Race and Sexually Transmitted Diseases in Women With and Without Borderline Personality Disorder

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Abstract

Background: The purpose of this study was to examine the history of sexually transmitted diseases (STDs) among women with borderline personality disorder (BPD) with and without a lifetime substance use disorder (SUD) and to compare their histories to those of a group of women with a current nonpsychotic axis I disorder.

Methods: Two-hundred fifteen women completed the Structured Clinical Interview for DSM-IV Axis I diagnoses (SCID-I), Structured Interview for DSM-IV Personality for Axis II diagnoses (SIDP-IV), and a sexual health interview. African American women were oversampled because little is known about BPD in African American women and because they are at greater risk for STDs than non-African American women.

Results: Women with a lifetime SUD (especially cannabis use disorder) reported more STD risk factors and STDs than women without a lifetime SUD. BPD dimensional scores and African American race were predictors of STD, even after controlling for age, socioeconomic status (SES), SUDs, and participation in the sex trade.

Conclusions: Determining predictors of STDs within at-risk subpopulations may help reduce the spread of STDs and prevent HIV infection within these groups by helping providers identify women at the highest risk of infection.

Introduction

BORDERLINE PERSONALITY DISORDER (BPD) is a severe and chronic disorder that affects approximately 6% of women in the general population,¹ 23% of psychiatric outpatients,² and 40%–44% of psychiatric inpatients.^{3,4} Individuals meet DSM-IV⁵ criteria for BPD if they have five of nine maladaptive personality traits, including marked impulsivity, unstable and intense relationships, frantic efforts to avoid abandonment, identity disturbance, recurrent suicidal or self-injurious behaviors, affective instability, chronic feelings of emptiness, inappropriate anger or inability to control anger, and stress-related paranoid ideation, delusions, or severe dissociative symptoms. Impulsive behavior is a hallmark of BPD, and sexual impulsivity has been documented among people with BPD symptoms, including sexual partnerships with multiple strangers.^{6,7}

There is empirical evidence that sexually transmitted diseases (STDs) are more prevalent among people with mental illness.^{8–10} Meade and Sikkema¹¹ reviewed rates of sexual behaviors and STDs in people with severe mental illness (SMI) and concluded that most of these individuals are sexually active; a substantial proportion engage in risky behaviors, such as trading sex for money, drugs, or goods; they have

significantly higher rates of STDs than people without SMI. However, rates of STDs and HIV may vary as a function of the psychiatric population examined.^{11–14} In a recent study of women with BPD, 27% reported 20 or more lifetime sexual partners, and 35% reported at least one lifetime STD,¹⁵ suggesting that this group of women is at particularly high risk for STDs.

In Meade and Sikkema's theoretical model of HIV risk for individuals with SMI,¹¹ substance use disorder (SUD) is an important pathway. Psychiatric outpatients who are diagnosed with concurrent SUDs are more likely to engage in high-risk sexual behaviors and are at greater risk of contracting STDs,^{14–16} including HIV.¹⁷ BPD is perhaps the most common Axis II disorder in women with SUD, with prevalence ranging from 10% to 65%.^{17–20} In the largest and most stringent study on the comorbidity of BPD in psychiatric patients to date, 59% of women with BPD had at least one lifetime SUD, including alcohol abuse or dependence, and 41% had at least one lifetime diagnosis of drug abuse or dependence.²¹ In addition, BPD appears to be associated with new onsets of SUD, even in BPD patients who are in stable remission.²² Nevertheless, the results of one study suggest that comorbid SUD may be more important for HIV risk in individuals with mood disorders than in individuals

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with BPD,¹² so more research on the effect of dual diagnosis is warranted.

BPD is associated with marked impulsivity as well as high rates of SUD, placing individuals with this diagnosis at risk for unsafe sexual behaviors and STDs. However, research on the relationship between psychiatric disorders and STDs has focused almost exclusively on antisocial personality disorder and Axis I disorders. Chen et al.¹⁵ were the first to compare women with BPD without a current SUD to women with BPD and a current SUD (BPD/SUD). The BPD/SUD group reported significantly more STDs than the BPD group without SUD. The authors also examined mediators of the relationship between BPD/SUD and STDs and found that engaging in sex trade made an independent contribution to this association. They reported a lower rate of recent sex trade (5% overall and 12% in the BPD/SUD subgroup) compared with patients with SMI in the Meade and Sikkema¹¹ review (12%–45%), but this may have been due to demographic differences between the two samples. Specifically, the Chen et al.¹⁵ sample was 83% European American, and despite the well-known racial disparity in STD rates in the United States, no mention was made of race as a predictor of STDs in their multivariate analyses.

Our study includes twice as many African American women with BPD as the most comprehensive study on BPD to date, the Collaborative Longitudinal Personality Disorders Study (CLPS).²³ To our knowledge, no studies have examined the interaction of race and psychiatric disorders in assessing risk for acquiring STDs among women with personality disorders. Hardly any studies have included a sizable number of African American women with BPD. Studying this population is important because African American women are at very high risk of contracting STDs compared with women from other racial groups.^{24–28} Additionally, few studies have compared HIV risk in women with BPD to HIV risk in women with other psychiatric disorders.¹⁵

Our first hypothesis was that there would be an additive effect of SUD and BPD diagnoses on risk factors for STDs (e.g., many sex partners, sex trade) and prevalence of reported STDs. Our second hypothesis was that women with BPD would have more risk factors and STDs than women with a current nonpsychotic Axis I disorder. Our third hypothesis was that African American women would be at greater risk of STDs than the other women from this population, even after BPD traits and lifetime history of SUDs were included in multivariate models.

Materials and Methods

Participants

Women were recruited as part of an ongoing cross-sectional study examining the association between drug abuse and risky sexual behavior in women with BPD. Participants were recruited through fliers posted at (1) inpatient and outpatient programs at the Western Psychiatric Institute and Clinic, which is a part of the University of Pittsburgh Medical Center (e.g., psychiatric outpatient programs, substance use treatment programs), (2) substance use treatment programs in the community, (3) local community centers, and (4) university counseling centers (e.g., University of Pittsburgh Student Counseling Center) and (5) through word of mouth. Study candidates who called the telephone number listed on the fliers were invited to participate in a telephone

screening to determine preliminary eligibility for participation. Candidates deemed eligible based on the telephone screening were invited to visit the research office for an in-person evaluation. Participants provided written informed consent after all study procedures had been fully explained.

Potential participants were excluded if they (1) met DSM-IV criteria for a lifetime psychotic disorder, (2) had a major medical illness that influences the central nervous system (CNS) and might be associated with organic personality changes (e.g., seizure disorder, lupus), or (3) had an organic mental disorder or mental retardation. Women who had received electroconvulsive therapy (ECT) within the previous 6 months were also excluded because this treatment can cause short-term cognitive impairments that might impact the assessments. Finally, women who had engaged in exclusively same-gender sexual behavior over the past 5 years were excluded because their sexual behavior and risks for pregnancy and STDs are not comparable to those of women who predominantly engage in heterosexual sexual behaviors.

The study sample included 215 women between the ages of 18 and 40 years who met DSM-IV criteria either for BPD or for a current, nonpsychotic Axis I disorder. Of the participants, 137 (64%) were European American, 73 (34%) were African American, and 5 (2%) were Asian American. For the present analyses, European American and Asian American participants ($n = 142$, 66%) were combined to form a comparison group for the African American participants. This sample was primarily young, single, and of low socioeconomic status (SES). The mean age was 26.9 years (standard deviation [SD] = 6.6), and the majority of the sample (68%) were <age 30. Most of the women had never married (83%); only 8% were currently married. The majority of participants had completed high school (91%). In terms of employment, 40% of the sample was employed at least part-time, 23% received welfare or disability payments, 19% were students, and 17% were unemployed. Seventy percent of the women reported a personal annual income <US\$15,000. The majority of women ($n = 158$, 74%) were currently receiving some type of psychological or psychiatric outpatient treatment.

All participants met DSM-IV criteria for at least one current DSM-IV Axis I disorder. The most frequent lifetime Axis I diagnoses not caused by substance use were major depressive disorder (MDD) (84%), panic disorder (45%), and social phobia (34%). In terms of personality disorders, 113 women (53%) met DSM-IV criteria for BPD. Two thirds of the sample (69%) met criteria for at least one lifetime diagnosis of substance abuse or dependence: alcohol (54%), cannabis (33%), cocaine (20%), polysubstance (12%), opioid (9%), stimulant (4%), hallucinogen (4%), and sedative (3%).

Assessment

Diagnostic evaluations. Axis I disorders were assessed with the Structured Clinical Interview for DSM-IV (SCID-I).²⁹ Personality disorder diagnoses were assigned based on results of the Structured Interview for DSM-IV Personality (SIDP-IV).³⁰ To obtain a more differentiated index of BPD severity, BPD criteria were scored on a 6-point scale³¹ in addition to the conventional 4-point scale used with the SIDP-IV. BPD dimensional scores were created by summing the scores of each of the nine BPD criteria. Dichotomous variables were created for three categories of SUD diagnoses: (1) lifetime alcohol abuse or dependence, (2) lifetime cannabis

abuse or dependence, and (3) lifetime cocaine, heroin, or polysubstance abuse or dependence.

Interviewers were female mental health professionals with a Ph.D., master's degree, or bachelor's degree in psychology or social work, who had at least 2 years experience in evaluating psychiatric populations and were trained to administer the diagnostic interviews following guidelines provided in the SCID-I and SIDP-IV. After completion of all study assessments, the primary interviewer met with the primary investigator (PI) to review all diagnostic data, demographic information, and psychiatric indicators (e.g., general psychiatric symptoms, anxiety, depression, social adjustment, and psychiatric treatment history). Consensus diagnoses were formulated based on the integration of this information, with an emphasis on functional impairment and longitudinal consistency.

Sexual and reproductive history. Participants were interviewed about their lifetime sexual and reproductive history using the Sexual Health and Reproductive History Interview³² during their fourth (last) visit to the research office. By this time, after spending 8 hours or more with the study staff, participants were expected to have developed a trusting rapport with the study team. Several additional strategies were adopted to enhance the validity of self-reports, including those recommended by Weinhardt et al.,³³ such as introducing the questions after building rapport and explaining the purpose of the study, using language that is easily understood, asking questions in a direct fashion, and placing the burden of denial on participants.

We obtained a Certificate of Confidentiality (COC) from the National Institute of Drug Abuse (NIDA). With this federal certificate, the investigators cannot be forced, for example by court order, to disclose information that may identify participants in any federal, state, or local court or in any administrative, legislative, or other proceeding. This is explained to participants to encourage them to share sensitive information with us. The COC was acquired to provide additional protection to participants and to help them feel safer sharing sensitive or illegal behaviors with investigators about substance use, risky sexual behaviors, and exchanging sex for trade. Additionally, interviewers were carefully trained to adopt a nonjudgmental communication style and provide motivating instructions that encouraged honesty.

Participants' age of first voluntary vaginal-penile sexual intercourse was used to create an early sex variable to identify participants whose first intercourse occurred before the age of 14 years (early sex, 14%). The women provided their lifetime number of pregnancies and their age at each pregnancy, which was used to identify teenage pregnancies. In terms of sex partners, participants reported on the lifetime number of male and female sexual partners, male sexual partners who also had sex with other men (MSM), and sexual partners who were intravenous (IV) drug users. The women were also asked if they had ever engaged in sexual behavior in exchange for a place to stay, drugs, or money, and this was used to create a dichotomous variable representing ever engaging in sex trade.

STDs. Self-reported lifetime STD history was also assessed as part of the Sexual Health and Reproductive History Interview. Participants reported their history of and frequency of the most common STDs, including gonorrhea, *Chlamydia*, trichomoniasis, genital herpes, genital warts, human papillo-

mavirus (HPV), syphilis, hepatitis B, hepatitis C, and HIV. STDs were grouped as viral or bacterial and also examined as a dichotomous outcome (ever/never had an STD). Roughly half (49%) of the women in this sample reported a lifetime STD. Nearly a quarter (24%) reported contracting a viral infection, such as HPV (18%), genital warts (6%), or genital herpes (5%), and 36% reported contracting a bacterial infection, such as *Chlamydia* (24%) or gonorrhea (11%). For the purposes of this study, trichomoniasis (a parasitic infection reported by 16% of the participants) was treated as a bacterial infection because it can be treated with an antibiotic. There were no reported cases of hepatitis B or HIV and only one case of syphilis reported by the sample. The lifetime number of different viral STDs and number of bacterial infection episodes reported by a single participant ranged from 0 to 14 (mean = 1.33, SD = 2.04).

Socioeconomic status. Socioeconomic status (SES) was assessed with Hollingshead's four-factor index of social status, which takes into account participants' marital status, educational attainment, and occupational status.³⁴ Students with no other occupation (19%, ranging in age from 18 to 24 years) were assigned their parents' SES score.

Procedure

The current study is part of a much larger study, the Women's Personality Study. During the first visit at the Women's Personality Study, evaluators described the study protocol, solicited written informed consent, and administered a confirmation screening. Those who passed the confirmation screening were administered the SCID-I. During the second visit, participants were administered the SIDP-IV and a demographic background interview. During the third visit, participants completed a series of neurocognitive tests and psychiatric symptom interviews. During the fourth (last) visit, evaluators administered the Sexual Health and Reproductive History Interview. Participants were reimbursed \$280 for completing the entire study. Only 5 participants dropped out of the study before completing all four assessment sessions, yielding an attrition rate of 2.27%. The present study was approved by the University of Pittsburgh Institutional Review Board.

Statistical analyses

The participants were divided into four groups as a function of BPD diagnosis and lifetime SUD. Women with BPD were divided into a BPD/no SUD group ($n = 24$, 21%) and a BPD/SUD group ($n = 89$, 79%). The BPD/SUD group included women who met DSM-IV criteria for a diagnosis of lifetime substance abuse or dependence consequent to use of any of the substances listed in the DSM, including alcohol. To determine if BPD itself is associated with additional risk for self-reported early, unprotected, or risky sex and STDs, beyond the risk of other psychiatric disorders, both BPD groups were compared to women with a current nonpsychotic Axis I disorder but no BPD (no BPD group, $n = 102$). The no BPD group was divided into a no BPD/no SUD group ($n = 42$, 41%) and a no BPD/SUD group ($n = 60$, 59%).

In the first set of analyses, we compared risk factors for STDs and prevalence of reported STDs between the BPD/SUD and BPD/no SUD groups. Outcomes for both BPD groups were then compared to those of the no BPD groups.

For the purpose of examining health disparities associated with race, we compared risk factors for STDs and self-reported history of STDs of African American participants to those of the European American and Asian American participants. Preliminary analyses were conducted to check for between-groups differences in key demographic and psychiatric variables. Cramer's V tests were used to compare dichotomous outcomes, such as ever married, among the four groups. Analyses of variance (ANOVA) were used to compare group means on continuous outcomes, such as age and borderline personality dimensional scores. Means for the four groups were then compared in *post-hoc* analyses (Tukey's tests were used to compare all groups to each other).

In the second set of analyses, hierarchical logistic regression analysis was conducted on the entire sample ($n = 215$) to test if race and BPD traits were significant predictors of self-reported STD, after controlling for age, SES, SUD, and sex trade. Accordingly, demographic characteristics (age, race, and SES scores) were entered into the first step. BPD dimensional scores were entered into the second step to test if BPD severity was associated with STDs in all participants, after controlling for demographic characteristics. The third step tested the independent effects of the following three categories of lifetime SUDs: (1) alcohol, (2) cannabis, and (3) cocaine/opioid/polysubstance disorders. Lifetime sex trade was entered in the next to last step because Chen et al.¹⁵ reported that engaging in sex trade mediated the effect of BPD and SUD on STDs. A race $\times$ BPD interaction term was entered into the final step and then removed if it was not significant.

Results

Demographic and psychodiagnostic characteristics as a function of diagnosis

Table 1 depicts key demographic and diagnostic variables for the no BPD/no SUD, no BPD/SUD, BPD/no SUD, and BPD/SUD groups. There were no significant differences in

age, race, or marital status among the four groups. Women in the no BPD/SUD group were the most likely to have dropped out of high school ($V = 0.19$, $p < 0.05$), and women in the no BPD/no SUD group had significantly higher SES than women in the other three groups ($F = 3.23$, $p < 0.05$). As expected, women in the no BPD groups had significantly lower BPD dimensional scores compared to women in the BPD groups ($F = 182.44$, $p < 0.001$). Women in the BPD groups were more likely to have a lifetime diagnosis of panic disorder or post-traumatic stress disorder (PTSD) compared to women in the no BPD groups ($V = 0.24$, $p < 0.01$), who were more likely to have a lifetime diagnosis of MDD than women with BPD ($V = 0.19$, $p < 0.05$). Women in the BPD/SUD group were more likely to have lifetime bipolar I disorder compared to women in the other three groups ($V = 0.31$, $p < 0.01$). There were no significant differences in diagnoses of social phobia, generalized anxiety disorder (GAD), or obsessive-compulsive disorder (OCD) among the four groups of participants.

Risk factors and prevalence of self-reported STDs as a function of diagnosis

The self-reported risk factors for STDs and self-reported prevalence of STDs in each group are presented in Table 2. For the majority of STD risk factors examined in the bivariate analyses, BPD appeared to confer additional risk for STDs above and beyond the contribution of an SUD. For example, women with BPD/SUD were nearly twice as likely to have had ≥ 20 male sex partners ($V = 0.43$, $p < 0.001$), MSM sex partners ($V = 0.24$, $p < 0.01$), and IV drug-using sex partners ($V = 0.28$, $p < 0.001$) as women with no BPD/SUD. Moreover, 44% of the women with BPD/SUD had engaged in sex trade compared to 13% of the women with no BPD/SUD ($V = 0.44$, $p < 0.001$). BPD was also associated with additive risk of any STD ($V = 0.32$, $p < 0.001$), trichomoniasis ($V = 0.24$, $p < 0.01$), *Chlamydia* ($V = 0.24$, $p < 0.01$), and gonorrhea ($V = 0.20$, $p < 0.05$). There were no significant differences in self-reports of HPV, genital warts, or genital herpes among the four groups.

TABLE 1. CHARACTERISTICS OF WOMEN WITH AND WITHOUT BORDERLINE PERSONALITY DISORDER AND SUBSTANCE USE DISORDER

	No BPD/no SUD n = 42	No BPD/SUD n = 60	BPD/no SUD n = 24	BPD/SUD n = 89
Demographic data				
Mean age in years (SD)	25.02 (5.3)	7.08 (7.0)	25.04 (6.4)	27.71 (6.8)
African American	31%	42%	25%	33%
Lifetime married	10%	17%	17%	20%
High school dropout	5%	17%*	—	8%
Mean SES-Hollingshead (SD)	39.95 (14.3)*	32.83 (12.6)	34.58 (14.3)	31.97 (15.0)
Psychiatric data				
Mean BPD scores (SD)	14.52 (3.2)*	18.38 (3.7)*	29.75 (4.5)	31.51 (5.6)
Lifetime major depression	93%*	90%*	79%	76%
Lifetime bipolar I disorder	0%	5%	8%	24%*
Lifetime panic disorder	36%	30%	50%*	57%*
Lifetime social phobia	33%	35%	33%	35%
Lifetime PTSD	7%	13%	29%*	34%*
Lifetime GAD	38%	25%	38%	30%
Lifetime OCD	7%	5%	13%	10%

* $p < 0.05$.

BPD, borderline personality disorder; GAD, generalized anxiety disorder; OCD, obsessive-compulsive disorder; PTSD, posttraumatic stress disorder; SD, standard deviation; SES, socioeconomic status; SUD, substance use disorder.

TABLE 2. PREVALENCE OF SEXUALLY TRANSMITTED DISEASE RISK FACTORS AND SEXUALLY TRANSMITTED DISEASES IN WOMEN WITH AND WITHOUT BORDERLINE PERSONALITY DISORDER AND WITH AND WITHOUT SUBSTANCE USE DISORDER

	No BPD/no SUD n = 42	No BPD/ SUD n = 60	BPD/no SUD n = 24	BPD/ SUD n = 89
STD risk factors				
Early onset of sexual intercourse ^a	5%	15%	5%	21%
Teenage pregnancy ^b	10%	42%*	13%	38%*
20+ male partners	7%	27%*	13%	56%*
Sex trade	—	20%*	—	44%*
MSM sex partners	7%	13%*	8%	28%*
IDU sex partners	7%	18%*	13%	36%*
STDs				
Any STD	31%*	48%*	21%	64%*
Any bacterial STD ^c	14%	45%	8%	47%
Any viral STD	21%	22%	13%	29%
<i>Chlamydia</i>	10%	27%*	8%	34%*
HPV	17%	15%	13%	21%
Trichomoniasis	7%	17%*	—	25%*
Gonorrhea	—	13%*	4%	16%*
Genital warts	7%	3%	—	8%
Genital herpes	2%	7%	—	7%

* $p < 0.05$.

^aOnset of voluntary vaginal-penile sexual intercourse before the age of 14 years.

^bFirst pregnancy before the age of 19 years.

^c*Trichomonas vaginalis* was included in the bacterial infection summary variable, even though it is a parasite, because it is treated with an antibiotic.

STD, sexually transmitted disease; MSM, men who have sex with men; IDU, injection drug user; HPV, human papillomavirus.

Demographic and psychodiagnostic characteristics as a function of race

Table 3 depicts demographic, psychodiagnostic, and STD risk differences between the African American and European American and Asian American participants. There were no between-group differences in the diagnosis of any lifetime SUD or diagnosis of a SUD related to either alcohol or cocaine/opiate/polysubstance use, but African American women were more likely to report having had a cannabis use disorder ($V = 0.21$, $p < 0.01$). As seen in Table 3, there was evidence from the bivariate analyses that African American women were more likely to engage in earlier sexual intercourse ($V = 0.18$, $p < 0.01$) and more likely to have a teenage pregnancy ($V = 0.33$, $p < 0.001$) compared to non-African American women. Non-African American women, on the other hand, were more likely to have MSM sex partners ($V = 0.20$, $p < 0.01$). Consistent with health disparities reported in the literature, African American women were more likely to report a bacterial STD ($V = 0.42$, $p < 0.001$), such as gonorrhea or *Chlamydia*, than European American or Asian American women.

Multivariate model of any lifetime STD

The results of a logistic regression model predicting any self-reported lifetime STD are shown in Table 4. This equation

TABLE 3. SAMPLE CHARACTERISTICS, PSYCHIATRIC DIAGNOSES, AND RISK FOR SEXUALLY TRANSMITTED DISEASES AS A FUNCTION OF RACE

	African American women n = 73	European American and Asian American women n = 142
Mean age in years (SD)	28.7 (7.6)	26.0 (5.9)*
High school dropout	19%	3%*
Mean SES (SD)	34.0 (16.8)	38.4 (16.6)
BPD diagnosis	48%	56%
Mean BPD dimensional scores	23.8 (7.6)	24.7 (9.1)
Lifetime alcohol use diagnosis	52%	54%
Lifetime cannabis use diagnosis	47%	26%*
Lifetime cocaine/heroin/ polysubstance use diagnosis	29%	38%
Early onset of sexual intercourse	23%	10%*
Mean lifetime male sex partners (SD)	20.3 (34.9)	23.9 (38.3)
Sex trade	19%	25%
MSM sex partners	10%	22%*
IDU sex partners	18%	25%
Teenage pregnancy ^a	52%	25%*
Ever had a viral STD	21%	25%
Ever had a bacterial STD	64%	25%*
Mean number of STDs (SD)	2.2 (2.6)	0.87 (1.6)*

* $p < 0.05$.

^aFirst pregnancy before the age of 19 years.

accounted for 19% of the variance in STDs in women with and without BPD (Cox and Snell $R^2 = 0.19$, model chi-square 43.44, $p < 0.001$). Higher BPD scores and African American race were risk factors for any STD, even after controlling for age and SUDs.

Discussion

This is the first study to examine risk factors for STDs and self-reported rates of STDs in African American women with and without BPD and to compare their risk for STDs to women with and without BPD who are not African American. All the women in this sample, including those with another Axis I disorder and women who were not African American, were more likely to report STDs than would be expected in the general population. Almost 1 in 4 (24%) of the women reported having been infected with *Chlamydia* compared to an incidence rate of 3.2% for women aged 15–24 (the group with the highest incidence rate) in Allegheny County,³⁵ Pennsylvania, where the city of Pittsburgh is located. Gonorrhea was reported in <2% of women aged 20–39 years in Allegheny County compared to 11% reported by our sample. Sixteen percent of our participants reported having had trichomoniasis, compared to 3% of a national sample of women of reproductive age.³⁶ Although two thirds of our participants were European American or Asian American, the rate for trichomoniasis in the present sample is much closer to the national rate for African American women, 13%. Although we are comparing our self-report rates with biologically confirmed rates, these findings are consistent with previous studies of STDs in individuals with SMI,^{9–11} providing converging evidence that individuals with SMI may be at much higher risk of HIV infection than other individuals.

TABLE 4. HIERARCHICAL LOGISTIC REGRESSION MODEL FOR LIFETIME SEXUALLY TRANSMITTED DISEASES (N=215)

	Predictors	Beta	SE	Wald	Exp (B)	Confidence interval
Step 1	African American	0.74	0.34	4.78*	2.10	1.08-4.07
	Age	0.07	0.03	7.40*	1.07	1.02-1.13
	SES	-0.02	0.01	2.68	0.98	0.96-1.00
Step 2	BPD dimensional score	0.05	0.02	4.91*	1.05	1.01-1.09
Step 3	Lifetime alcohol use diagnosis	0.09	0.34	0.07	1.09	0.56-2.15
	Lifetime cocaine or opiate or polysubstance use disorder diagnosis	-0.37	0.42	0.80	0.69	0.30-1.56
Step 4	Lifetime cannabis use diagnosis	0.93	0.35	7.12*	2.54	1.28-5.03
	Lifetime sex trade	0.30	0.45	0.45	1.35	0.56-3.26

* $p < 0.05$.

Although rates of self-reported STDs were high in this study compared to the numbers reported for the general population, African American women remained disproportionately affected. They were more likely to report having multiple STDs, especially bacterial STDs, consistent with the greater disparity seen in bacterial infections in epidemiological studies. The African American women in this study were not exposed to more sexual partners, more likely to have ever been engaged in sex trade, or more likely to have a history of cocaine, heroin, or polysubstance abuse or dependence compared to non-African American women. However, they were more likely to report having a cannabis use disorder, and this SUD was specifically associated with STDs in the current study, consistent with the literature on cannabis use and risky behavior.³⁷⁻³⁹ In addition, African American race was a significant predictor of risk for ever having had an STD in the multivariate models, even after controlling for age, SUD, and BPD dimensional scores. Therefore, the health disparities seen in the general population appear to carry over into this psychiatric sample. The results of these analyses suggest that BPD presented an additive risk for African American women, rather than a multiplicative one, because the race×BPD interaction term was not a significant predictor of STDs.

To our knowledge, this is the second study to compare rates of risky behavior and self-reported STDs in individuals with BPD who did or did not have an SUD. Chen et al.¹⁵ divided the BPD sample into those with and without a current SUD to predict the lifetime risk for STDs, whereas we used lifetime SUD and lifetime STDs to create a BPD/SUD group for comparison. Nonetheless, our results are consistent with those of Chen et al.¹⁵: a dual diagnosis of BPD/SUD did appear to confer additional risk for any STDs; 64% of the women in this group reported a STD. However, the addition of a comparison group of women without BPD in this study demonstrates that rates of various self-reported STDs were not necessarily higher in the women with BPD/no SUD than in the women with another Axis I disorder with a history of SUD. In fact, women with SUD and another diagnosis in this study reported more STD risk factors and more STDs than women with BPD/no SUD. These findings confirmed that SUD may be an important pathway of risk for HIV among individuals with SMI, as suggested by Meade and Sikkema.¹¹ The results of this study suggest, however, that the combination of BPD and SUD is of particular concern for healthcare providers interested in the reproductive health of women

with mental illness. It is also important to note that the inclusion of a considerably higher percentage of African American women in the current study may influence our results, as African American women are at much higher risk of STDs than American women from other racial/ethnic groups.

BPD is a disorder that mimics the course of other impulsive disorders, such as SUD, beginning in adolescence and peaking in young adulthood.^{1,40,41} Thus, symptoms may first appear when young women become sexually active and may contribute to earlier and riskier sexual behavior, placing these women at greater risk of STD and HIV infection. The disorder is most severe during the prime childbearing years, when the rates of STDs are also highest in the American population. However, the association between BPD and self-reported STDs is complex. Impulsivity in BPD may be expressed differently as a function of race,⁴² and there may also be important differences in the diagnosis and treatment of STDs in African American patients.⁴³ Moreover, there may be different pathways of exposure to infection via cannabis use disorder or opioid/cocaine disorders as a function of race. It is important to examine risk for STDs in more diverse populations of people with BPD.

Impulsivity is commonly cited as an underlying feature of both disorders that may help explain the association between SUD and BPD.^{18, 44-46} Participants from the no BPD/SUD groups reported more STD risk factors than women in the BPD/no SUD group, and women from the BPD/SUD group appeared to be at greatest risk for STDs. Even though the results of one study suggest that comorbid SUD may be more important for HIV risk in individuals with mood disorders than in individuals with BPD,¹² our findings suggest that comorbid SUD might be considered a red flag for STD risk among female patients with BPD.

By entering different categories of SUD separately in the regression analysis, we were able to determine that cannabis use disorder in particular was the SUD most closely associated with STD risk in this sample of women. We currently do not have data to explain why cannabis use disorders are more closely associated with STDs than other common SUDs among these women. However, there are many potential pathways that could be explored in future research. For example, women with comorbid BPD and cannabis use disorder may choose sex partners from riskier networks than women with alcohol use disorders or other SUDs. There is also the possibility that they may be less likely to consistently use

barrier methods of contraception during intercourse or more likely to engage in more anal sex than women without cannabis use disorders. Finally, there is evidence from both the human and animal literature that cannabinoids may impair the immune system.⁴⁷

Future research may also compare the effect of BPD with the effect of multiple comorbid Axis II diagnoses. Recent studies have demonstrated that the frequency of additional personality disorders may influence the health of patients more than any specific personality disorder.^{48,49} With respect to risky sexual behavior, clinical lore would suggest that personality traits capturing the cluster B personality disorders (i.e., antisocial, borderline, histrionic, and narcissistic) are of particular relevance.

Limitations

One limitation of this study was the reliance on self-report for a history of STDs, which can be problematic because of the stigma associated with STDs and the fact that many infected individuals are asymptomatic and may be unaware of having an STD. However, several strategies have been adopted to enhance the validity of these self-reports. A Certificate of Confidentiality from NIDA was obtained for this project, and participants were informed about the meaning of this certificate. In addition, interviewers were trained to adopt a non-judgmental communication style and provide motivating instructions that encouraged honesty and to record possible STD symptoms during the Sexual Health and Reproductive History interview. The collection and assay of biological specimens are not only perceived by participants as invasive but also provide time-limited data, capturing only current infections and outbreaks and not lifetime acquisition of STDs. Most of the women in our study were in their 20s, suggesting that they only had to recall if they had a diagnosis in the past decade or so. Nevertheless, STDs may have been underestimated in the current study because participants may not have known they were infected.

There were other limitations to the study. The cross-sectional design did not permit us to examine temporal associations between diagnoses with SUD, BPD, other psychiatric disorders, and STDs. The sample was self-referred into the study from numerous recruitment sites and may have been motivated by the financial incentive, although this was meager considering how much time and effort the participants contributed to this study. It was difficult recruiting women of color in Pittsburgh; therefore, no data were collected on women of Hispanic or Native American origin. For example, Latin Americans represent only 1.5% of the local population of Allegheny County, and Latina women could not be recruited in sufficient numbers for analysis. Additionally, there were not many participants with BPD without an SUD diagnosis, as the disorders frequently co-occur, so this subgroup was relatively small.

Conclusions

Severity of BPD symptoms and African American race were both associated with STDs in the current study of women with mental illness, even after controlling for SUD. The results of this study suggest that women with BPD may be at higher risk of contracting HIV, especially if they also have a history of cannabis use disorder.

Disclosure Statement

The authors have no conflicts of interest to report.

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