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Pregnancies, Abortions and Births in Women with and without Borderline Personality Disorder (BPD)

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Abstract

Background—The purpose of this study was to examine history of pregnancies among women with and without borderline personality disorder (BPD), to determine whether BPD symptoms are associated with teenage pregnancies, unplanned pregnancies, (elective and spontaneous) abortions, and live births.

Methods—Three hundred seventy-nine 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 reproductive health interview. African-American (AA) women were oversampled, because little is known about BPD in AA women and they are at greater risk of teenage pregnancy, unplanned pregnancies and spontaneous abortions.

Results—BPD symptom severity was associated with a teenage pregnancy, even after controlling for race and socioeconomic status. Symptom severity was also associated with unplanned pregnancies and live births, but only in women without a history of substance use disorder. BPD symptom severity was not associated with abortion.

Conclusions—Women with BPD become pregnant and have children, often during the period when BPD symptoms emerge and intensify. They are at increased risk of teenage pregnancies and unintended pregnancies, compared to women with Axis I disorders. Treatment planning for this population should include attention to their reproductive health and better integration of physical and mental health services.

INTRODUCTION AND BACKGROUND

Borderline personality disorder (BPD) is a severe mental illness (SMI) that affects 1.6% of adults in the US (Lenzenweger et al., 2007), more individuals than autism or schizophrenia. Up to 23% of psychiatric outpatients (Korzekwa et al., 2008) and 40–44% of psychiatric

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inpatients (Marinangeli et al., 2000) have been diagnosed with BPD. Personality disorders are a class of mental disorders in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2000) describing enduring traits and behaviors that are outside societal norms, and that cause significant impairment in functioning.

BPD is a personality disorder characterized by a mixture of emotional vulnerability and behavioral dysregulation (Linehan, 1993) that is pervasive. Diagnostic criteria for BPD include having five of the following longstanding or recurrent traits and behaviors: fear of abandonment; unstable and intense relationships; unstable self-image or sense of identity; impulsive and self-destructive behavior in two or more areas such as spending, reckless driving, sexual behavior, substance abuse and binge-eating; repeated suicidal or self-harming behavior or threats; instability of mood; persistent feelings of emptiness; difficulty controlling anger or inappropriate anger; paranoid thinking when stressed. Additionally, many individuals with BPD have other mental health problems such as mood disorders and/or substance abuse or dependence (Stinson et al., 2008). BPD symptoms usually appear in late adolescence and become severe during the ages when women are most fertile.

Women with mental illness are just as likely to become pregnant and give birth as other women (Vesga-López et al., 2008). The combination of emotion and behavioral dysregulation experienced by women with BPD may place them at greater risk of unplanned pregnancies. Although there are no studies of pregnancies or births in women with BPD, studies of sexually transmitted disease (STD) in women with BPD suggest that they may be more likely to have early and unprotected sexual intercourse than women without SMI (Chen et al., 2007) and women with other mental illness (De Genna et al., 2011). Greater sexual impulsivity, higher prevalence of sexual abuse history (Bradley, Jenei, & Westen, 2005) and comorbid substance use disorders (SUDs) may all contribute to a higher risk of unplanned pregnancies.

Most of the pregnancy literature on women with SMI has focused on women with schizophrenia. Psychotropic medications used by women with SMI may negatively impact the developing fetus, especially during embryogenesis (third through eighth week of gestation). Conversely, women whose psychiatric illness is untreated or undertreated may not receive adequate prenatal care, use more tobacco and controlled substances, and have difficulties bonding with their newborns (ACOG, 2008). Motherhood is rewarding for women with SMI but they are more likely to be single mothers, live in dangerous environments, and lose custody of their children. Moreover, they may face discrimination from healthcare providers and social service workers as a consequence of their erratic behavior (Montgomery, Brown, & Forchuk, 2011).

No studies to date have examined abortions in women with BPD. However, women with BPD often have comorbid conditions associated with abortion such as SUDs, depression and anxiety. The results of several large population studies suggest that elective abortions are more common among women with psychiatric disorders. For example, in the Christchurch Health and Developmental Study, spontaneous abortions were associated with mental health problems but the number of live births was not associated with mental illness (Fergusson, Horwood, & Boden, 2008). Both types of abortion occur disproportionately among women living in poverty, African-American (AA) women (Jones, Finer, & Singh, 2010), and as the result of teenage and unplanned pregnancies (Finer & Henshaw, 2006).

It is crucial to learn about pregnancies, abortions and births among women with BPD because they are women with sexual and reproductive lives. BPD traits such as impulsivity and risk-taking behavior may be associated with increased risk of pregnancies that are too early, unplanned, and result in abortions and miscarriage. To our knowledge, no studies have

examined pregnancy or pregnancy outcomes in women with and without BPD. Based on previous findings that BPD severity predicts risky sexual behavior and STDs (Chen et al., 2007; De Genna et al., 2011) we hypothesized that 1) women with more BPD symptoms (greater symptom severity) have had a greater number of teenage pregnancies, unplanned pregnancies, abortions, and live births when compared to women with Axis I psychiatric disorders who do not have many BPD symptoms; 2) women with greater BPD symptom severity have had more live births than women with Axis I disorders, because of the association between teenage pregnancies and higher fertility (Guzzo & Furstenberg, 2007).

METHODS

Participants

Women were recruited as part of a cross-sectional study examining the association between drug abuse and risky sex among women with BPD. The Institutional Review Board of [blinded for peer review by *WHI* editors] reviewed and approved of this study. Participants were recruited through fliers posted at (a) psychiatric outpatient programs, (b) substance use treatment programs in the community, (c) local community centers, (d) university counseling centers, and (e) through word-of-mouth. Potential participants were excluded if they: (a) met DSM-IV criteria for a lifetime psychotic disorder, (b) had a major medical illness that influences the central nervous system and might be associated with organic personality changes (e.g., seizure disorder), or (c) had an organic mental disorder or mental retardation. Women who had engaged in exclusively same-gender sexual behavior over the past 5 years were also excluded.

The study sample included 379 women between the ages of 18 and 40 years who either met DSM-IV criteria for BPD or for a current, non-psychotic DSM-IV Axis-I disorder. This sample was not representative of the city of Pittsburgh's general population, because AA women were oversampled. Our study includes twice as many AA women with BPD than the most comprehensive study on BPD to date, the Collaborative Longitudinal Personality Disorders Study (Skodol et al., 2005). This is important because AA women are at greater risk of teenage pregnancies (Hamilton, Martin, & Ventura, 2010), unplanned pregnancies (Finer & Henshaw, 2006), abortions (Jones et al., 2010) and live births (Dye, 2008).

Assessment

Diagnostic evaluations—Axis-I disorders were assessed with the Structured Clinical Interview for DSM-IV (SCID-I: First et al., 1995). Personality disorder diagnoses were assigned using the Structured Interview for DSM-IV Personality (SIDP-IV: Pfohl, Blum, & Zimmerman, 1997). Interviewers were female mental health professionals from psychology or social work with at least 2 years' experience evaluating psychiatric populations and trained to administer the interviews following guidelines provided in the SCID-I and SIDP-IV.

For those participants who met criteria for a BPD diagnosis, we created a measure of BPD symptom severity using a six-point scale to score participants' responses for each of the nine BPD criteria on the SIDP-IV (Clarkin, Hull, & Hurt, 1993). Following completion of all study assessments, the primary interviewer met with the 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 lifetime sexual and reproductive history using the Sexual Health and Reproductive History Interview (Gold & Feske, unpublished interview) during their last (fourth) study visit. After spending 8 hours or more with 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 (1998) such as explaining the purpose of the study, using easily understood language, asking direct questions, and placing the burden of denial on participants. We obtained a Certificate of Confidentiality (COC) from the National Institute of Drug Abuse (NIDA) to provide additional protection to participants and help them feel safer sharing sensitive and/or illegal behaviors with investigators. Additionally, interviewers were carefully trained to adopt a non-judgmental communication style and provide motivating instructions that encouraged honesty.

Participants' age of first *voluntary* vaginal-penile sexual intercourse was used to identify participants whose first intercourse occurred before the age of 14 (early sex; 14%). This age is a common cut-off used in the literature (e.g., Kaestle et al., 2005; Olesen et al., 2011) and in reports from large studies such as the National Survey of Family Growth and the National Longitudinal Study of Adolescent Health (Add Health).

The women were asked about their lifetime number of pregnancies, age at each pregnancy (used to identify teenage pregnancies) and the outcome of each pregnancy. For each pregnancy, women were asked whether the pregnancy was planned. Negative responses were coded as unplanned pregnancies (i.e., unintended or mistimed). Women also reported the outcome of each pregnancy: elective abortion, spontaneous abortion, stillbirth, ectopic, or live birth.

Socioeconomic status (SES)—SES was assessed with Hollingshead's (1975) four-factor index of social status, which takes into account participants' marital status, educational attainment, and occupational status. Full-time students with no other occupation were assigned their parents' SES score.

Procedure

Recruitment for the study began in 2007 and the assessments took place at a private suite of offices on campus from 2007–2011. During the first visit, evaluators described the study protocol, solicited written informed consent, and administered a confirmation screen to ensure that the women recruited for the study met inclusion criteria. Those who met study inclusion criteria 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 and last visit, evaluators administered the Sexual Health and Reproductive History Interview. Participants were reimbursed \$280 for completing the entire study. Only 10 participants dropped out of the study prior to completing all four assessment sessions, yielding an attrition rate of 2.57%.

Statistical Analyses

This is a report of analyses from a large cross-sectional study of drug use and risky sex in women with and without BPD. The purpose of the secondary data analysis was to examine the history of pregnancies among women with and without borderline personality disorder (BPD); to determine whether a BPD diagnosis was uniquely associated with teenage pregnancies, unplanned pregnancies, (elective and spontaneous) abortions, and live births; and whether there was a dose-response relation between BPD symptom severity and these reproductive outcomes. Univariate analyses were conducted to examine the variables for

normalcy, make transformations as necessary, and to characterize the sample (provide demographic, reproductive and mental health data about the participants).

Bivariate analyses were used to identify correlates of pregnancy and birth outcomes, and to compare the prevalence of teenage pregnancies, unplanned pregnancies, and abortions (elective and spontaneous) in women as a function of BPD diagnosis and race. We also descriptively compared rates of live births in this sample to rates of live births in the US by race. BPD severity scores were used in correlational analyses to investigate dose-response associations with increasing BPD severity, whereas BPD diagnoses were used in the cross-tabulations by race and outcome.

For the multivariate analysis, BPD traits were regressed on teenage pregnancy, unplanned pregnancy, abortion, and live births using logistic regression. Demographic characteristics were entered first. BPD severity scores were entered next, to test whether they were associated these outcomes after controlling for demographics. For the analyses examining teenage pregnancy, early sex (no/yes) was included as a covariate. For the analyses examining abortion, sex trade (no/yes) was included as a covariate. The next step tested the effects of lifetime diagnoses of SUD. Interaction terms (BPD \times Race, BPD \times SUD, Race \times SES) were entered into the final step and removed if they were not significant.

RESULTS

Univariate Analyses

Demographic Characteristics—Of the participants, 224 (59%) were White, 148 (39%) were AA, 5 (1%) were Asian, 1 (.3%) was American Indian and 1 (.3%) was Native Hawaiian. Three percent of the participants were also Hispanic. For the regression analyses, White, Asian, Native-American and Native-Hawaiian participants ($n = 231$, 61%) were combined to form a comparison group for the AA group ($n = 148$, 39%).

This sample was primarily young, single and of low socio-economic status (SES). The mean age was 26.8 years ($SD = 6.6$) and the majority of the sample (69%) was less than age 30 years old. Most of the women had never married (82%); only 8% were currently married. The majority of participants had completed high school (68%) and 49% reported some additional education. Ninety participants (24% of the sample) were currently students; 44% of the sample was employed at least part-time; 27% received welfare or disability payments; 29% were unemployed. Almost half of the women ($n = 168$; 44%) were currently receiving psychological or psychiatric outpatient treatment.

Reproductive Characteristics—In this section, we provide univariate results for the reproductive health outcomes in the study. Two cut-offs were used for teenage pregnancy – pregnancy by age 18 (24%) and pregnancy by age 20 (35%). Multiple teenage pregnancies were common in this study: 8% of the sample had been pregnant two or more times by age 18 and 14% had been pregnant at least twice by age 20. Half of the women in the sample reported an unplanned pregnancy, including 30% who reported 2 or more unplanned pregnancies. Roughly one in five women reported having had an abortion (22%) or miscarriage (18%). Fourteen percent had experienced 1 birth and one-quarter of the sample reported 2 or more births ($M = 0.95$, $SD = 1.59$: range = 0–10).

Mental Health Characteristics—All participants met DSM-IV criteria for at least one current DSM-IV Axis-I disorder. Two-thirds (69%) met criteria for at least one lifetime diagnosis of substance abuse or dependence and nearly half (45%) met criteria for 2 or more diagnoses including alcohol (53%), cannabis (38%), cocaine (19%), opioid (10%), polysubstance (9%), stimulant (3%), hallucinogen (3%), and sedative (2%) abuse or

dependence. Due to the prevalence of one or more lifetime SUD diagnoses, an ordinal variable was created with 3 levels: no SUD (31%), 1 SUD (24%), and 2 or more SUDs (45%). The most frequent lifetime Axis-I diagnoses other than SUD were major depressive disorder (84%), panic disorder (37%), social phobia (29%), and generalized anxiety disorder (24%). Two hundred and two women (53%) met DSM-IV criteria for current BPD.

Bivariate Analyses

BPD symptom severity scores were correlated with all of the pregnancy and birth outcomes. Symptom severity was associated with teenage pregnancy by age 18 ($r = .13, p < .01$) and by age 20 ($r = .13, p < .01$), elective abortions ($r = .11, p < .05$), spontaneous abortions ($r = .11, p < .05$) stillbirths ($r = .15, p < .01$), unplanned pregnancies ($r = .16, p < .01$) and live births ($r = .13, p < .01$). BPD symptom severity was significantly correlated with unplanned pregnancies, but a BPD diagnosis was not associated with unplanned pregnancies for any group (top of Table 2) and appeared to be associated with less risk for abortions (bottom of Table 2).

Age, SES and race were also correlated with reproductive outcomes. Participants who were older were more likely to have become pregnant by 18 ($r = .17, p < .001$) or 20 ($r = .26, p < .0001$) and report an elective abortion ($r = .25, p < .0001$), a spontaneous abortion ($r = .23, p < .0001$) or a stillbirth ($r = .13, p < .01$). Older women also reported more unplanned pregnancies ($r = .47, p < .0001$) and births ($r = .53, p < .0001$). Women with lower SES were more likely to have had a pregnancy by 18 ($r = -.33, p < .0001$), 20 ($r = -.37, p < .0001$) and report an elective abortion ($r = -.17, p < .001$), spontaneous abortion ($r = -.18, p < .0001$) or stillbirth ($r = -.13, p < .01$). Lower SES was also associated with unplanned pregnancies ($r = -.39, p < .0001$) and live births ($r = -.36, p > .0001$). AA women experienced more teenage pregnancies (Table 1), unplanned pregnancies and abortions (Table 2). BPD diagnosis appeared to confer risk for teenage pregnancy among White women and Hispanic women (of any race) but not for AA women (Table 1).

The percent distribution of live births to White and AA women aged 20–39 years old in the US and in the current study is presented in Table 3, stratifying for race/ethnicity and age. The US Census groups 18–19 year old women with 16–17 year olds (Dye, 2008). Because we did not include women less than 18 years old, 48 women aged 18–19 years old were left-censored from this table. Similarly, we did not include women aged 40 from our study in Table 1 ($n = 13, 3\%$) because the US Census groups these women included women ages 41–44, and we did not assess women older than 40 years of age. Focusing on the first section of Table 3, which presents the percentages of births to White women in the US compared to White women in our sample, it is clear that the White women in our sample were more likely to be nulliparous at every age. They were also more likely to be over-represented in the 5 or more live births category from ages 24–39, although the data were not analyzed for significant differences using statistical tests. The differences are not as clear for the AA women, although it appears that women in the present sample were also more likely to have had 5 or more births than other AA women in the US.

Multivariate Analyses

The results of the regression models on teenage pregnancy by ages 18 and 20 are depicted in Table 4. BPD symptom severity scores predicted teenage pregnancies, even after controlling for race, age, early sexual intercourse, and SUD. The final equation predicting pregnancy by age 18 accounted for 13% of the variance (Cox & Snell R^2 ; $\chi^2 = 51.94, p < .0001$). The final equation predicting pregnancy by age 20 accounted for 19% of the variance (Cox & Snell $R^2 = .19$; $\chi^2 = 77.83, p < .0001$).

The results of the regression models on unplanned pregnancies are in Table 5. The final equation for having one unplanned pregnancy accounted for 32% of the variance (Cox & Snell R^2 ; $\chi^2 = 146.55$, $p < .0001$). The final equation for 2 or more unplanned pregnancies accounted for 29% of the variance (Cox & Snell R^2 ; $\chi^2 = 126.91$, $p < .0001$). There was a significant interaction of BPD diagnosis \times SUD for unplanned pregnancies. The results of an analysis of variance (ANOVA) and Dunnett t -tests on women with and without 2 or more unplanned pregnancies suggest that women without SUD who had multiple unplanned pregnancies had higher BPD symptom severity scores, $F(2, 110) = 3.24$, $p < .05$. However, this dose-response pattern was not significant in the women with SUD, $F(2, 263) = 1.90$, $p < .15$.

The results of the regression models on abortions are depicted in Table 6. The final equation for having an elective abortion accounted for 9% of the variance (Cox & Snell R^2 ; $\chi^2 = 37.32$, $p < .0001$). The final equation for having a spontaneous abortion accounted for 11% of the variance (Cox & Snell R^2 ; $\chi^2 = 44.73$, $p < .0001$). BPD symptom severity scores did not significantly predict abortions of either type. There was a significant interaction of Race \times SES for spontaneous abortions. The results of our probe into that interaction effect revealed that SES was significant only for White women, who were more likely to have spontaneous abortions if they had low SES ($t = 4.23$, $p < .001$).

The results of the regression models on live births are depicted in Table 7. The final equation accounted for 34% of the variance (Adjusted R^2 ; $F = 34.48$, $p < .0001$). There was a BPD diagnosis \times SUD interaction predicting number of live births. In an ANOVA, there was a trend for women with more live births to have higher BPD symptom severity scores than the women with fewer live births, but only among women without a history of SUD. The final equation for two or more live births accounted for 29% of the variance (Cox & Snell R^2 ; $\chi^2 = 130.48$, $p < .0001$).

CONCLUSIONS AND DISCUSSION

This is the first study to examine pregnancy and birth outcomes in women with and without BPD. Our findings show that BPD symptom severity is associated with teenage pregnancy, even after controlling for race, SES and early sex. Of note, nearly one in five (18%) of the women had become pregnant by age 16. It is likely that emerging BPD is associated with early unprotected sex (including coercive encounters). It is also possible that becoming and coping with teenage pregnancy may exacerbate BPD symptoms. Mowbray et al (2005) reported greater difficulties in functioning among women whose mental illness onset occurred within 18 months of the birth of their first child. Only longitudinal studies that are prospectively following girls with BPD traits into adulthood, such as the Pittsburgh Girls Study, will help determine the direction of this effect.

BPD diagnosis may be associated with different fertility patterns from the general population. White women with a BPD diagnosis appear to be disproportionately more likely to have had either no children or 5 or more children. AA women with BPD seem more likely to have 5 or more children than other women their age. This is a concern because mentally ill women who are AA are disproportionately more likely to have their children removed from their homes and placed into foster care (Lewin & Abdrbo, 2009; Montgomery et al., 2011). Depending on their resilience or vulnerability, the offspring of these women may also be at much greater risk of BPD, major depressive disorder, SUD and other SMI (Abela et al., 2005).

The effect of BPD symptom severity on unplanned pregnancies and live births may vary as a function of SUDs. Women with higher symptom severity scores without a history of SUD

had more unplanned pregnancies and more live births. However, BPD symptom severity was not associated with more unplanned pregnancies and live births in women with a history of SUD. It may be that the combined effects of BPD symptom severity and SUD on unplanned pregnancies and births are additive and not multiplicative. In other words, BPD symptoms may confer additional risk for unplanned pregnancies and live births in women who do not have another impulse disorder such as SUD.

Our hypothesis that BPD symptom severity would be associated with abortion was not supported. Studies in other psychiatric populations suggest that women with mental illness are at greater risk of both elective and spontaneous abortions (Fergusson, Horwood, & Boden, 2008). However, this was the first study to examine the prevalence of abortions in women with and without BPD, controlling for race, SES, sex trading and SUD. In the current study, lower SES was the best predictor of abortions. These results highlight the importance of examining contextual factors in the reproductive lives of women with BPD and other SMI. Qualitative research and research that examines the contribution of relationships and sexual partners to these women's reproductive health may provide some context to these women's reproductive behavior.

This study includes one of the largest samples of AA women with BPD to date. It was therefore possible to examine racial differences in the effects of BPD severity on pregnancy and birth outcomes. AA race was a risk factor for teenage pregnancies, unplanned pregnancies and live births, consistent with findings in the general population of women with and without mental disorders (Dye, 2008; Jones et al., 2010). In contrast to studies of women *without* mental illness (Jones et al., 2010), in our sample AA race was not associated with higher rates of elective or spontaneous abortions. Among women with mental illness such as BPD and/or Axis I disorders, White and AA women are equally likely to have elective abortions, after accounting for SES.

Managing teenage and unplanned pregnancies in women with BPD is costly to society. Many are already receiving obstetric care, social services, and behavioral health care (Gunderson, 2009) but it is not clear whether these services are well-integrated. Women with BPD are not only an underserved population, they can be a challenging and "hard to serve" population. The personality traits characteristic of BPD, such as intense and unstable attachments, impulsive behavior, and impaired decision-making, may lead to teenage pregnancies and unplanned pregnancies. These same patient characteristics may also present an obstacle to receiving consistent and coordinated medical and mental health care. Better education for providers about the effects of mental illness on physical and reproductive health and tools to assist providers in developing and sustaining a treatment relationship with challenging patients such as those with BPD or other SMI could lead to improved treatment compliance and more consistent care. Additionally, integrated multidisciplinary health services that include both physical and mental health providers may contribute to improved reproductive health outcomes for women with SMI and their offspring (ACOG, 2008).

Limitations

One limitation of this study was reliance on self-report, which can be problematic because of retrospective bias and stigma associated with teenage pregnancies, unplanned pregnancies and abortions. Our interviewers were trained to adopt a non-judgmental communication style and provide instructions that encouraged honesty. Most of the women in the study were in their twenties, so they only had to recall pregnancies from the past decade. Another limitation was the cross-sectional design, which did not permit us to examine temporal associations between BPD diagnosis, other psychiatric disorders, and types of pregnancies

and births. Additionally, we did not include men, although men with BPD and fathers with SMI are also understudied.

CONCLUSIONS

Women with BPD are sexually active, and most will become pregnant during the most severe trajectory of their illness. Despite this temporal convergence, no other studies have examined pregnancies and births in women with and without BPD. In this sample, BPD severity was associated with greater likelihood of teenage pregnancies, unplanned pregnancies, and live births. However, the effect of BPD symptoms on unplanned pregnancies and births was moderated by history of SUD. BPD symptoms were not a significant predictor of elective or spontaneous abortions, once SES was included in the models. Taken together, these findings suggest that many women with BPD are more likely to experience adolescent pregnancies, unplanned pregnancies and more live births. Therefore, it is critical that treatment planning for women with BPD include attention to their reproductive health.

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References

- Abela JRZ, Skitch SA, Auerbach RP, Adams P. The impact of borderline personality disorder on vulnerability to depression in children of affectively-ill parents. *Journal of Personality Disorders*. 2005; 19:68–83. [PubMed: 15899721]
- ACOG Committee on Practice Bulletins—Obstetrics. ACOG Practice Bulletin: Clinical management guidelines for obstetrician-gynecologists number 92. Use of psychiatric medications during pregnancy and lactation. *Obstetrics and Gynecology*, 2008. 2008; 111:1001–1020.
- American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*. Fourth Edition, Text Revision. Washington, D.C.: American Psychiatric Association; 2000.
- Bradley R, Jenei J, Westen D. Etiology of borderline personality disorder: Disentangling the contributions of intercorrelated antecedents. *Journal of Nervous Mental Disease*, 2005. 2005; 193:24–31.
- Chen EY, Brown MZ, Lo TY, Linehan MM. Sexually transmitted disease rates and high-risk sexual behaviors in borderline personality disorder versus borderline personality disorder with substance use disorder. *Journal of Nervous Mental Disease*. 2007; 195:125–129.
- Clarkin JF, Hull JW, Hurt SW. Factor structure of borderline personality disorder. *Journal of Personality Disorders*. 1993; 7:137–143.
- De Genna NM, Feske U, Angiolieri T, Gold MA. Race and sexually transmitted diseases in women with and without borderline personality disorder. *Journal of Women's Health*. 2011; 20:333–340.
- Dye, JL. *Current Population Reports*. Washington, DC: U.S. Census Bureau; 2008. Fertility of American women: June 2008; p. P20-P563.
- Fergusson DM, Horwood LJ, Boden JM. Abortion and mental health disorders: Evidence from a 30-year longitudinal study. *British Journal of Psychiatry*. 2008; 193:444–451. [PubMed: 19043144]
- Finer LB, Henshaw SK. Disparities in rates of unplanned pregnancy in the United States, 1994 and 2001. *Perspectives on Sexual and Reproductive Health*. 2006; 38:90–96. [PubMed: 16772190]
- First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. *Structured Clinical Interview for DSM-IV Axis I Disorders: Patient Edition*. New York: Biometrics Research Department, New York State Psychiatric Institute; 1995. 1995
- Gunderson JG. Borderline personality disorder: Ontogeny of a diagnosis. *American Journal of Psychiatry*. 2009; 166:530–539. [PubMed: 19411380]

- Guzzo BK, Furstenberg FF Jr. Multipartnered fertility among young women with a nonmarital first birth: Prevalence and risk factors. *Perspectives on Sexual and Reproductive Health*. 2007; 39:29–38. [PubMed: 17355379]
- Hamilton, BE.; Martin, JA.; Ventura, SJ. *National Vital Statistics Reports*, 2010. Vol. 58. Hyattsville, MD: National Center for Health Statistics; 2010. Births: Preliminary data for 2008.
- Hollingshead, A. Four-factor index of social status. New Haven, CT: Unpublished manuscript, Yale University; 1975. 1975
- Jones, RK.; Finer, LB.; Singh, S. *Characteristics of U.S. Abortion Patients*, 2008. New York: Guttmacher Institute; 2010. 2010
- Kaestle CE, Halpern CT, Miller W, Ford C. Young age at first sexual intercourse and sexually transmitted infections in adolescents and young adults. *American Journal of Epidemiology*. 2005; 161:774–780. [PubMed: 15800270]
- Korzekwa MI, Dell PF, Links PS, Thabane L, Webb SP. Estimating the prevalence of borderline personality disorder in psychiatric outpatients using a two-phase procedure. *Comprehensive Psychiatry*. 2008; 49:380–386. [PubMed: 18555059]
- Lenzenweger MF, Lane MC, Loranger AW, Kessler RC. DSM-IV personality disorders in the National Comorbidity Survey Replication. *Biological Psychiatry*. 2007; 62:553–564. [PubMed: 17217923]
- Lewin L, Ahrbom A. Mothers with self-reported Axis I diagnoses and child protection. *Archives of Psychiatric Nursing*. 2009; 23:200–209. [PubMed: 19446775]
- Linehan, MM. *Cognitive-behavioral Treatment of Borderline Personality Disorder*. New York: Guilford Press; 1993.
- Marinangeli MG, Butti G, Scinto A, Di Cicco L, Petrucci C, Daneluzzo E, Rossi A. Patterns of comorbidity among DSM-III-R personality disorder. *Psychopathology*. 2000; 33:69–74. [PubMed: 10705249]
- Montgomery P, Brown S, Forchuk C. A comparison of individual and social vulnerabilities, health, and quality of life among Canadian women with mental diagnoses and young children. *Women's Health Issues*. 2011; 21:48–56.
- Mowbray CT, Bybee D, Oyserman D, MacFarlane P. Timing of mental illness onset and motherhood. *Journal of Adolescence*. 2005; 28:443–463. [PubMed: 16022881]
- Olesen TB, Jensen KE, Nygård M, Tryggvadottir L, Sparén P, Hansen BT, Liaw K, Kjær SK. Young age at first intercourse and risk-taking behaviours—a study of nearly 65 000 women in four Nordic countries. *European Journal of Public Health*. 2011 Epub ahead of print.
- Pfohl, B.; Blum, N.; Zimmerman, M. *Structured Interview for DSM-IV Personality (SIDP-IV)*. Washington, DC: American Psychiatric Press; 1997.
- Skodol AE, Gunderson JG, Shea MT, McGlashan TH, Morey LC, Sanislow CA, Bender DS, Grilo CM, Zanarini MC, Yen S, Pagano ME, Stout RL. The Collaborative Longitudinal Personality Disorders Study (CLPS): Overview and implications. *Journal of Personality Disorders*. 2005; 19:487–504. [PubMed: 16274278]
- Stinson FS, Dawson DA, Goldstein RB, Chou SP, Huang B, Smith SM, Ruan WJ, Pulay AJ, Saha TD, Pickering RP, Grant BF. Prevalence, correlates, disability, and comorbidity of DSM-IV narcissistic personality disorder: results from the wave 2 national epidemiologic survey on alcohol and related conditions. *Journal of Clinical Psychiatry*. 2008; 69:1033–1045. [PubMed: 18557663]
- Vesga-López O, Blanco C, Keyes K, Olfson M, Grant BF, Hasin DS. Psychiatric disorders in pregnant and postpartum women in the United States. *Archives of General Psychiatry*. 2008; 65:805–815. [PubMed: 18606953]
- Weinhardt LS, Forsyth AD, Carey MP, Jaworski BC, Durant LE. Reliability and validity of self-reported HIV-related sexual behavior: Progress since 1990 and recommendations for research and practice. *Archives of Sexual Behavior*. 1998; 27:155–180. [PubMed: 9562899]

Table 1

Teenage Pregnancy by Race/Ethnicity and BPD diagnosis

	Any Teenage Pregnancy		Multiple Teenage Pregnancies	
	Pregnant < age 18	Pregnant < age 20	Pregnant 2+ < age 18	Pregnant 2+ < age 20
White Women				
BPD diagnosis	15%	22%	4%	6%
No BPD diagnosis	12%	20%	3%	7%
African-American Women				
BPD diagnosis	41%	54%	10%	24%
No BPD diagnosis	39%	57%	17%	27%
Hispanic Women (any race)				
BPD diagnosis	57%	71%	-	29%
No BPD diagnosis	-	17%	-	-

Note: BPD = Borderline personality disorder

Table 2

Unplanned Pregnancies and Abortions by Race/Ethnicity and BPD diagnosis

	Number of Unplanned Pregnancies		
	0 unplanned pregnancies	1 unplanned pregnancy	2+ unplanned pregnancies
White Women			
BPD diagnosis	67%	17%	17%
No BPD diagnosis	61%	15%	24%
African-American Women			
BPD diagnosis	33%	26%	41%
No BPD diagnosis	30%	27%	43%
Hispanic Women (any race)			
BPD diagnosis	29%	14%	57%
No BPD diagnosis	67%	17%	17%
	Number of Abortions		
	Elective	Spontaneous	
White Women			
BPD diagnosis	15%	9%	
No BPD diagnosis	21%	16%	
African-American Women			
BPD diagnosis	21%	24%	
No BPD diagnosis	40%	30%	
Hispanic Women (any race)			
BPD diagnosis	14%	29%	
No BPD diagnosis	33%	17%	

Table 3

Percent Distribution of Live Births to Women aged 20–39 years old by Race/Ethnicity and Age

Number of Live Births:	US Census data (2008)					BPD Study sample						
	0	1	2	3	4	5+	0	1	2	3	4	5+
White Women												
20–24 years old	73%	16%	8%	2%	.5%	.1%	94%	4%	1%	-	1%	-
25–29 years old	48%	22%	19%	8%	3%	.5%	74%	7%	9%	4%	4%	2%
30–34 years old	27%	21%	30%	15%	5%	2%	67%	11%	11%	-	7%	4%
35–39 years old	20%	18%	34%	19%	8%	3%	30%	15%	33%	19%	-	4%
African-American Women												
20–24 years old	57%	26%	11%	4%	2%	.7%	52%	28%	13%	4%	-	2%
25–29 years old	33%	25%	23%	13%	3%	3%	37%	22%	22%	11%	4%	4%
30–34 years old	24%	19%	25%	19%	8%	5%	19%	19%	24%	19%	10%	10%
35–39 years old	18%	21%	22%	23%	10%	7%	21%	25%	11%	14%	7%	21%

Note: BPD = Borderline personality disorder

Table 4

Final logistic regression equations on teenage pregnancy

	Beta	S.E.	Wald	Odds Ratio (95% Confidence Interval)
PREGNANT BY AGE 18				
Race (African-American)	1.52	0.27	31.18 ***	4.57 (2.68–7.78)
Age	0.05	0.02	5.30 *	1.05 (1.01–1.09)
BPD severity scores	0.04	0.02	5.93 *	1.04 (1.01–1.08)
Sex by age 14	0.46	0.29	2.48	1.58 (0.90–2.77)
SUD	0.07	0.16	0.18	1.07 (0.78–1.47)
PREGNANT BY AGE 20				
Race (African-American)	1.61	0.25	41.38 ***	5.00 (3.06–8.17)
Age	0.08	0.02	18.10 ***	1.08 (1.04–1.12)
BPD severity scores	0.04	0.02	5.24 *	1.04 (1.01–1.07)
Sex by age 14	0.36	0.27	1.74	1.43 (0.84–2.43)
SUD	0.12	0.15	0.62	1.13 (0.84–1.51)

Note.

^t
p < .10,*
p > .05,**
p < .01,***
p < .001

Age = age at enrollment

BPD = Borderline personality disorder

SUD = Substance use disorder

Table 5

Final logistic regression equations on unplanned pregnancies

	Beta	S.E.	Wald	Odds Ratio (95% Confidence Interval)
ONE UNPLANNED PREGNANCY				
Race (African-American)	1.26	0.27	21.36***	3.53 (2.07–6.03)
Age	0.14	0.02	42.38***	1.15 (1.10–1.20)
SES	–0.06	0.01	29.56***	0.94 (0.92–0.96)
BPD severity scores	0.07	0.03	7.35**	1.07 (1.02–1.13)
SUD	1.23	0.48	6.71**	3.42 (1.35–8.68)
BPD × SUD	–0.05	0.02	6.65**	0.95 (0.92–0.99)
REPEAT UNPLANNED PREGNANCIES				
Race (African-American)	0.77	0.28	7.30**	2.15 (1.23–3.75)
Age	0.16	0.02	55.52***	1.17 (1.13–1.22)
SES	–0.06	0.01	19.94***	0.94 (0.92–0.97)
BPD severity scores	0.08	0.03	7.92**	1.08 (1.02–1.15)
SUD	1.27	0.53	5.79*	3.56 (1.27–10.0)
BPD × SUD	–0.05	1.23	5.17*	0.96 (0.92–0.99)

Note.

t
p < .10,*
p > .05,**
p < .01,***
p < .001

Age = age at enrollment

BPD = Borderline personality disorder

SUD = Substance use disorder

Table 6

Final logistic regression equations on abortions

	Beta	S.E.	Wald	Odds Ratio (95% Confidence Interval)
ELECTIVE ABORTIONS				
Race (African-American)	0.47	0.27	2.97 ^t	1.59 (0.94–2.71)
Age	0.08	0.02	16.45 ^{***}	1.08 (1.04–1.12)
SES	–0.02	0.01	4.13 [*]	0.98 (0.96–0.99)
BPD severity scores	0.02	0.02	2.15	1.02 (0.99–1.06)
Sex Trade	0.30	0.32	0.90	1.36 (0.72–2.54)
SUD	–0.10	0.17	0.37	0.90 (0.65–1.26)
SPONTANEOUS ABORTION				
Race (African-American)	–0.58	0.75	0.59	0.56 (0.13–2.45)
Age	0.07	0.02	12.61 ^{***}	1.10 (1.03–1.12)
SES	–0.10	0.04	5.75 [*]	0.91 (0.84–0.98)
BPD severity scores	0.03	0.02	2.35	1.03 (0.99–1.07)
Sex Trade	–0.38	0.35	1.16	0.69 (0.35–1.36)
SUD	0.31	0.18	2.83 ^t	1.36 (0.95–1.96)
Race × SES	0.05	0.03	3.91 [*]	1.05 (1.00–1.10)

Note.

^t
p < .10,^{*}
p > .05,^{**}
p < .01,^{***}
p < .001

Age = age at enrollment

BPD = Borderline personality disorder

SUD = Substance use disorder

Table 7

Final regression equations on live births

Linear Regression on Number of Live Births						
	B	S.E.	t-value	R ² change	F change	
Race (African-American)	0.66	0.14	4.64***	0.35	66.22***	
Age	0.11	0.01	10.25***			
SES	-0.02	0.01	-4.23***			
BPD severity scores	0.03	0.01	2.50**	0.00	1.92	
SUD	0.40	0.23	1.74†	0.00	0.31	
BPD×SUD	-0.19	0.01	-2.04*	0.01	4.18*	

Logistic Regression on Multiple Live Births					
	Beta	S.E.	Wald	Odds Ratio (95% Confidence Interval)	
Race (African-American)	0.82	0.30	7.31**	2.26 (1.25–4.08)	
Age	0.19	0.02	63.81***	1.21 (1.15–1.27)	
SES	-0.06	0.01	17.16***	0.94 (0.92–0.97)	
BPD severity scores	0.01	0.02	0.50	1.01 (1.15–1.27)	
SUD	-0.04	0.17	0.05	0.96 (0.69–1.35)	

Note,

† p < .10,

* p > .05,

** p < .01,

*** p < .001

Age = age at enrollment

BPD = Borderline personality disorder

SUD = Substance use disorder