 3.88]) compared to two or less. Blacks (0.61 [0.41-0.92]) were significantly less likely to report utilization of outpatient mental health services.

Utilization of Psychotropic Medication

Nearly 37% of patients reported receiving a psychotropic medication. Of those that reported using a specific psychotropic medication, 60% reported being prescribed an antidepressant, 36.5% reported being prescribed an antipsychotic medication, and 34.5% reported being prescribed an anxiolytic medication. About two-thirds (65.4%) of those who reported receiving a psychotropic medication also reported utilizing outpatient mental health services.

Table 3 reports patient characteristics associated with patient use of psychotropic medications. In multivariate regression patient characteristics were related to usage of psychotropic medications for a mental health condition were women compared to men (AOR 1.66 [1.13-2.43]), being disabled (AOR1.79 [1.14- 2.82]), those with 3-5 primary care visits (AOR 1.85 [1.12 -3.04]) and greater than seven primary care visits (AOR 2.10 [1.25 -3.52]) compared to two or less in the past 6 months. Blacks (AOR 0.37 [0.24-0.58]) as well as Hispanics (AOR 0.39 {0.22-0.72]) were significantly less likely to report utilizing a psychotropic medication compared to Whites.

Discussion

Among a sample of HIV infected patients receiving outpatient HIV related medical care at one of 14 sites affiliated with the HIV Research Network, we found that over a third reported receiving at least one outpatient mental health visit within the last 6 months. On average these patients attended 8 visits in a 6 month period. Utilization of outpatient mental health services was greater among disabled patients, current and former drug users as well as those with more primary care visits. Blacks were less likely to have an outpatient mental health visit compared to Whites.

We also found over a third reported utilizing psychotropic medication for a mental health condition. Antidepressant medication was the most commonly used psychotropic medication. About two thirds of those reporting use of psychotropic medication also reported utilizing mental health services and utilization of psychotropic medication was significantly associated with mental health visits. Utilization of psychotropic medications for a mental health condition was greater among women compared to men, among disabled patients, and those with more primary care visits. Blacks and Hispanics were less likely to use a psychotropic medication.

Consistent with the HCSUS data we found that those who were disabled were significantly more likely to utilize outpatient mental health services compared to those without disabilities. Also consistent with the HCSUS data we found that Blacks were less likely to utilize outpatient mental health services compared to Whites.[3] This is similar to other studies in the general population that have found that African Americans receive less care for mental health conditions such as depression.[11-13] It is also in accordance with finding from the HIV/AIDS Cost Study which found among HIV infected people with mental health and substance abuse disorders that African Americans self-reported receiving less mental health care in a 3 month time frame compared to Whites. [14] Given the above and given that the HIV epidemic in America has disproportionately affected African-American and Hispanic people, future efforts to improve the delivery of mental health services to HIV infected people should focus on creating models of mental health care that is accessible, acceptable and culturally relevant to African-American and Hispanic people.

In contrast to the HCSUS study, we did not find that educational level was associated with increased mental health service use. This may reflect differences in the HCSUS vs. the HIVRN samples. For example, only 14% of our sample reported having a college/post-college education compared to approximately 46% of those in the HCSUS study. Although not directly evaluated in HCSUS, our adjusted analysis found that both current and former illicit drug abusers were significantly more likely to utilize outpatient mental health services compared to those without substance use disorders. As psychiatric disorders and substance use disorders commonly co-occur among those with HIV [1] it is reasonable that those with current and/or a history of illicit drug abuse may be more likely to be referred and thereby utilize mental health services compared to those without substance use disorders. Finally, consistent with the HCSUS study, measures of disease status such as CD4 count and HIV-1

RNA were not associated with use of mental health outpatient services.[3] Of note, we did not find any association between utilization of HAART and utilization of outpatient mental health services.

Similar to HCSUS data we found that those who were disabled were significantly more likely to utilize psychotropic medication as compared to those without disabilities.[2] Also consistent with the HCSUS data[2] we found that Blacks and Hispanics were less likely to report using psychotropic medications compared to Whites. Other studies have also found that African-Americans and Hispanics are less likely to use antidepressants for depression in primary care settings and HIV settings.[11;13;14] Pooled results of randomized, placebo controlled clinical trials demonstrate that antidepressants are efficacious in treating depression among depressed HIV infected individuals. Blacks and Hispanics were underrepresented in the many of the studies limiting the generalizability of results to these groups of people. [15] This possible disparity may be particularly important as depression is associated with poor adherence to HAART and several studies have found that mental health treatment increases the probability that individuals with depression receive and utilize HAART. [16-20] Given this studies that more directly evaluate the efficacy of antidepressant treatments among Black and Hispanic HIV infected people are certainly warranted.

Unlike HCSUS, we found that women were significantly more likely to utilize psychotropic medication compared to men. This is similar to research that suggests that depressed women are more likely than depressed men to receive treatment for depression. [12] Finally, measures of disease status such as CD4 count and HIV-1 RNA were not associated with use of psychotropic medications. We did not find any association between utilization of HAART and utilization of psychotropic medications.

We also found that increased use of primary care visits was associated with both greater use of outpatient mental health services and psychotropic medication. This finding may be consistent with previous studies that have found that the use of ancillary services, such as mental health services is associated with increased engagement and retention in primary care.[21;22] This may also suggest the importance of integrating mental health and HIV related medical services in one location. By doing this, patients can receive attention to both their medical and mental health needs at one location which may limit barriers associated with transportation, child-care as well as competing demands on the patients time.

Results of this study should be interpreted in light of several potential limitations. First, we were limited by self-reported measures of outpatient psychiatric care utilization in this analysis. It is possible that some respondents forgot to include some outpatient psychiatry visits in the total, while others may have reported visits that occurred outside the six-month reference period. Though this may introduce misclassification bias, reliance on self-reported data greatly increases the feasibility of such studies. Second, the convenience sample of interviewees may introduce bias into the estimates of outpatient psychiatric care use, as respondents and non-respondents may differ in service use. Unlike Burnam et al. we did not have a method for identifying need for psychiatric services. Nonetheless, our results are similar to Burnam even after they controlled for need for psychiatric services.[3]

Due to the cross sectional nature of our study we can not make any claims about the direction of causation. The HIVRN is not a national probability sample. Though its population is similar to that of a 1996 nationally representative sample of persons in care for HIV infection,[23]we are cautious about generalizing our findings to the entire U.S. HIV-infected population. In particular, all subjects in this study were engaged with a source of regular HIV care. We compared all patients enrolled in the HIVRN during 2003 to those

who participated in the interview and found no differences in gender, race, or HIV risk factor; however, there may still be other differences between those patients who chose to participate in the study and the overall population of patients using HIVRN clinics. The high percentage of interviewees who were unemployed, disabled, or retired may also have led to the introduction of bias, as these patients had more potential free time to attend an interview. Although participants were specifically asked about psychotropic medication used to treat mental or emotional problems, it is possible that participants may have reported using these medications to treat somatic problems [e.g., pain). This may bias our results leading to an over-estimation of use of these medications. Although changes in HIV treatment have occurred since 2003 including the introduction of streamlined HAART treatments, novel classes of antiretroviral therapy (e.g., integrases) and a better understanding of HIV virus resistance patterns, few novel antidepressants or antipsychotic medications have been introduced into the American market over that time period. In fact, the most recent data regarding the use of mental health services in the United States was collected in 2001-2003, [24] during the similar time of our study. It is unclear what impact these changes in the mental health system may have for our results. However, there is no data to our knowledge that suggests that their have been improvements in ultization of mental health services for minorities from 2003 to the present.

Conclusions

In the HAART era, self reported rates of mental health service and psychotropic medication utilization are high. Those who are disabled are more likely to use mental health services and psychotropic medication. Women are reported to be more likely to utilize psychotropic medication compared to men. Blacks continue to report lower use of mental health and psychotropic utilization compared to Whites. Future efforts to improve the delivery of mental health services to HIV infected people should focus on creating models of mental health care that is accessible, acceptable and culturally relevant to African-American and Hispanic people.

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APPENDIX

Participating Sites

Alameda County Medical Center, Oakland, California (Howard Edelstein, MD, Silver Sisneros, D.O.)

Children's Hospital of Philadelphia, Philadelphia, Pennsylvania (Richard Rutstein, M.D.)

Community Health Network, Rochester, New York (Roberto Corales, D.O.)

Community Medical Alliance, Boston, Massachusetts (James Hellinger, M.D.)

Drexel University, Philadelphia, Pennsylvania (Sara Allen, C.R.N.P.)

Henry Ford Hospital Detroit, Michigan (Norman Markowitz, M.D.)

Johns Hopkins University, Baltimore, Maryland (Kelly Gebo, M.D., Richard Moore, M.D., George Siberry MD, Allison Agwu MD)

Montefiore Medical Group, Bronx, New York (Robert Beil, M.D.)

Montefiore Medical Center, Bronx, New York (Lawrence Hanau, M.D.)

Nemechek Health Renewal, Kansas City, Missouri (Patrick Nemechek, M.D.)

Oregon Health and Science University, Portland, Oregon (P. Todd Korthuis, M.D.)

Parkland Health and Hospital System, Dallas, Texas (Philip Keiser, M.D.)

St. Jude's Children's Hospital and University of Tennessee, Memphis, Tennessee (Aditya Gaur, M.D.)

St. Luke's Roosevelt Hospital Center, New York, New York (Victoria Sharp, M.D.)

Tampa General Health Care, Tampa, Florida (Chararut Somboonwit, M.D.)

University of California, San Diego, La Jolla, California (Stephen Spector, M.D.)

University of California, San Diego, California (W. Christopher Mathews, M.D.)

Wayne State University, Detroit, Michigan (Jonathan Cohn, M.D.)

Sponsoring Agencies

Agency for Healthcare Research and Quality, Rockville, Maryland (Fred Hellinger, Ph.D., John Fleishman, Ph.D., Irene Fraser, Ph.D.)

Health Resources and Services Administration, Rockville, Maryland (Robert Mills, Ph.D.)

Data Coordinating Center

Johns Hopkins University (Richard Moore, M.D., Jeanne Keruly, C.R.N.P., Kelly Gebo, M.D., Perrin Lawrence, M.P.H., Michelande Ridore, B.S., Cindy Voss MA, Bonnie Cameron, MS)

Reference List

1. Bing EG, Burnam MA, Longshore D, Fleishman JA, Sherbourne CD, London AS, et al. Psychiatric disorders and drug use among human immunodeficiency virus-infected adults in the United States. Arch Gen Psychiatry. 2001; 58(8):721–728. [PubMed: 11483137]
2. Vitiello B, Burnam MA, Bing EG, Beckman R, Shapiro MF. Use of psychotropic medications among HIV-infected patients in the United States. Am J Psychiatry. 2003; 160(3):547–554. [PubMed: 12611837]
3. Burnam MA, Bing EG, Morton SC, Sherbourne C, Fleishman JA, London AS, et al. Use of mental health and substance abuse treatment services among adults with HIV in the United States. Arch Gen Psychiatry. 2001; 58(8):729–736. [PubMed: 11483138]
4. Fleishman JA, Gebo KA, Reilly ED, Conviser R, Christopher MW, Todd KP, et al. Hospital and outpatient health services utilization among HIV-infected adults in care 2000-2002. Med Care. 2005; 43(9 Suppl):III40–III52. [PubMed: 16116308]
5. Gebo KA, Fleishman JA, Reilly ED, Moore RD. High rates of primary Mycobacterium avium complex and Pneumocystis jiroveci prophylaxis in the United States. Med Care. 2005; 43(9 Suppl):III23–III30. [PubMed: 16116306]
6. Hicks PL, Mulvey KP, Chander G, Fleishman JA, Josephs JS, Korthuis PT, et al. The impact of illicit drug use and substance abuse treatment on adherence to HAART. AIDS Care. 2007; 19(9): 1134–1140. [PubMed: 18058397]

7. Bozzette SA, Berry SH, Duan N, Frankel MR, Leibowitz AA, Lefkowitz D, et al. The care of HIV-infected adults in the United States. HIV Cost and Services Utilization Study Consortium. N Engl J Med. 1998; 339(26):1897–1904. [PubMed: 9862946]
8. Galvan FH, Bing EG, Fleishman JA, London AS, Caetano R, Burnam MA, et al. The prevalence of alcohol consumption and heavy drinking among people with HIV in the United States: results from the HIV Cost and Services Utilization Study. J Stud Alcohol. 2002; 63(2):179–186. [PubMed: 12033694]
9. National Institute on Alcohol Abuse and Alcoholism. Helping people who dring too much: A clinicians guide. NIAAA; Rockville, Maryland: 2005. Ref Type: Pamphlet
10. Hosmer, DW.; Lemeshow, S. Applied Survival Analysis. John Wiley & Sons, Inc.; New York: 1999. Model Development.; p. 158-195.
11. Miranda J, Cooper LA. Disparities in care for depression among primary care patients. J Gen Intern Med. 2004; 19(2):120–126. [PubMed: 15009791]
12. Olfson M, Marcus SC, Druss B, Elinson L, Tanielian T, Pincus HA. National trends in the outpatient treatment of depression. JAMA. 2002; 287(2):203–209. [PubMed: 11779262]
13. Stockdale SE, Lagomasino IT, Siddique J, McGuire T, Miranda J. Racial and ethnic disparities in detection and treatment of depression and anxiety among psychiatric and primary health care visits, 1995-2005. Med Care. 2008; 46(7):668–677. [PubMed: 18580385]
14. Weaver MR, Conover CJ, Proescholdbell RJ, Arno PS, Ang A, Ettner SL. Utilization of mental health and substance abuse care for people living with HIV/AIDS, chronic mental illness, and substance abuse disorders. J Acquir Immune Defic Syndr. 2008; 47(4):449–458. [PubMed: 18197121]
15. Himelhoch S, Medoff DR. Efficacy of antidepressant medication among HIV-positive individuals with depression: a systematic review and meta-analysis. AIDS Patient Care STDS. 2005; 19(12): 813–822. [PubMed: 16375613]
16. Cook JA, Cohen MH, Burke J, Grey D, Anastos K, Kirstein L, et al. Effects of depressive symptoms and mental health quality of life on use of highly active antiretroviral therapy among HIV-seropositive women. J Acquir Immune Defic Syndr. 2002; 30(4):401–409. [PubMed: 12138346]
17. Turner BJ, Fleishman JA, Wenger N, London AS, Burnam MA, Shapiro MF, et al. Effects of drug abuse and mental disorders on use and type of antiretroviral therapy in HIV-infected persons. J Gen Intern Med. 2001; 16(9):625–633. [PubMed: 11556944]
18. Sambamoorthi U, Walkup J, Olfson M, Crystal S. Antidepressant treatment and health services utilization among HIV-infected medicaid patients diagnosed with depression. J Gen Intern Med. 2000; 15(5):311–320. [PubMed: 10840266]
19. Yun LWH, Maravi M, Koayashi JS, Barton PL, Davidson AJ. Antidepressant treatment improves adhernce to antiretorviral therapy among depressed HIV-infected patients. J Acquir Immune Defic Syndr. 2005; 38(4):432–438. [PubMed: 15764960]
20. Cook JA, Grey D, Burke-Miller J, Cohen MH, Anastos K, Gandhi M, et al. Effects of treated and untreated depressive symptoms on highly active antiretroviral therapy use in US mutli-site cohort of HIV-positive women. AIDS Care. 2006; 18(2):93–100. [PubMed: 16338766]
21. Ashman JJ, Conviser R, Pounds MB. Associations between HIV-positive individuals' receipt of ancillary services and medical care receipt and retention. AIDS Care. 2002; (Suppl 1):S109–S118. [PubMed: 12204145]
22. Lo W, MacGovern T, Bradford J. Association of ancillary services with primary care utilization and retention for patients with HIV/AIDS. AIDS Care. 2002; (Suppl 1):S45–S57. [PubMed: 12204141]
23. Holmberg SD. The estimated prevalence and incidence of HIV in 96 large US metropolitan areas. Am J Public Health. 1996; 86:642–654. [PubMed: 8629714]
24. Wang PS, Lane M, Olfson M, Pincus HA, Wells KB, Kessler RC. Twelve-month use of mental health services in the United States: results from the National Comorbidity Survey Replication. Arch Gen Psychiatry. 2005; 62(6):629–640. [PubMed: 15939840]

Table 1

Demographic and Clinical Characteristics

	Overall N=951(%)	Any OP Psychiatry N=308 (%)	Use of Psychotropic Medication N=175 (%)
Sex			
Male	648 (68)	209 (65)	113 (65)
Female	303 (32)	113 (35)	62 (35)
Age (years)			
18-39	240 (25)	87 (27)	60 (34)
40-49	437 (46)	149 (46)	76 (43)
≥50	267 (28)	85 (26)	39 (22)
HIV Risk Factor			
Injection drug use (IDU)	137 (18)	52 (20)	29 (19)
Men who have sex with men (MSM)	287 (38)	90 (35)	69
MSM and IDU	21 (3)	10 (4)	5
Heterosexual	238 (31)	76 (29)	36
Heterosexual and IDU	74 (10)	31 (12)	12
Race			
White	294 (31)	109 (34)	90 (51)
Black	491 (52)	144(45)	57 (33)
Hispanic	130 (14)	56 (17)	21 (12)
Other/missing	36 (4)	13 (4)	7 (4)
Education			
< High school degree	244 (26)	90 (28)	41 (23)
High school grad/junior college	369 (61)	178 (56)	101 (58)
College/ post-college	127 (14)	51 (16)	33 (19)
Employment			
Working	225 (24)	50 (16)	29 (17)
Retired	151 (16)	51 (16)	26 (16)
Disabled	475 (50)	193 (60)	111 (63)
Unemployed	91 (10)	27 (8)	9 (5)
Insurance			
Private	215 (23)	68 (21)	46 (26)
Medicaid	357 (38)	128 (41)	57 (33)
Medicare	92 (10)	40 (13)	21 (12)
Medicare/Medicaid	181 (19)	60 (19)	36 (21)
None	94 (10)	20 (6)	11 (6)
Primary Care Visits			
≤3	375 (39)	93 (29)	55 (31)
4, 5	117 (12)	39 (12)	22 (13)
6, 7	227 (24)	76 (24)	41 (23)
≥8	232 (24)	114 (35)	57 (33)

	Overall N=951(%)	Any OP Psychiatry N=308 (%)	Use of Psychotropic Medication N=175 (%)
First CD4 Count of 2003 (cells/mm^3)			
<50	45 (5)	17 (5)	12 (7)
50-199	114 (12)	39 (12)	21 (12)
200-499	319 (34)	107 (33)	66 (38)
>499	234 (25)	82 (25)	49 (28)
Missing	239 (25)	77 (24)	27 (15)
HIV Viral Load (copies/ml)			
<400	349 (37)	136 (42)	78 (45)
≥ 400	360 (38)	108 (34)	69 (39)
Undetectable	242 (25)	78 (24)	28 (16)
HAART			
No	291 (31)	103 (33)	52 (30
Yes	659 (69)	216 (67)	123 (70)
Illicit drug use			
Current	244 (36)	136 (42)	70 (40)
Former	336 (35)	120 (37)	64 (37)
Never	267 (28)	65 (20)	41 (23)
Alcohol use			
Hazardous binge drinking	94 (10)	212 (66)	105 (60)
Social Alcohol Usage	284 (30)	80 (25)	53 (30)
No Alcohol	573 (60)	29 (9)	17 (10)

Table 2

Factors Associated with making any Outpatient Psychiatry Visit within the past 6 months

	Bivariate OR (95% CI) Associated with an Outpatient Psychiatry Visit	Multivariate OR (95% CI) Associated with an Outpatient Psychiatry Visit
Sex		
Male	1.00 (Ref)	----------
Female	1.29 (0.89 – 1.63)	
Age (years)		
18-45	1.00 (Ref)	----------
≥46	0.86 (0.64 -1.14)	
Race		
White	1.00 (Ref)	1.00 (Ref)
Black	0.59 (0.41-0.86)*	0.61 (0.41 – 0.92) *
Hispanic	1.19 (0.69-1.79)	1.19 (0.71 – 2.00)
Other	0.72 (0.48-2.25)	0.72 (0.30 – 1.75)
Group Test (P-Value)	12.30 (0.064)	7.27 (0.06)
Education		
< High School	1.00 (Ref)	
H.S. or Junior College	0.88 (0.64 – 1.23)	----------
College or More	1.26 (0.78 – 2.02)	
Group Test (P-Value)	0.90 (0.234)	
Employment		
Working	1.00 (Ref)	1.00 (Ref)
Retired	1.63 (1.00 – 2.66)	1.45(0.84 -2.51)
Disabled	2.50 (1.72 – 3.64	2.39 (1.53 – 3.72)*
Unemployed	1.54 (0.87 - 2.73)	1.71 (0.92 – 3.17)
Group Test (P-Value)	24.43 (0.000)	10.30 (0.01)
Insurance		
Private	1.00 (Ref)	1.00 (Ref)
Medicaid	1.24 (0.78 - 1.97)	0.82 (0.49- 1.38)
Medicare	1.66 (0.96 - 2.87)	1.11 (0.82 – 2.03)
Medicaid/Medicare	1.17 (0.72 - 1.91)	0.67 (0.38 - 1.16)
None	0.62 (0.33 - 1.17)	0.62 (0.32 -1.20)
Group Test (P-Value)	9.45 (0.051)	4.59 (0.33)
Primary Care Visits past 6 months		
0-2	1.00 (Ref)	1.00 (Ref)
3-5	1.67 (1.04 – 2.66)	1.57 (1.00 – 2.45)*
6, 7	1.31 (0.88 – 1.94)	1.35 (0.84 – 2.17)
≥8	2.54 (1.75 – 3.69)	2.46 (1.56 – 3.88)*
Group Test (P-Value)	25.66 (0.000)	13.04 (0.00)
Receipt of HAART		
No	1.00 (Ref)	----------

	Bivariate OR (95% CI) Associated with an Outpatient Psychiatry Visit	Multivariate OR (95% CI) Associated with an Outpatient Psychiatry Visit
Yes	0.89 (0.66 – 1.20)	
CD4 in 2003 (cells/mm^3)		
<50	1.00 (Ref)	
50-199	0.82 (0.39 -1.73)	
200-499	0.86 (0.44 – 1.68)	----------
>499	0.90 (0.45 -1.78)	
Missing	1.08 (0.51 – 2.26)	
Group Test (P-Value)	1.15 (0.887)	
HIV Viral Load (copies/ml)		
<400		
≥400	1.00 (Ref)	
Missing	0.74 (0.53 -1.02)	----------
Group Test (P-Value)	1.08 (0.68 -1.72)	
	4.35 (0.114)	
Illicit drug use		
Current	2.27 (1.57 -3.29)	2.26 (1.53 - 3.35)*
Former	1.83 (1.26 – 2.66)	1.84 (1.24 - 2.73)*
Never	1.00 (Ref)	1.00 (Ref)
Group Test (P-Value)	19.44 (0.000)	14.05 (0.00)
Alcohol use		
Hazardous/Binge drinking	0.78 (0.56 -1.08)	
Social Alcohol Use	0.73 (0.45- 1.18)	----------
No Alcohol Use	1.00 (Ref)	
Group Test (P-Value)	3.24 (0.198)	

-------Not included in the final model due to nonsignificant bivariate association.

Note: Group test is a chi-square test of the joint significance of all category indicators for a variable.

Table 3

Factors Associated with Utilizing Psychotropic Medications

Variable Name	Bivariate Odds Ratio 95% (CI)	Multivariate Odds Ratio 95% (CI)
Outpatient Psychiatry Visit		
Yes	12.73 (8.98- 18.03)*	11.4 (7.92-16.46)*
No	1.0 (Ref)	1.0 (Ref)
Sex		
Female	1.00 (Ref)	1.00 (Ref)
Male	1.43 (1.06 – 1.94)*	1.66 (1.13-2.43)*
Age		
18-45	1.00 (Ref)	----------
≥46	0.91 (0.68 – 1.20)	
Race		
White	1.00 (Ref)	1.00 (Ref)
Black	0.42 (0.29 – 0.60)*	0.37 (0.24-0.58)*
Hispanic	0.59 (0.37 – 0.97)*	0.39 (0.22-0.72)*
Other	0.62 (0.28 - 1.36)	0.34 (0.12 – 0.96)*
Group Test (P-Value)	21.82 (0.00)	16.04 (0.00)
Education		
< High School	1.00 (Ref)	
H.S. or Junior College	0.99 (0.71 – 1.38)	----------
College or More	1.12 (0.69 – 1.81)	
Group Test (P-Value)	0.33 (0.85)	
Employment		
Working	1.00 (Ref)	1.00 (Ref)
Retired	1.39 (0.85 – 2.28)	1.02 (0.56-1.85)
Disabled	2.47 (1.70- 3.59)*	1.79 (1.14- 2.82)*
Unemployed	1.19 (0.66 -2.13)	0.95 (0.48 – 1.89)
Group Test (P-Value)	28.07 (0.00)	7.72 (0.05)
Insurance		
Private	1.00 (Ref)	
Medicaid	1.27 (0.80 – 2.01)	
Medicare	1.86 (1.07 – 3.23)	----------
Medicare/Medicaid	1.93 (1.19 -3.13)	
None	1.02 (0.56 -1.84)	
Group Test (P-Value)	11.88 (0.02)	
Primary Care Visits past 6 months		
0-2	1.00 (Ref)	1.0 (Ref)
3-5	2.12 (1.46 – 3.36)*	1.85 (1.12 -3.04)*
6, 7	1.95 (1.24 – 3.06)	1.62 (0.94 -2.78)
≥8	3.45 (2.22 – 5.34)*	2.10 (1.25 -3.52)*
Group Test (P-Value)	31.6 (0.00)	7.69 (0.05)

Variable Name	Bivariate Odds Ratio 95% (CI)	Multivariate Odds Ratio 95% (CI)
CD4 in 2003 (cells/mm^3)		
<50	1.00 (Ref)	
50-199	0.83 (0.40 – 1.73)	
200-499	0.66 (0.34 – 1.27)	----------
>499	0.72 (0.36 – 1.41)	
Missing	0.96 (0.46 – 2.00)	
Group Test (P-Value)	3.81 (0.43)	
Illicit drug use		
Current	1.76 (1.22 – 2.53)*	
Former	1.72 (1.19 – 2.48)*	----------
Never	1.00 (Ref)	
Group Test (P-Value)	10.91 (0.00)	
Alcohol use		
Hazardous/Binge drinking	0.74 (0.46 – 1.20)	
Social Alcohol Use	0.90 (0.66 -1.26)	----------
No Alcohol Use	1.00 (Ref)	
Group Test (P-Value)	1.56 (0.49)	

-------Not included in the final model due to nonsignificant bivariate association.

Note: Group test is a chi-square test of the joint significance of all category indicators for a variable.