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The Relationship of Manic Episodes and Drug Abuse to Sexual Risk Behavior in Patients with Co-Occurring Bipolar and Substance Use Disorders: a 15-Month Prospective Analysis

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Abstract

Abstract Risky sexual behavior is common among individuals with bipolar and substance use disorders. This 15-month prospective study examined the effects of between-subject differences and within-subject changes in mood symptoms and drug use on sexual risk behavior among 61 patients with both disorders. Participants completed five post-treatment follow-up assessments at 3-month intervals. Using a multivariate mixed-effects model analysis, more average weeks of mania (between-subject difference) was associated with greater sexual risk, but change in weeks of mania (within-subject change) was not; depression was unrelated to sexual risk. In addition, within-subject increases in days of cocaine use predicted increases in sexual risk. Results underscore the importance of substance abuse treatment and suggest that bipolar patients with active and/or recurrent mania are in need of targeted HIV prevention services. Further research is needed to test whether individual differences in impulsivity may explain the association between mania and sexual risk.

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Keywords

Sexual risk behavior; Bipolar disorder; Substance dependence; Mania; Cocaine

Introduction

The mentally ill have been disproportionately affected by the HIV epidemic, with seroprevalence rates many times higher than that in the general population [1]. Individuals with severe mental illnesses, particularly those with mood disorders, engage in high rates of sexual risk behaviors associated with HIV infection, including multiple sex partners, unprotected intercourse, and sex trade [2]. To date, there has been limited research on the mechanisms underlying the association between mental illness and HIV infection. This study examined the potential role of mood symptoms and substance abuse on sexual risk in adults with co-occurring mental illness and substance dependence.

Bipolar disorder (BD) is a severe mood disorder characterized by the presence of manic (including hypomanic or mixed) episodes, often alternating with depressive episodes. Manic symptoms, including euphoria, increased energy, grandiosity, hypersexuality, impulsivity, and poor judgment, are present to varying degrees in manic episodes. This constellation of symptoms is often associated with risky behaviors, such as spending sprees, gambling, and promiscuous sex [3]. While it has been hypothesized that mania leads to increased sexual risk, empirical research is limited. In one study, inpatients with BD were more likely than those with depressive or other psychiatric disorders to report increased sexuality, including sexual thoughts, desire, and activity, during the acute phase of illness leading to hospitalization [4]. Another study found that psychiatric inpatients with BD were more likely than other inpatients to have had sex with prostitutes [5]. In a study of outpatients with co-occurring BD and substance use disorder (SUD), a recent manic episode was associated with increased HIV risk behavior [6]. While these findings support the hypothesis that mania is associated with increased sexual risk, the extant literature is limited by cross-sectional designs that cannot differentiate the effects of within- and between-subject variations in mood symptoms on sexual risk behavior.

Most patients with BD experience depressive episodes; symptoms include depressed mood, apathy, changes in appetite and sleep, loss of energy, self-loathing, poor concentration, and suicidal ideation. While some studies have reported an association between depressive symptoms and greater sexual risk [7], a meta-analysis found no such relationship [8]. Many of these studies used cross-sectional designs and global measures of affect that may not accurately identify clinically significant mental health problems. Furthermore, the relationship between depression and sexual risk has not been examined among patients with BD.

Among the mentally ill, SUDs nearly triple the risk of HIV infection [1, 9]. In a chart review of over 11,000 psychiatric outpatients at Duke University Medical Center, the HIV prevalence among BD patients without and with co-occurring SUD was 2.6 and 9.1%, respectively [9]. Nearly half of individuals with BD have one or more lifetime SUDs [10], and substance abuse is a well-established risk factor for HIV infection [11]. Cocaine use, in particular, has been associated with increased sexual risk behavior [11] and may further exacerbate engagement in risky behavior among individuals with BD.

Longitudinal, within-subjects designs are needed to determine whether the frequency of sexual risk behavior varies within individuals over time in relation to mood episodes and substance abuse. In this prospective analysis, we assessed the relationship between these

factors and sexual risk behavior over a 15-month period among patients with co-occurring BD and SUD. It was hypothesized that manic episodes and cocaine use would be associated with increased sexual risk, and depressive episodes would be associated with decreased sexual risk.

Method

Participants and Procedures

This study used data from a clinical trial of integrated group therapy versus group drug counseling for patients with co-occurring BD and SUD. As described in detail elsewhere [12], both conditions received 12 weekly 1-h group sessions delivered by Masters-level counselors. Participants were recruited from McLean Hospital programs, clinician referrals, and fliers and advertisements in the community. Specific inclusion criteria were current diagnoses of BD and substance dependence, substance use within 60 days of baseline, mood stabilizer regimen for ≥2 weeks, and ≥18 years of age. Exclusions were acute psychosis or mania at baseline, current danger to self or others, need for medical detoxification, concurrent group treatment, and residential treatment restricting substance use. Eligibility was confirmed at baseline via clinical interviews and questionnaires. Of 130 individuals assessed, 39 were not eligible (22 did not meet BD diagnostic criteria, 6 had concurrent group treatment, 4 had not used substances in the past 60 days, 2 were not on a stable medication regimen, 1 required medical detoxification, and 4 had other reasons) and 30 decided not to participate, leaving a final sample of 61. Five post-treatment follow-up visits consisting only of assessments occurred every 3 months over 15 months; 93% completed ≥1 follow-up visit. Complete data were available for 64–78% of participants at each assessment. Trained interviewers administered assessments in private offices. Participants provided written informed consent and were compensated $25 at baseline, $50 each at months 3, 6, and 9, and $100 each at months 12 and 15.

Measures

Sexual Risk Behavior—The Risk Assessment Battery (RAB) is a self-administered questionnaire designed for substance-abusing populations to assess HIV risk behavior [13]. The sex risk subscale is comprised of nine items (e.g., number of sex partners, frequency of sex trading, and frequency of unprotected intercourse) that are summed to provide a composite score. The RAB correlates strongly with interviewer-administered instruments, has excellent test–retest reliability, and is predictive of HIV seroconversion [13]. In the current study, the RAB was administered every 3 months, so the measure was adapted to assess behavior in the past 3 rather than 6 months. In addition, because sexual orientation is not a risk behavior and is not expected to change, this item was dropped from the sex risk composite score. Scores ranged from 0 to 6, with higher scores indicative of greater frequency of sexual risk behaviors.

Mood Episodes—Mood episodes in the past 3 months were assessed at each follow-up using the Longitudinal Interval Follow-Up Evaluation (LIFE) [14], which utilizes calendar methodology to facilitate the week-by-week review and recording of manic, depressive, and psychotic symptoms. This yielded a binary measure of whether or not criteria were met for a DSM-IV-TR manic (combining manic, hypomanic, and mixed) or depressive episode on each week. The number of weeks of manic and depressive episodes during each 3-month follow-up period was then computed.

Substance Use—At each follow-up, urine toxicology screens were obtained and the timeline follow-back (TLFB) technique was used to assist in the recall of days of substance

use in the past 3 months [15]. As reported previously [12], nearly all self-reports were consistent with urine data, and any discrepancies were resolved at the next visit.

Data Analysis

To test the effects of between-subject differences and within-subject changes in mood episodes and substance use on sexual risk, average and deviation scores were computed for each of these predictor variables. Average scores assessed the effect of between-subject differences in the predictor on variation in sexual risk, while deviation scores assessed the effect of within-subject changes in the predictor on changes in sexual risk during follow-up. In general, within-subject effects are less prone to confounding than between-subject effects. The average score was the mean value of each predictor across the five assessments (i.e., number of weeks of mood episodes and number of days of substance use). The deviation score was the value of the predictor at each assessment minus the average score. For example, if an individual with an average of 2 weeks of mania per 3-month period had 4 weeks of mania at the 6-month visit, his deviation score at that visit would be +2 weeks. A mixed-effects model analysis was used to examine the association between average and deviation scores for each predictor on sexual risk in the past 3 months at each of the five assessments over 15 months. All predictor variables were entered simultaneously into a multi-variate model. Preliminary analyses revealed that marijuana (estimate of slope = 0.005, $P = 0.50$) and alcohol (estimate of slope = 0.009, $P = 0.34$) use were unrelated to sexual risk; therefore, these variables were not included in the final model. Similarly, demographic factors (age, gender, race, education, and marital status) and treatment condition were unrelated to sexual risk, and their inclusion in the model did not alter the results. To maximize the precision of the estimates of effects, these covariates were not included in the final model.

Results

The sample included 25 women and 36 men. Participants were 18–65 years old (M = 38.3, SD = 11.1), primarily Caucasian (91.8%) and single (72.1%), and generally well-educated (98.4% graduated from high school, 49.2% graduated from college), yet only 45.9% were currently employed. All participants had co-occurring BD and substance dependence. Most (65.6%) were dependent on drugs and alcohol, 26.2% on alcohol only, and 8.2% on drugs only. Among drug-dependent participants, the most common primary drugs of abuse were cocaine (42.2%) and marijuana (40.0%).

At baseline, 62.3% of participants were sexually active in the past 3 months. Among these, 76.3% had unprotected intercourse, 23.7% had multiple partners, 4.9% traded money/drugs for sex, and 3.3% traded sex for money/drugs. The mean RAB sex risk score was 2.57 (SD = 2.36); this is comparable to other mentally ill samples [16]. The frequency of these sexual risk behaviors remained relatively stable over time, and there was no significant time effect on overall RAB sex risk score (see Table 1).

Table 1 presents the results of the multivariate mixed-effects model analysis predicting sexual risk over the 15-month assessment period. For mania, average weeks of manic episodes predicted sex risk score, with participants who experienced more mania engaging in greater sexual risk (estimate of slope = 0.34, $P < 0.05$). Specifically, for every 1-week increase in average mania, there was a 0.34 point increase in RAB score. However, contrary to our hypothesis, within-subject changes in mania (i.e., deviations in weeks of mania) did not correlate with changes in sex risk score (estimate of slope = −0.06, $P > 0.05$). In contrast, within-subject changes in days of cocaine use predicted changes in sex risk score, with increases in cocaine use correlating with increases in sexual risk behavior during that follow-up period (estimate of slope = 0.04, $P < 0.05$). Specifically, for every 7-day increase

in cocaine use, there was a 0.28 point increase in RAB score. Average weeks of depression and deviations in weeks of depression did not significantly predict sexual risk behavior.

Discussion

This is the first prospective study to investigate the effects of between-subject differences and within-subject changes in both mood symptoms and substance abuse on sexual risk behavior in patients with co-occurring BD and SUD. Consistent with prior cross-sectional studies, participants who typically had more weeks of mania reported higher sexual risk. However, our hypothesis that within-subject changes in mania would be associated with changes in sexual risk over time was not supported. Individual differences in impulsivity may help explain this set of results. Previous research using the Barrett Impulsivity Scale (BIS), a measure of trait-like impulsivity, has found higher scores among BD patients in current manic or mixed states [17] and among those with co-occurring SUDs [18]. Furthermore, higher BIS scores are associated with more severe course of illness, including more frequent mood episodes and severity of manic symptoms [19]. Higher BIS scores also correlate with greater sexual risk behavior in non-BD samples [20]. Thus, trait-like impulsivity may be one mechanism linking mania and sexual risk in BD patients. That is, BD patients high in impulsivity may be more likely to both have more frequent and severe manic episodes and to engage in greater sexual risk. Further research is needed to test whether the association between mania and sexual risk can be explained, at least in part, by between-subject variation in trait-like impulsivity. Nevertheless, our results suggest that BD patients with active and/or recurrent manic episodes are in need of targeted HIV prevention services, including HIV testing and counseling, sexual risk reduction, and psychiatric medication management.

In contrast, we found no relationship between depressive episodes and sexual risk behavior. While this may seem counterintuitive, the literature on depressive symptoms and sexual risk behavior has been mixed. It is possible that a curvilinear relationship exists: mild depression may be associated with increased sexual risk-taking (possibly as a coping mechanism for managing negative affect) and severe depression may be associated with decreased sexual activity (loss of interest in sex is a common symptom of depression, and sexual dysfunction is a common side-effect of many antidepressant medications). Further research is needed to explore these relationships in general, and among BD patients in particular.

Cocaine use was an independent predictor of sexual risk behavior. As hypothesized, within-subject change in cocaine use was associated with change in sexual risk over time. That is, an increase in number of days of cocaine use during any 3-month period was associated with an increase in sexual risk behavior during that same period. These results support existing evidence that stimulants like cocaine increase sexual desire and risky sexual behavior [20, 21]. Yet, few studies have examined within-subject change in cocaine use and its relationship to sexual risk, and none has examined this relationship among individuals with mental illness. Thus, our study extends the previous literature by showing that reductions in frequency of cocaine use is associated with reductions in HIV risk among BD patients. Our results point to the importance of treating cocaine dependence, a chronic and often relapsing disease, as an HIV prevention strategy.

The primary limitation of this study was low power, given the relatively small sample size, infrequent occurrence of manic episodes, and limited variability in sexual behavior. However, the overall disease course (i.e., length and frequency of mood episodes) was consistent with a typical BD profile, and over half of participants reported at least one manic and depressive episode during the study. In addition, the frequency of sexual activity was consistent with previous studies of adults with severe mental illness [2]. Second, although

the study was prospective in design, behaviors were assessed at 3-month intervals. Thus, it is possible that the effects of short-term shifts in mood and/or substance use on sexual behavior could have been missed. Shorter timeframes assessing week-by-week variations in sexual risk, coupled with the LIFE and TLFB assessments, would be ideal for assessing the effects of mood- and substance-related changes on sexual risk behavior. Use of personal digital assistants might facilitate the recording of these variables on a daily basis. Third, the current study involved secondary analysis of data collected as part of a clinical trial. Although treatment condition was unrelated to sexual risk, the sample may not be representative of all individuals with co-occurring BD and SUD, including those not receiving mood stabilizing mediations and/or unwilling to participate in a clinical trial of integrated group treatment. The association between sexual risk, mood symptoms, and substance use may differ, and possibly even be stronger, among non-treatment-seeking individuals. Replication studies with larger, more ethnically and socioeconomically diverse samples are indicated.

A major strength of the study was the use of multiple follow-up visits over 15 months, including week-by-week assessment of mood symptoms and substance use, to more accurately track these variables over time. Furthermore, the RAB is a well-validated instrument among substance abusers, providing a reliable summary of risk behavior at each visit. Future studies might supplement their analyses by examining the effects of mania and cocaine use on specific sexual behaviors. In particular, previous research points to a link between cocaine use and sex trade [22–24]. Finally, there was a high rate of data completion over this 15-month study.

The results of this study provide convincing evidence that both manic symptoms and cocaine use predict sexual risk behavior in patients with co-occurring BD and SUD. The current study must be replicated with larger, more representative samples, including non-treatment-seeking individuals, to validate and clarify the associations between mood symptoms, substance use, and sexual risk. Further research is also needed to identify the mechanisms linking mood symptoms and sexual risk, and to test whether simultaneous increases in mania and cocaine use have interactive effects on sexual risk. In particular, studies should include measures of state and trait impulsivity at each follow-up to test for possible mediation. This line of research has direct implications for the development of targeted HIV prevention interventions to reduce the disproportionate burden of HIV and other sexually transmitted diseases among individuals with severe mental illnesses like BD.

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Table 1

Predictors of sexual risk behavior in substance abusers with bipolar disorder over 15 months

	Estimate of the slope	Standard error	*t*-value	*P*-value
Time (months)	0.05	0.07	0.71	0.478
Mania (weeks)				
Average	0.34	0.15	2.26	0.028
Deviation	−0.06	0.06	−0.99	0.324
Depression (weeks)				
Average	0.03	0.08	0.37	0.710
Deviation	−0.06	0.04	−1.56	0.120
Cocaine (days)				
Average	0.02	0.04	0.42	0.677
Deviation	0.04	0.02	1.99	0.048