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HIV RISK BEHAVIOR AMONG PSYCHIATRIC OUTPATIENTS: ASSOCIATION WITH PSYCHIATRIC DISORDER, SUBSTANCE USE DISORDER, AND GENDER

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Abstract

Persons living with a mental illness are disproportionately vulnerable to HIV. The current study sought to examine the influence of psychiatric disorder, substance use disorder, and gender on risky sexual behavior in this vulnerable population. Participants were 228 female and 202 male outpatients (66% mood disorder, 34% schizophrenia) each of whom took part in a Structured Clinical Interview for the *DSM-IV* and a comprehensive assessment of sexual risk behavior. Univariate and multivariate analyses tested *a priori* hypotheses. The results indicated that risk behavior was more frequent among patients diagnosed with a mood disorder (compared to those diagnosed with schizophrenia) and/or with a substance use disorder (compared to those without a co-morbid disorder). We recommend routine HIV risk screening and risk reduction programs for this vulnerable population.

Introduction

Seroprevalence studies document that persons living with a mental illness are disproportionately vulnerable to infection with HIV, the deadly AIDS virus. Early studies conducted in mostly large metropolitan areas provided prevalence estimates that range from 4% to 23% (Carey et al., 1995). A recent study that sampled psychiatric patients from smaller metropolitan and rural locations as well as large metropolitan sites reported HIV infection rates that ranged from 1.7% to 5.0%, respectively (Rosenberg et al., 2001); in addition, this study found alarmingly high rates of hepatitis B and C virus. Given these findings, behavioral research that explores sexual risk behavior in this vulnerable population of patients is needed to guide the development of effective risk reduction programs (Carey et al., 1997a).

We have reported results from two *screening studies* that sought to identify the individual characteristics associated with risky sexual behavior. For the first, we reviewed records from 889 patients with a mental illness (Carey et al., 1999) and found that 11% reported HIV risk behavior. In this sample, there was no direct association between psychiatric disorder and risky sex. In a subsequent investigation, we reviewed 1,558 records at another hospital and found that 23% reported risky behaviors (Carey et al., 2001a); however, in this second study, risk behavior was less common among patients diagnosed with schizophrenia-spectrum disorders. Although these two hospital-wide screening studies provide reasonable estimates of risk behavior *prevalence*, the information that they provide regarding the psychiatric *correlates* of risk behavior tends to be of lower quality. A fine-grained understanding of the relationship

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between psychiatric disorder and risk behavior requires higher quality data from structured, research-quality, clinical interviews.

Fortunately, several studies have examined the association between risk behavior and individual patient characteristics using more detailed assessments. For example, one study surveyed 68 men and 66 women regarding their sexual behavior and combined these data with diagnostic information obtained from medical chart reviews (Otto-Salaj et al., 1998); in this study, the factors predictive of greater risk included being female and high levels of alcohol use. The relationship between risk behavior and psychiatric (and substance use) disorder were not reported for this study. A second study sampled 195 psychiatric inpatients and outpatients (64% male), and then administered the *Structured Clinical Interview for the DSM-III-R* as well as a sexual behavior interview (McKinnon et al., 2001). These authors reported no association between psychiatric disorder and sexual risk behavior but did report that substance use disorder diagnosis was associated with having an STD history. This study also found that women were more likely than men to have sex partners with known HIV risks.

These published studies provide the empirical precedent for the present investigation, which sought to examine the *simultaneous* influence of three patient characteristics (*viz.*, psychiatric disorder, substance use disorder, and gender) on risky sexual behavior in a large sample of psychiatric outpatients using psychometrically validated measures. To do this, we used detailed psychiatric and substance use diagnostic information from the *Structured Clinical Interview for the DSM-IV* (First et al., 1995) as well as detailed sexual risk behavior information from the *Comprehensive Timeline Followback* method (Carey et al., 2001b; Weinhardt et al., 1998a) to test three hypotheses.

First, we hypothesized that persons diagnosed with a schizophrenia-spectrum disorder would be *less* likely to engage in risky sexual behavior than would patients diagnosed with a mood disorder. This prediction emerged from four ideas: (a) schizophrenia is a pervasive biobehavioral disorder that generally interferes with effective social skills and functioning (Bellack et al., 1997); (b) schizophrenia is often characterized by anhedonia, avolition, cognitive and communication deficits, characteristics that may interfere with being interested in or able to initiate and maintain a sexual relationships; (c) some mood disorders (*viz.*, bipolar disorder) are associated with hypersexuality; and (d) sexual interest and activity may return to depressed persons when their depression lifts (Wincze & Carey, 2001).

Second, we predicted that psychiatric patients diagnosed with an alcohol (or drug) abuse or dependence diagnosis would report more risky sexual behavior. This prediction is consistent with the findings reported by others (Kalichman et al., 1994; McKinnon et al., 2001; Susser et al., 1995), and emerged from the ideas that substance use tends to (a) impair decision-making (Fischhoff et al., 1991), (b) make the immediate reinforcing benefits of risky sex more salient than the more distal consequences of such behavior (alcohol myopia theory; Steele et al., 1990), and (c) place substance users in situations where sexual victimization is more likely (Goodman et al., 2001; Testa et al., 2000).

Third, because previous research from the general population has found that men report more sexual partners and behavior (Laumann et al., 1994) whereas previous research with psychiatric samples has suggested that women may be at greater risk (McKinnon et al., 2001; Otto-Salaj et al., 1998), we sought to explore the influence of gender on risk behavior, and to test the hypothesis that psychiatric disorder would interact with gender with respect to their effects on sexual behavior. Specifically, we predicted that men with a mood disorder would report relatively more sexual risk behavior than men with a schizophrenia-spectrum disorder; in contrast, we predicted that women diagnosed with a schizophrenia-spectrum disorder would report more sexual risk behavior than women with a mood disorder. This prediction emerged

from three assumptions: (a) persons with schizophrenia-spectrum disorders will have poorer social skills than persons with mood disorders (Bellack et al., 1990; Dworkin et al., 1990), (b) men need effective interpersonal skills to *initiate* intimate relationships (especially with women), and (c) women need interpersonal skills to *avoid* coercive (and often risky) relationships with men (Schilling et al., 1991; Weinhardt et al., 1999).

A secondary purpose of this study was to examine results from three different analytic approaches suitable for non-normally distributed count data. This purpose emerged from a recent methodological review and critique regarding the analysis of count data that demonstrate strong deviations from normality (Schroder et al., 2003). Therefore, three univariate analytic strategies were applied and compared, namely, *t*-tests or analyses of variance using transformed scores, (b) non-parametric group comparisons using the Mann-Whitney *U*-test, and (c) linear and non-linear regression approaches. We sought to determine the equivalence of findings obtained when using these alternative data analytic approaches.

Methods

Participants

Inclusion criteria for this study included (a) being at least 18 years of age, (b) reporting sexual activity in the past year, (c) diagnosed with a mood disorder or a schizophrenia-spectrum disorder, and (d) use of alcohol or other substances in the past year. Exclusion criteria were (a) being acutely psychotic, or (b) being married and cohabitating with one's spouse in a self-reported mutually monogamous relationship. The sample was drawn from consecutive outpatients seen for an intake appointment or ongoing psychiatric treatment at one of seven outpatient clinics at two not-for-profit hospitals during the period 1997–2000. All participating patients provided written informed consent.

The sample ($N = 430$) included 228 female (53%) and 202 male (47%) psychiatric outpatients. The mean age of patients was 36.4 years ($SD = 9.7$); self-described race/ethnicity was 66% European-American, 22% African-American, 3% Native-American, and 8% other. Psychiatric diagnoses consisted of 66% with a mood disorder, and 34% with schizophrenia or other thought disorder; 74% of patients were also diagnosed with a substance use disorder. Patients reported a lifetime average of 6.2 psychiatric hospitalizations, and the mean Global Assessment of Functioning (GAF) score from the SCID was 47.2 ($SD = 13.0$), indicating serious impairment in social and/or occupational functioning. Indeed, most patients (81%) were unemployed even though 66% had at least a high school education; they reported an average annual income of \$6,357 (well below the poverty level in the US).

Measures

Sociodemographic interview. A structured interview was used to obtain information regarding age, gender, ethnicity, level of educational attainment, employment status, marital and living status, and current income. These data were corroborated by examining the patient's medical chart.

Structured Clinical Interview for the DSM-IV (First et al., 1995). The SCID yielded information regarding psychiatric history (age at first hospitalization, number of previous hospitalizations), psychiatric and substance abuse diagnoses, and Global Assessment of Functioning (GAF) scale scores. The interview yields both lifetime prevalence of major psychiatric disorders as well as the presence of symptoms in the past month. To determine the reliability of the primary diagnoses yielded by the SCID, a second trained interviewer who was blind to diagnoses viewed a randomly sampled subset ($n = 37$) of videotapes and provided independent scoring of the SCID. There was 84% exact agreement for primary diagnosis on this subset of interviews.

This agreement rate indicates a moderately high degree of reliability and is consistent with other reports of interrater reliability (Lehman et al., 1994).

Comprehensive Timeline Followback (Carey et al., 2001b; Weinhardt et al., 1998a). The comprehensive TLFB was used to assess risky sexual behavior and substance use during the past three months. This comprehensive measure is a modification of the original TLFB (Sobell et al., 1996); like the original TLFB, the comprehensive TLFB uses calendars marked with landmark events and personally meaningful dates, as well as other memory prompts to facilitate accurate recall. The comprehensive TLFB has been demonstrated to be reliable and valid with psychiatric patients (Carey et al., 2001b). Sexual risk information yielded by the TLFB included: number of sex partners, number of partner risk characteristics (e.g., injection drug use, multiple partners), frequency of vaginal intercourse, frequency of unprotected vaginal intercourse (UVI), alcohol use before intercourse, frequency of drug use before intercourse, and information regarding STI history (past year and lifetime). The TLFB also yielded number of occasions of alcohol use and drug use before sex.

Procedures

All procedures were approved by the Institutional Review Boards at Syracuse University and at the two participating hospitals. This research was preceded by a period of formative research, including focus groups to obtain patient feedback regarding study procedures and survey development work (Carey et al., 1997b; Gordon et al., 1999). The research team included doctoral-level clinical psychologists and advanced graduate students in clinical psychology. All had prior experience and training in the assessment of substance use and sexual behavior, and received additional training and ongoing supervision in the instruments used in this study from the investigators who are licensed clinical psychologists.

During standard clinical care, outpatients were asked if they had been sexually active and if they had used alcohol or other drugs in the previous year. Those who screened positive for both behaviors were invited by a research assistant (RA) to participate in a detailed assessment. They were informed about the purpose and procedures of the study, including the protections afforded by a certificate of confidentiality, and told that information that they provided would not be released to anyone (including clinical staff) unless patients requested this in writing.

Those who agreed and provided informed written consent met with an doctoral-level psychologist who completed the SCID. All interviews were videotaped for the purpose of providing supervision and determining inter-rater reliability. The SCID interview required 60-90 minutes, and was administered in a single session. In a separate session, patients met with a RA to complete the TLFB as well as battery of other measures required for a larger study (Carey et al., in press). Completion of these assessments took 3 sessions; patients were reimbursed \$30 for their expenses.

Statistical Analyses

All data were double-entered and checked for accuracy. Data analyses were performed with STATA™ and SPSS 11. Because of strong deviations from normality, three univariate approaches suitable for non-Gaussian distributions were applied and compared. First, outcomes were transformed to achieve the best approximation to a normal distribution and subsequently analyzed with *t*-tests or analyses of variance (ANOVA). A square root transformation was applied to the number of sexual partners. Except for the number of partner risks (range: 0 to 3), all other variables were transformed by $\log_{10}(x + 1)$. Second, non-parametric group comparisons (Mann-Whitney *U*-Tests) were performed. Third, the dichotomous predictor variables were used as dummy variables in linear and non-linear regressions. Negative binomial regression (Poisson with over-dispersion) was applied to all

skewed variables, except for the number of partner risks, which were analyzed by linear regression. In addition, multiple negative binomial regressions were performed with the frequency of unprotected vaginal intercourse (UVI) using all three predictor variables (psychiatric disorder: schizophrenia vs. mood disorder; substance use disorder: present vs. absent; and gender: male vs. female) simultaneously. For comparison, a main effect ANOVA and a full factorial ANOVA with the normalized UVI scores were performed. One-tailed significance tests were performed for all hypothesized effects.

Results

Sexual Risk Behavior

During the past three months, 57% of the patients had engaged in unprotected vaginal sex ($M = 11.7$ events); anal sex was reported by only 47 of 430 patients (10.9%); even among these persons, the mean number of occasions of unprotected anal sex in the past three months was 10.5 events. Most patients reported having only a single sexual partner during this interval although the range of partners across patients was large (0-49). The co-occurrence of substance use and unprotected sex was frequent ($M = 7.3$ occasions). A minority (6%) of patients reported coercive sexual experiences or sex trading (3%). During the past year, 8% reported that they had had a sexually transmitted infection (STI), and 3% acknowledged injection drug use. A lifetime history of a STI was reported by 39% of the sample. Most (75%) had been tested for HIV and 8 participants (2%) reported that they were infected with HIV.

Correlates of HIV Risk: Results from Univariate Analyses

Psychiatric disorder and HIV risk. Univariate results comparing the two groups formed by psychiatric diagnosis (mood vs. schizophrenia spectrum disorders) on each of the risk markers are presented in Table 1. As can be seen there, all three analytical methods indicated significant differences for two of the risk markers, namely, frequency of vaginal intercourse and the frequency of unprotected vaginal intercourse (UVI). Patients diagnosed with mood disorder reported a higher frequency of vaginal intercourse and a corresponding higher UVI risk index than schizophrenic patients. Results for the number of partners were less consistent: The t -test with normalized scores and the non-parametric U -test indicated a significantly higher number of partners among mood disorder patients; however, the negative binomial regression was non-significant. These outcomes emerged even though the mean of the raw scores appeared to be roughly equivalent; however, the raw score means are disproportionately influenced by a single outlier in the schizophrenia group. When this outlier was truncated, the mean for the schizophrenia group declined from 1.5 ($SD = 4.3$) to 1.3 ($SD = 2.1$), and the outcome of the negative binomial regression analysis was consistent with the results of the t - and the U -tests.

We conducted two sets of follow-up exploratory analyses. First, because patients diagnosed with a mood disorder received higher GAF scores than did patients diagnosed with schizophrenia ($M_s = 48.0$ vs. 43.5, respectively; $t = 3.51$, $p < .0005$), we repeated the aforementioned group comparisons using GAF as a covariate to determine whether functional level could explain the differences between groups. These analyses indicated that covarying out the influence of GAF did not explain the risk behavior differences between patients with mood and schizophrenia disorders.

A second set of exploratory analyses tested whether patients diagnosed with a major depressive disorder differed from those diagnosed with bipolar disorder. Results of these analyses indicated only one statistically significant differences between the groups, namely, patients diagnosed with bipolar disorder reported a higher number of lifetime STIs ($M = 1.2$, $SD = 3.5$) compared to unipolar depressive patients ($M = 0.8$, $SD = 1.3$) in the negative binomial regression ($\beta = -.45$, $SE = 0.25$, $z = 1.79$, $p < .05$, one-tailed).

Substance use disorders and HIV risk. Patients were grouped by lifetime substance use disorder (none vs. any alcohol or illicit drug abuse or dependence). Univariate results comparing the two groups are presented in Table 2. These analyses revealed consistently significant effects for self-reported drug-use before sex (all $ps < .001$); as expected, persons with a substance use disorder were more likely to use drugs before sex. Further, all analyses indicated a higher frequency of UVI among substance abusers ($ps < .05$). The number of lifetime STIs emerged as higher among abusers, but only in the negative binomial regression ($p < .05$).

Gender and HIV risk. No differences were found between male and female patients on the seven risk measures using either t - or U -tests. However, three significant gender differences were found using negative binomial regression analyses. First, women reported more lifetime STIs ($M = 1.1$) than men ($M = 0.7$; $p < .01$); similar tendencies appeared in t -test and U -test but were only marginally significant ($p < .10$). Second, men reported a greater number of sexual partners during the past three months ($M = 1.66$) compared to women ($M = 1.32$; $p < .05$). Third, men reported more occasions of alcohol use before sex during the past three months ($M = 4.4$) than did women ($M = 2.4$; $p < .05$).

Correlates of HIV Risk: Results from Multivariate Analyses

Multiple negative binomial regression and three-factorial ANOVAS were used to analyze the frequency of UVI. With both methods, main effects (alone) were evaluated in the first step, and both main effects and interactions were evaluated in the second step. The results of the three-way ANOVA indicated that psychiatric disorder ($F = 5.81$, $p = .008$) and substance use disorder ($F = 3.60$, $p = .03$) were significant predictors of UVI. Neither gender nor any of the interactions were significant. For the multiple negative binomial regression analysis, psychiatric diagnosis ($z = -2.29$, $p < .02$) and substance use disorder ($z = 1.43$, $p < .08$) both predicted UVI in the initial step. When the interaction terms were entered in the second step, however, the effects of psychiatric diagnosis weakened and the effect of substance use disorder was enhanced ($z = 1.70$, $p < .05$); none of the interactions were significant. The results from the second step of the analysis probably reflect multicollinearity among the predictors.

Discussion

Several important findings emerged from the current study. First, we found ample support, from both univariate and multivariate analyses, for the hypothesis that persons diagnosed with a schizophrenia-spectrum disorder are less likely than patients with a mood disorder to engage in risk behavior. Univariate analyses indicated that persons with a mood disorder reported more frequent sexual intercourse, higher frequencies of unprotected vaginal intercourse, and more sexual partners. Multivariate analyses (using both negative binomial regression and analysis of variance approaches) corroborated these results, and indicated that persons diagnosed with a mood disorder were more likely (than persons with schizophrenia) to engage in risky sexual behavior, even after controlling for the effects of substance use disorder and gender.

This pattern of results is consistent with our initial expectations and corroborates previous findings (Susser et al., 1995). Exploratory analyses indicated that differences between psychiatric diagnostic groups could not be explained simply by the slightly higher level of functioning among persons with mood disorders relative to schizophrenia-spectrum disorders. The lack of differences between bipolar and (unipolar) depressed persons highlights the need for heightened vigilance among clinicians working with persons having all mood disorders. The vulnerabilities arising from psychiatric illness (e.g., low awareness or even apathy regarding vulnerability to HIV) – coupled with improvements in energy, mood, and sexual desire resulting from symptom remission – may contribute to increased risk for HIV among these depressed patients. Fortunately, evidence from several intervention studies suggest that risk reduction interventions tailored to the mentally ill can help patients to increase condom

use and other risky-reducing sexual practices (Carey et al., 2003; Kalichman et al., 1995; Otto-Salaj et al., 2001; Susser et al., 1998).

The hypothesis that persons with a history of substance abuse or dependence would be more likely than patients without one to engage in sexual risk behavior received partial support. Analyses indicated that persons with a substance use disorder reported more unprotected intercourse, more frequent use of drugs before sex, and more lifetime STIs (but only in the regression analysis). However, in contrast to the initial expectations, no differences were found in the use of alcohol before sex, the number of partners, or the riskiness of sexual partners between patients with a substance use disorder and those without.

The association between substance use and HIV risk has emerged in a variety of populations including men who have sex with men, adolescents, heterosexual men and women, and psychiatric patients (Cooper et al., 2000; Fromme et al., 1999; Malow et al., 2001; McKinnon et al., 2001; Woods et al., 1996). It seems self-evident that persons who abuse alcohol and other drugs engage in unprotected sex with risky, and sometime multiple, partners. Despite this continuing association, however, evidence from event-level analyses (Weinhardt et al., 2001) does not support a direct *causal* relationship between substance use and unprotected sex. Reconciling the discordance between correlational results and event-level analyses remains a complex challenge (Weinhardt et al., 2000). One approach to integrating these apparently discrepant results is to interpret the co-occurrence of these two related risk behaviors as reflecting an overall disposition toward risk-taking. The dimensions of this disposition are likely multidimensional, and may include both psychological and social characteristics (Kalichman et al., 1996; Malow et al., 2001). Such hypotheses require further testing before strong conclusions can be drawn.

Given the main effects of psychiatric and substance use diagnoses in the multivariate analyses, it is likely that persons who are dually diagnosed will be at elevated risk for infection with HIV and other STIs. Interventions for this group include both sexual and substance risk reduction approaches (Carey et al., 2002; Carey et al., 2003). Evidence suggests that both approaches can be implemented successfully, but research is needed to develop interventions that address multiple health risk behaviors.

The current study also sought to investigate the association between gender and risk behavior in the context of psychiatric illness. Regression analyses indicated that male patients tended to report more sexual partners and greater use of alcohol prior to sex. These main effects of gender are consistent with research in non-psychiatric populations (Laumann et al., 1994). However, the results did not support the hypothesis that psychiatric disorder would interact with gender to forecast sexual risk behavior. Results from the multivariate analyses suggest that women diagnosed with schizophrenia do not differ from women with severe and persistent mood disorders with respect to their sexual risk behavior and experiences. Nevertheless, women did report more lifetime STIs in this study, and mounting evidence from other studies suggests that women with a mental illness are especially vulnerable to sexual coercion (Goodman et al., 2001); continued development of interventions to provide these women with the skills they need to protect themselves from unwanted sexual encounters remains a clinical and public health priority (Weinhardt et al., 1999).

Another important finding of this research is the demonstration that the strength of the statistical relationships among gender, psychiatric diagnosis, substance use diagnosis, and risky sexual behavior depend on (a) the marker of risk behavior selected and (b) the data analytic approach employed. The overall pattern of results from the current study makes clear that no single behavioral marker measures the construct of “risk” completely. Thus, leading behavioral scientists often advise the use and reporting of multiple risk indicators (Kelly et al., 2002;

Ostrow et al., 2000; Pequegnat et al., 2000). In addition, the fact that mixed results can emerge from different univariate approaches may help to explain discrepant findings across studies. Furthermore, results from univariate analyses do not necessarily maintain using multivariate approaches that adjust for the effects of multiple predictors. These results suggest the need for using and reporting results from multiple data analytic strategies, especially when evaluating skewed sexual behavior data. This finding points to the need for continued research regarding the analysis of sexual behavior and other highly skewed data (Schroder et al., 2003).

The present findings should be interpreted mindful of study strengths and limitations. Strengths include recruitment of a large sample of male and female psychiatric outpatients from both private and public treatment settings; use of research-quality psychiatric and substance use (SCID) diagnoses; use of multiple markers of sexual risk assessed with a detailed, and psychometrically-validated method (viz., the TLF method); explicit hypotheses grounded in both conceptual and empirical precedent; use of three univariate data analytic methods because sexual behavior data are often strongly skewed; and use of two multivariate analyses to control for the simultaneous influence of other predictor variables.

Several limitations should be noted. First, the sampling strategy sets limits on how the findings should be generalized. Generalization to patients with other disorders, or to similarly diagnosed but higher functioning patients, should be done cautiously. Second, research on sexual behavior involves the use of self-report, which can be affected by memory errors, social stigma, embarrassment, and other factors. To attenuate these factors, we used methods designed to minimize the cognitive burden on participants through the use of calendars, landmark events, and other memory cues (Carey et al., 2001b); the assessments were conducted by assessors who not associated with the patient's clinical care and masked to the study's hypotheses as recommended by Weinhardt et al. (1998b). In addition, we provided detailed explanations of the public health importance of the research and assurances of confidentiality (including use of a federal certificate of confidentiality) to earn patients' trust and candor.

A third limitation that also affects nearly all HIV-related research involves the distributional properties of sexual behavior data. Counts of sexual behavior tend to be highly skewed, creating difficulties for traditional data analytic approaches. We employed three univariate data analytic approaches, and two multivariate approaches to minimize this problem. Often the results of these approaches converged, enhancing confidence in their robustness. However, the results also differed depending on the data analytic approach, highlighting the need for methodological research to guide the interpretation of discordant results.

Future research investigating HIV risk behavior among psychiatric patients can be advanced further by expanding the sampling strategy used in this study to include patients with personality, anxiety, and other disorders, as well as measuring biological markers of risky sexual behavior (e.g., incident STIs). Continued research is needed to understand better the psychological and social factors that increase the vulnerability of psychiatric patients. Equally important is research to explore how best to disseminate effective interventions so that they are more widely adopted in treatment settings. Such research and dissemination efforts will benefit from partnerships among administrators, clinicians, and scientists working to promote the sexual as well as the mental health of psychiatric patients.

Conclusions

In conclusion, a minority of patients receiving outpatient treatment for a psychiatric disorder engage in sexual behavior that places them at risk for infection with HIV and other STIs. Risk behavior was more common among patients diagnosed with a mood disorder, and those diagnosed with a co-morbid substance use disorder. We recommend routine screening for

sexual risk behavior in psychiatric treatment settings, and implementation of risk reduction programs for patients who are at risk.

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Table 1
Univariate Analyses Testing the Effect of Psychiatric Disorder on HIV Risk

Risk Variables	Mood Disorders		Schizophrenia - spectrum Disorders		Normal scores	Mann Whitney	Linear and Nonlinear Regressions ^c		
	M	SD	M	SD	t	Z	Est.	SE	z
Number of Partners ^{a, b}	1.46	1.8	1.52	4.3	2.14*	-1.99 *	0.04	0.12	0.31
Number of partner risks	0.5	0.7	0.7	0.8	-1.64	-1.18	0.13	0.8	1.64
Frequency of vaginal sex ^a	16.1	30.9	10.4	19.2	2.55*	-2.48**	-0.44	0.19	-2.34*
Frequency of unprotected vaginal intercourse ^a	13.7	30.4	8.4	18.4	2.56*	-2.37**	-0.49	0.23	-2.10*
Alcohol before sex ^a	3.7	16.2	2.9	9.8	0.51	-0.69	-0.23	0.36	-0.65
Drug use before sex ^a	4.9	29.6	2.1	10.1	1.03	-0.32	-0.86	0.49	-1.75
STIs lifetime ^a	0.9	2.1	1.1	2.4	-0.79	-0.56	0.19	0.20	0.95

Notes. STIs = sexually transmitted infections.

^a negative binomial regressions;

^b for the normalized number of partners: $M_{\text{mood disorder}}=1.02$, mean rank=215.67; $M_{\text{schizophrenia spectrum}}=.88$, mean rank=193.09; accordingly, t value is positive for this outcome;

^c Mood disorder coded 0, Schizophrenia coded 1;

* $p < .05$;

** $p < .01$.

Table 2
Univariate Analyses Testing the Effect of Substance Use Disorder on HIV Risk

Risk Variables	No Substance Use Disorder		Substance Use Disorder		Normal scores	Mann Whitney	Linear and Nonlinear Regressions ^c		
	M	SD	M	SD	<i>t</i>	<i>Z</i>	Est.	SE	<i>z</i>
Number of Partners ^a	1.33	2.0	1.54	3.1	-1.24	-1.22	0.15	0.13	1.17
Number of partner risks	0.5	0.7	0.6	0.8	-1.38	-1.34	0.11	0.08	1.36
Frequency of vaginal sex ^a	11.4	20.1	14.6	29.2	-1.17	-1.11	0.25	0.20	1.22
Frequency of unprotected vaginal intercourse ^a	8.3	18.3	12.7	28.8	-2.51 **	-2.81 **	0.43	0.25	1.73 *
Alcohol before sex ^a	3.4	21.9	3.3	10.2	0.07	-1.54	-0.03	0.38	-0.08
Drug use before sex ^{a, b}	0.3	2.1	5.0	28.2	-5.89 ***	-3.97 ***	2.87	0.53	5.44 ***
STIs lifetime ^a	.70	1.4	1.02	2.4	-1.07	-0.88	0.38	0.22	1.72 *

Notes. STIs = sexually transmitted infections;

^a negative binomial regressions;

^b *t*-test for unequal variances was performed;

^c Non-abusers coded 0, Abusers coded 1;

* $p < .05$;

** $p < .01$;

*** $p < .001$.