

UC San Diego

UC San Diego Previously Published Works

Title

5.13 SEXUAL RISK BEHAVIOR AMONG ADOLESCENTS WITH BIPOLAR DISORDER

Permalink

<https://escholarship.org/uc/item/3m40v6bt>

Journal

Journal of the American Academy of Child and Adolescent Psychiatry, 55(10)

ISSN

0890-8567

Authors

Krantz, Megan L
Goldstein, Tina R
Liao, Fangzi
et al.

Publication Date

2016-10-01

DOI

10.1016/j.jaac.2016.09.272

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed

Sexual Risk Behavior Among Youth With Bipolar Disorder: Identifying Demographic and Clinical Risk Factors

Megan Krantz, BA, Tina Goldstein, PhD, Brian Rooks, MA, John Merranko, MA, Fangzi Liao, MS, Mary Kay Gill, MSN, Rasim Diler, MD, Danella Hafeman, MD, PhD, Neal Ryan, MD, Benjamin Goldstein, MD, PhD, Shirley Yen, PhD, Heather Hower, MSW, Jeffrey Hunt, MD, Martin Keller, MD, Michael Strober, PhD, David Axelson, MD, Boris Birmaher, MD

Objective: This study aims to document rates of sexual activity among youth with bipolar spectrum disorder (BD) and to examine demographic and clinical factors associated with first sexual activity and sexual risk behavior during follow-up.

Method: The sample was drawn from the Course and Outcome of Bipolar Youth (COBY) study of 413 youth 7 to 17 years at baseline who met criteria for bipolar spectrum disorder according to the Schedule for Affective Disorders and Schizophrenia for School-Aged Children. Psychiatric symptoms during follow-up were assessed using the Adolescent Longitudinal Interview Follow-Up Evaluation (ALIFE). Sexual behavior and level of sexual risk (e.g., unprotected sex, multiple partners, and/or partners with known sexually transmitted infections) were assessed by trained evaluators using the ALIFE Psychosocial Functioning Scale. Analyses were conducted in relation to first sexual behavior during follow-up and then to subsequent sexual behaviors (mean 9.7 years, standard deviation 3.2).

Results: Sexually active COBY youth ($n = 292$ of 413; 71%) were more likely females, using substances, and not living with both parents. Consistent with findings among healthy youth, earlier first sexual activity in the sample was significantly associated with low socioeconomic status, female sex, comorbid disruptive behavior disorder, and substance use. As with healthy youth, sexual risk behavior during follow-up was significantly associated with non-Caucasian race, low socioeconomic status, substance use, and history of sexual abuse. Of those COBY youth who were sexually active, 11% reported sexual assault or abuse, 36% reported becoming pregnant (or the significant other becoming pregnant), and 15% reported having at least 1 abortion (or the significant other having an abortion) during follow-up. Hypomanic symptoms during follow-up were temporally associated with the greatest risk for sexual risk behavior.

Conclusion: Demographic and clinical factors could help identify youth with bipolar spectrum disorder at significantly greatest risk for sexual activity and sexual risk behavior. Attending to sexual risk behaviors in this population is warranted.

Key words: bipolar disorder, sexual risk behavior, sexual activity

J Am Acad Child Adolesc Psychiatry 2018;57(2):118–124.  

Given that nearly half of US high school students report being sexually active,¹ sexual risk behaviors including lack of contraceptive use, acquisition of sexually transmitted infections (STIs), and unplanned pregnancies and abortions in youth are of great public health import.

One subgroup of youth who engage in risky sexual behaviors at increased rates is youth with psychiatric disorders, particularly those with externalizing disorders.^{2,3} Youth in psychiatric care are as much as 3 times more likely to report early sexual debut and risky sex (multiple partners and inconsistent condom use) and have 4 times greater risk of contracting STIs.⁴ Females in psychiatric care report early pregnancy at a rate 3 times higher than healthy youth.⁵ Although prior cross-sectional studies have implicated mood, anxiety, disruptive, personality, and substance use disorders (SUDs) specifically in sexual risk behaviors,^{3,6,7} little is known about the temporal association between specific psychiatric disorders in youth and sexual risk behavior. Greater understanding of this association could inform prevention strategies for those at greatest risk.

Youth with bipolar spectrum disorder (BD) can be especially vulnerable when considering manic and depressive episodes are associated with sexual risk behavior. Youth in psychiatric care who display sub-threshold hypomania symptoms are more likely than youth with other psychiatric disorders to be sexually active, engage in unprotected sex, have at least 2 sexual partners, and test positive for an STI.^{8,9} Furthermore, specific symptoms of mania—namely hypersexuality and impulsivity—are, in general, associated with greater sexual risk in youth.^{4,9,10} Depressive symptoms in youth are associated with earlier sexual debut,^{11,12} which in turn is linked to greater risk for STIs and unplanned pregnancy.^{13,14} Studies of adults have yielded similar conclusions: those with BD are more likely to contract STIs¹⁵ and report more unplanned pregnancies and/or abortions in their lifetime.¹⁶

However, prior studies were predominantly retrospective and did not examine the temporal association between sexual risk behaviors and mood symptoms. Prospectively examining the temporal association of mood symptoms and sexual risk behavior in youth with BD is essential to

identifying mood-dependent risk and informing effective prevention and intervention approaches for this population.

For the first time in the literature, the present study aimed to prospectively document sexual activity in youths with BD and explore sexual risk behavior (e.g., unprotected sex, multiple partners, non-monogamous partners, and partners with known STIs) and its association with demographic and clinical risk factors. Using data from the longitudinal, multisite Course and Outcome of Bipolar Youth (COBY) study, we examined sexual activity and risk behavior from first sexual activity in the study through follow-up (mean 9.7 years, standard deviation [SD] 3.2; median 10.7). We hypothesized age at first sexual activity and sexual risk behavior during follow-up would be associated with clinical (e.g., BD subtype, age at onset) and demographic (e.g., sex, race) factors, and sexual risk behavior during follow-up would be temporally associated with hypomanic and depressive symptoms.

METHOD

A detailed description of the methodology used in the COBY study has been described previously.^{17,18} The present analyses included 413 youth 7 to 17 years old who met criteria at baseline for *DSM-IV* bipolar I (BP-I), BP-II, or operationally defined BP not otherwise specified (NOS)¹⁸ according to the Schedule for Affective Disorders and Schizophrenia for School-Aged Children—Present and Lifetime Version (K-SADS-PL).¹⁹ Participants were primarily recruited from outpatient clinics (68%) at the 3 study sites and were enrolled independent of current mood state or treatment status. Youths with schizophrenia, IQ lower than 70, autism, and mood disorders secondary to substances, medications, or medical conditions were excluded.

Procedure

Each study site's institutional review board approved the study before enrollment of any participant, and youths and their parents or primary caretakers provided written informed assent and consent, respectively, after receiving a complete description of the study procedures.

Diagnostic Evaluation. At baseline, youths and parents or primary caretakers were interviewed for current and lifetime psychiatric disorders using the K-SADS-PL¹⁹; the Kiddie Mania Rating Scale (K-MRS)²⁰ and the depression section of the K-SADS-P²¹ were used to yield additional information on mood symptom severity. Research staff trained to reliability on the diagnostic evaluations conducted all assessments; child psychiatrists or psychologists confirmed diagnoses. The overall K-SADS-PL κ coefficients for psychiatric disorders were at least 0.8; intraclass correlation coefficients for the K-MRS and the K-SADS-P depression section were at least 0.95.

Illness Severity. Changes in psychiatric symptoms during follow-up were assessed retrospectively using the Adolescent Longitudinal Interview Follow-Up Evaluation (ALIFE),²² which yields excellent reliability and external validity.^{23,24} Week-by-week symptom ratings were attained using this instrument's Psychiatric Status Rating Scales (PSRs), which use numeric values operationally linked to *DSM-IV* criteria. Interviewers gathered information about *DSM-IV* criteria, rated severity of any comorbid diagnoses for which participants previously met full criteria (1 = no symptoms, 2 = subthreshold *DSM-IV* symptoms; 3 = full threshold *DSM-IV* criteria), and rated any new diagnoses for which participants met threshold criteria. Consensus scores incorporated all available data from youths and parents; in the event of conflicting information, summary ratings were guided by clinical judgment. PSR consensus ratings were confirmed by a child psychiatrist or psychologist subsequent to the

interview. Intraclass correlation coefficients for ALIFE syndromal and subsyndromal mood disorders were at least 0.75.

Medications. Weekly ratings of psychotropic drugs prescribed, dosing, and adherence were obtained through the ALIFE Psychotropic/Auxiliary Drugs/Electroconvulsive Therapy Treatment Schedule.

Demographics. Socioeconomic status (SES) was ascertained using the Hollingshead 4-factor criteria.²⁵ Pubertal status was assessed using the Self-Rating Scale for Pubertal Development²⁶; this scale was completed by parents for children 7 to 9 years old and thereafter by the children themselves (with assistance if needed) at all follow-ups.

Sexual Functioning. Monthly sexual functioning ratings were collected using the ALIFE Psychosocial Functioning Scale (PSF), yielding the following domains: sexual orientation (0 = no information/unsure; 1 = heterosexual; 2 = homosexual; 3 = bisexual), frequency of sexual activities (1 = ≥ 3 times weekly; 2 = at least once a week; 3 = at least once a month; 4 = never [i.e., not at all in the past month]; 5 = no information), number of partners (1 = 1; 2 = > 1 ; 3 = no information/not applicable), and level of sexual risk (1 = practices safe sex: uses protection against STIs and unwanted pregnancy; 2 = engages in moderate-risk sexual behavior: any unprotected sex without a desire to conceive or other moderate risk sexual behavior, e.g., unprotected sex with a partner presumed, but not confirmed, to be monogamous; 3 = engages in high-risk sexual behavior: includes any unprotected sex with a monogamous partner or other high-risk behavior, e.g., unprotected sex with a monogamous partner known to have an STI; 4 = no information). Evaluators were instructed to consider all potentially risky sexual behaviors when providing their "level of sexual risk" rating, and all ratings were reviewed with an attending psychiatrist or psychologist to yield a consensus score. Sexual activity ratings were dichotomized each month during follow-up (i.e., sexually active [score ≤ 3] or not sexually active [score 4 or 5]). Intraclass correlation coefficients for the PSF were at least 0.94.

Sexual Trauma. History of sexual trauma or abuse was assessed at study intake and at every follow-up using the Traumatic Events form derived from the K-SADS-PL. The measure also yields data on timing of the event (i.e., follow-up month), enabling temporal specificity during follow-up.

Pregnancy and Abortion. Items documenting pregnancy and abortion in the year preceding follow-up were extracted from the self-report Life Events Checklist (for participants < 18 years old)²⁷ and Life Experiences Survey (for participants > 18 years old)²⁸ completed at each assessment.

Family Environment. Family environment during the past 3 months was assessed using the parent and child Family Adaptability and Cohesion Scale—II self-reports (FACES-II)²⁹ and the parent and child Conflict Behavior Questionnaire self-reports (CBQ).³⁰

Data Analysis

First Sexual Activity During Follow-Up. We used Cox proportional hazard models to analyze age continuously (i.e., month of follow-up) at first sexual activity in the study, controlling for age at intake. From this model, the demographic variables theorized to potentially confound the effects of clinical predictor variables on outcome (i.e., sex, race, SES, age at BD onset, BD subtype, and history of sexual abuse) were first analyzed independently; we controlled for those significant at a p value less than .10 in subsequent models (i.e., only sex, SES, and history of sexual abuse). We fit a single Cox regression model to analyze the effects of clinician-rated presence of threshold comorbid disorder using the PSR (specifically attention-deficit/hyperactivity disorder [ADHD], disruptive behavior disorder [DBD],

anxiety, SUD, and nicotine dependence) since last assessment on age at first sexual activity; as such, odds ratios (ORs) for each comorbid condition controlled for the presence of other comorbid conditions. Similarly, we used separate Cox regression models to analyze the effect of self- and parent-rated family functioning (i.e., CBQ and FACES) on age at first sexual activity.

Sexual Risk. Proportional-odds cumulative logistic regression models were used to model level of sexual risk during follow-up, beginning with the first month the participant endorsed sexual activity. All models were estimated using the generalized estimating equations method.³¹ We analyzed the variables theorized to confound the association of predictor variables on outcome (i.e., sex, race, SES, age at BD onset, BD subtype, history of sexual abuse, and sexual orientation) independently, controlling for age at intake; then, we controlled for those that were significant ($p < .1$; i.e., race, SES, and history of sexual abuse) in all subsequent models. We fit a single proportional-odds cumulative logistic regression model associating threshold comorbid disorders (ADHD, DBD, anxiety, SUD, and nicotine dependence) and level of sexual risk, controlling for month of follow-up. Because the PSF scores yield only monthly ratings, interpretation of any temporal relation between symptomatology and sexual risk was limited to this timeframe. Therefore, we examined the association of comorbid disorders in the prior month with sexual risk behavior in the following month.

We used PSR scores to analyze each participant's predominant subsyndromal mood state (i.e., depressed, manic, well, mixed) over each month of follow-up. For example, a participant who was predominantly (largest percentage of weeks) asymptomatic in a particular month was categorized as "well" for that month. If mood symptoms were equally present during the month (e.g., 2 weeks with hypomanic and 2 weeks with depressive symptoms), the predominant symptoms during the last week of the month (the most temporally proximal to the month in which sexual risk was measured) was used to categorize the month. Weeks were labeled "mixed" when mania and depression were rated at or above subthreshold levels during the same week. We examined mood state within a previous month in relation to sexual risk in the following month. We generated a single regression model to make pairwise comparisons of predominant mood state with level of sexual risk, controlling for potential confounding variables, month of follow-up, and use of psychotropic medication (owing to potential for sexual side effects). We used this same method to examine for the association between sexual assault during follow-up and mood state.

Then, we used separate regression models to analyze the effect of family functioning (CBQ and FACES) on level of sexual risk, also controlling for potential confounding variables, month of follow-up, and use of psychotropic medication.

RESULTS

Demographics and Participant Illness Characteristics

The sample included 413 youth with an average age of 12.6 years (SD 3.3) at baseline; 42% lived with both biological parents. Participants were middle class (mean SES 3.4, SD 1.2) and 82% were Caucasian. At baseline, 59% ($n = 244$) met criteria for BP-I, 7% ($n = 28$) met criteria for BP-II, and 34% ($n = 141$) met criteria for BP-NOS¹⁸; the average age at illness onset was 9.2 years (SD 4.1). At baseline, participants met criteria for a mean of 1.9 (SD 1.3) additional current Axis I diagnoses with the K-SADS.

During follow-up, participants were interviewed a mean of 11.9 times (SD 6.5) on average every 0.76 years (SD 0.5) for a mean 9.7 years (SD 3.2). The mean time between follow-up assessments was 9.1 months (SD 6.2).

Sexual Activity. Two hundred ninety-two participants (71%) were sexually active during follow-up. They were older (and in a later Tanner stage),

more likely to be females, less likely to live with both biological parents, older at BD onset, more likely to endorse past sexual abuse and SUD during the follow-up period, and had longer mean follow-up time than non-sexually active participants ($p < .05$ for all comparisons; Table 1).

Most sexually active participants ($n = 207$, 71%) reported sexual activity "at least 3 times weekly" in at least 1 month during follow-up; 24% ($n = 70$) reported sexual activity "at least once per week," and 5% ($n = 15$) reported sexual activity "at least once per month." More than half ($n = 155$, 54%) had more than 1 sexual partner in at least 1 month of follow-up. Mean age at first sexual activity in the study was 17.3 years (SD 2.2; range 12.4–23.6; females 17.0 [SD 2.1], males 17.6 [SD 2.2]); during this first month, participants identified as heterosexual (84%, $n = 245$), homosexual (3%, $n = 10$), bisexual (11%, $n = 31$), or provided no information about their sexual orientation (2%, $n = 5$). Models of demographic, clinical, and family environment predictors are presented in Table 2.

Association With Demographic Variables. Female sex and lower SES were associated with younger age at first sexual activity during follow-up ($p < .1$ for all comparisons), whereas race was not ($p > .05$).

Association With Clinical Variables. Age at BD onset, BD subtype, and history of sexual abuse were not associated with age at first sexual activity during follow-up ($p > .05$ for all comparisons). After controlling for the presence of other comorbid disorders and demographic confounders, presence of DBD (hazard ratio 1.349, $p = .0455$), SUD (hazard ratio 2.13, $p = .0003$), and nicotine dependence (hazard ratio 2.396, $p < .0001$) were each independently associated with earlier first sexual activity during follow-up, whereas symptoms of ADHD and anxiety were not ($p > .05$ for the 2 comparisons). Only SUD and nicotine dependence remained associated with earlier first sexual activity after also controlling for the child's use of any psychotropic medication since last assessment ($p < .05$ for all comparisons).

Association With Family Environment. Better family functioning (by parent and child report) was associated with lower risk of sexual activity ($p < .05$ for all comparisons). FACES Adaptability and Cohesion subscales were significant ($p < .05$ for the 2 comparisons), whereas overall (and subscale) CBQ scores were not. These results did not change after controlling for the child's use of psychotropic medication since last follow-up visit.

Sexual Risk. Most sexually active participants ($n = 192$, 66%) reported engaging in sexual risk behavior (i.e., PSF sexual risk sub-score ≥ 2) in at least 1 month during follow-up (high risk, 28% [$n = 82$]; moderate risk, 38% [$n = 110$]).

Association With Demographic Variables. Non-Caucasian race and lower SES were associated with greater sexual risk ($p < .05$ for the 2 comparisons), whereas sex was not.

Association With Clinical Variables. History of sexual abuse was associated with level of sexual risk (OR 1.51, $p = .0082$), whereas age at BD onset and BD subtype were not. After controlling for threshold comorbid disorders, demographic confounders, and follow-up month, only the presence of threshold SUD symptoms in the previous month remained associated with level of sexual risk (OR 1.78, $p < .0001$). After also controlling for use of psychotropic medication during the previous month, SUD remained associated with level of sexual risk ($p < .05$). In sub-analyses dividing SUD into alcohol versus non-alcohol, we found only alcohol abuse or dependence was associated with level of sexual risk (OR 1.87, $p < .0001$).

Association With Mood State. Participants with predominantly hypomanic symptoms during the previous month were more likely to

TABLE 1 Sample Demographic and Clinical Characteristics at Intake and During Follow-Up

	Sexually Active (n = 292)		Non-Sexually Active (n = 121)		Test Statistics	df	p Value
	At Intake						
Characteristic	Mean	SD	Mean	SD	t Statistic	df ^a	
Age (y)	13.5	3.1	10.5	2.7	10	253	<.0001
Hollingshead SES	3.4	1.2	3.4	1.3	0.1	211	.9029
Age at bipolar onset (y)	10.0	4.1	7.3	2.9	7.5	307	<.0001
	n	%	n	%	χ ²	df	
Female sex	151	52	40	33	12	1	.0005
Caucasian race	241	83	98	81	0.7	1	.7099
Petersen Pubertal Status ^c							
Status I	48	20	39	46	39.9	2	<.0001
Status II or III	58	25	31	37			
Status IV or V	132	55	14	17			
Living situation at intake (both biological parents)	118	40	56	46	0.3	1	.0324
BD subtype							
BP-I	179	61	65	54	5.8	2	.0546
BP-II	23	8	5	4			
BP-NOS	90	31	51	42			
Prescribed psychotropic medications	259	89	109	90	0.2	1	.6812
History of sexual abuse	41	14	5	4	8.5	1	.0036
Males	17	42	2	40			
Females	24	58	3	60			
	During Follow-Up						
	Mean	SD	Mean	SD	t Statistic	Satterthwaite	
Length of follow-up (y)	10.4	2.2	7.7	4.2	6.6	147	<.0001
	n	%	n	%	Wald χ ²	df	
Comorbid Axis I diagnoses (lifetime)							
Anxiety disorder	195	67	77	64	0.2	1	.6429 ^b
ADHD	198	65	95	79	0.02	1	.8966 ^b
DBD	183	63	78	64	2.1	1	.1473 ^b
SUD	153	52	4	3	30.1	1	<.001 ^b

Note: Boldface data reflect statistical significance at $p < .05$. ADHD = attention-deficit/hyperactivity disorder; BD = bipolar disorder; BP-I = bipolar I disorder; BP-II = bipolar II disorder; BP-NOS = bipolar disorder not otherwise specified; DBD = disruptive behavior disorder; SES = socioeconomic status; SUD = substance use disorder.

^aApproximated using the Satterthwaite method.

^bControlling for age at end of follow-up.

^cMissing data from 91 participants.

endorse sexual risk behavior than participants who were predominantly depressed or well during the previous month ($p < .01$ for all comparisons; Table 3). Although sexual risk was more likely to occur after mixed versus depressed months (OR 1.55, $p = .009$), there was no difference after predominantly depressed versus well months (OR 0.87, $p = .2121$), predominantly mixed versus well months (OR 1.36, $p = .0732$), or predominantly mixed versus hypomanic months (OR 1.0, $p = .9956$). The results did not change after controlling for psychotropic medication use during the previous month. There was no significant association ($p = .86$) between sexual assault during follow-up and presence of any manic symptoms during the following month.

Association With Family Environment. Better family functioning (by parent and child report) was associated with lower level of sexual risk ($p < .05$ for all comparisons). The FACES Adaptability (OR 0.96, $p = .0003$) and Cohesion (OR 0.98, $p = .0016$) sub-scores were

associated with lower level of sexual risk. These results did not change after controlling for psychotropic medication use during the previous month.

Sexual Trauma. During follow-up, 11% ($n = 33$) of sexually active participants reported at least 1 sexual assault or abuse event.

Pregnancies and Abortions. During follow-up, 36% of sexually active participants ($n = 106$) reported becoming pregnant (or their girlfriend or significant other becoming pregnant) at least once. Fifteen percent of participants (or their girlfriend or significant other; $n = 45$) reported having at least 1 abortion.

DISCUSSION

To our knowledge, this is the first study to longitudinally assess sexual behavior in a sample of youth with BD and examine its temporal association with mood symptoms. As hypothesized, among COBY youth, first sexual

TABLE 2 Effect of Demographic, Clinical, and Family Functioning Variables on Sexual Activity

	First Sexual Activity During Follow-Up ^a			Sexual Risk ^b		
	HR	p Value	95% CI	OR	p Value	95% CI
Demographic variable						
Biological sex (female)	1.68	<.0001	1.31–2.15	1.08	.5659	0.83–1.41
Race (Caucasian)	0.91	.5705	0.66–1.25	0.59	.0004	0.44–0.79
SES (Hollingshead)	0.84	.0004	0.76–0.92	0.90	.0116	0.82–0.98
Clinical variable						
Age at bipolar onset	1.01	.6651	0.97–1.05	1.03	.0643	0.998–1.06
BD subtype		.2493 ^c			.6573 ^c	
History of sexual abuse	1.39	.0512	0.99–1.94	1.51	.0082	1.11–2.06
Comorbid Axis I diagnosis						
ADHD	0.763	.052	0.58–1.00	0.96	.7982	0.72–1.28
DBD	1.349	.0455	1.01–1.81	1.22	.1993	0.90–1.65
Anxiety	1.151	.3185	0.87–1.52	1.10	.4298	0.87–1.40
SUD	2.13	.0003	1.42–3.20	1.78	<.0001	1.41–2.24
Nicotine dependence	2.396	<.0001	1.57–3.65	1.05	.7011	0.83–1.33
Family functioning Variable						
CBQ parent total score	1.02	.1854	0.99–1.05	1.02	.1113	0.99–1.05
CBQ child total score	1.01	.3544	0.98–1.04	1.01	.3902	0.99–1.03
FACES parent total score	0.98	.0104	0.97–0.996	0.99	.05	0.98–1.00
FACES child total score	0.99	.006	0.98–0.996	0.99	.0069	0.98–0.997

Note: Boldface data reflect statistical significance at $p < .05$. ADHD = attention-deficit/hyperactivity disorder; BD = bipolar disorder; CBQ = Conflict Behavior Questionnaire; DBD = disruptive behavior disorder; FACES = Family Adaptability and Cohesion Scale–II; SES = socioeconomic status; SUD = substance use disorder.

^aIndividual Cox proportional hazard models: covariates for models using comorbid diagnoses include biological sex, SES, and history of sexual abuse.

^bProportional-odds cumulative logistic regression models with the generalized estimating equations method, controlling for age: covariates for models using comorbid diagnoses include race, SES, age at BD onset, and history of sexual abuse.

^cp Value from omnibus test.

activity during follow-up was associated with demographic (female sex, low SES) and clinical (comorbid DBD, SUD, and nicotine dependence) variables, similar to findings among healthy youth.^{11,32–35} Sexually active participants were more likely older and at later pubertal stages, females, not living with both biological parents, older at BD onset, using substances, and more likely to have a history of sexual abuse than non-sexually active youth. Indeed, sexual risk behavior was prevalent in the sample, with two-thirds of sexually active youth with BD reporting sexual activities above minimal risk and one-third reporting pregnancy. Of COBY youth, sexual risk behavior was associated with non-Caucasian race, low SES, history of sexual abuse, and symptoms of SUD, consistent with the normative literature.^{35–38} As predicted, mood symptoms, and specifically symptoms of hypomania, temporally preceded sexual risk behavior.

Females with BD reported younger age at first sexual activity in the study than males with BD. This result directly contrasts with normative data gathered through the Youth Risk Behavior Survey (YRBS), in which males reported an earlier sexual debut.³⁹ The discrepancy can be explained by the limited racial and ethnic diversity within the COBY; YRBS data suggested African American and Hispanic youth report a younger age at first sexual activity than youth of other races.³⁹ We found no difference between males and females in level of sexual risk, although several studies have indicated females are likely to concede to their partners in important sexual decisions,^{40,41} and psychiatric symptoms such as depression and mania/hypomania can further impair judgment.⁴² Delineation of specific sexual risk behaviors (e.g., condom use) could yield more conclusive results regarding sex differences in risk behaviors among youth with BD.

Our analyses suggest hypomanic symptoms are associated with greatest risk for sexual risk behavior (greater than depressed, mixed, and euthymic) within this population. Previous studies have established an

association of hypomanic symptoms with sexual risk behavior in youth,^{4,9,10} but to our knowledge, this is the first to identify risk specifically associated with hypomanic symptoms immediately preceding sexual risk behavior. Therefore, the present study provides insight into vulnerable periods for sexual risk over the course of BD illness in youth.

In keeping with the literature,⁴³ we found that history of sexual abuse was prevalent (19%; $n = 55$) at intake and was associated with earlier sexual activity during follow-up and a higher level of sexual risk. Traumatic sexual abuse or assault events continued during follow-up (11%; $n = 33$). Of note, a prior study documented an association between mood symptoms and victimization by peers among adolescents receiving psychiatric care, although this was not specific to youth with a BD diagnosis.⁴⁴ As such, documentation of sexual abuse could help clinicians identify youth at risk for later sexual risk behavior and victimization.

Given the high rate of comorbidity in pediatric BD, we examined the association between common comorbidities (ADHD, DBD, anxiety, SUD, and nicotine dependence) and sexual risk behavior. Current literature has associated symptoms of ADHD with sexual risk behavior,¹⁰ yet these symptoms were not associated with age at first sexual activity or level of sexual risk in our study. Given overlap in symptoms between ADHD and BD, in the presence of early-onset BD symptoms, the variance accounted for by comorbid ADHD in predicting sexual risk behavior might be less significant. We found no association of anxiety symptoms and first sexual activity or level of sexual risk during follow-up, consistent with prior findings.⁴ Symptoms of DBD were not associated with sexual risk in our sample, yet comorbid DBD symptoms were a strong predictor of first sexual activity during follow-up, as reported previously.³³ Therefore, youth with BD and concurrent DBD could be at particularly increased risk for earlier sexual activity. As in prior studies,^{4,9,45} SUD was strongly associated

TABLE 3 Manic/Hypomanic and Mixed Mood Symptoms Are Associated With Subsequent Sexual Risk (in the Following Month)

Predominant Mood Symptoms	OR	p Value ^a	95% CI for OR
Depressed vs. well	0.87	.2121	0.71–1.08
Manic/hypomanic vs. well	1.36	.0077	1.08–1.70
Mixed vs. well	1.36	.0732	0.97–1.89
Manic/hypomanic vs. depressed	1.55	.0008	1.20–2.01
Mixed vs. depressed	1.55	.009	1.12–2.16
Mixed vs. manic/hypomanic	1	.9956	0.71–1.40

Note: Boldface data reflect statistical significance at $p < .05$. OR = odds ratio.

^aSingle regression model controlling for age, race, socioeconomic status, age at bipolar onset, history of sexual abuse, and use of psychotropic medication.

with first sexual activity during follow-up and level of sexual risk. We hypothesize that the strong association of comorbid SUD and sexual risk behavior might be linked to impaired decision-making abilities under the influence and/or lack of parental monitoring in the environment in which substances are used. SUD should be closely monitored as a potent predictor of sexual risk behavior.

Our study highlights the potential protective function of family environment against sexual risk behaviors. In families reporting high cohesion and adaptability, youth are less likely to participate in risky sexual behavior. Clinicians could promote the protective potential of family relationships and identify patients for whom more targeted intervention might be required.

We identify several limitations of the present study. Ratings of sexual functioning are retrospective and therefore subject to errors in estimation and recollection. For this reason, ratings of sexual behavior, number of partners, or sexual frequency might not accurately estimate actual sexual risk within the sample. Furthermore, sexual behavior was assessed by clinical interview, which can result in under-reporting owing to social desirability compared with automated methods.⁴⁶ In addition, the PSF sexual risk categories do not characterize specific sexual behaviors, so there could be variability in participants' perceived definitions of "high-risk" behavior. However, assessors used specific anchors for sexual risk to standardize ratings. Future research examining sexual risk behavior in this population could consider measures specific to the sexual risk literature.

Although several participants reported pregnancy or abortion during follow-up, the self-report measures used did not reliably document the number of pregnancies or abortions per individual or the age and month at which these events occurred. Further examination of the temporal association of pregnancy and abortion with mood symptoms is warranted.

The study was naturalistic, and therefore psychiatric treatment varied within the sample. Although we did control for psychotropic medication usage in our analyses, we did not assess adherence to medication regimens. Thus, we cannot determine what role medication plays in sexual risk behavior in this sample. Similarly, we did not examine participation in psychotherapy to determine whether such treatment could affect sexual risk behavior.

The COBY sample was recruited primarily from outpatient university centers and was predominantly Caucasian, so generalizability of the results remains uncertain. In addition, youth with BP-II were under-represented in our sample, potentially limiting power to find differences between BD subtypes.

Overall, the present results suggest demographic and clinical factors are associated with risk for earlier sexual activity

and sexual risk behavior among youth with BD. Clinicians treating youth with BD should inquire regularly about sexual behavior. Females from low-SES families with DBD and SUD could be at increased risk for engaging in sexual activities at a young age. Non-Caucasian youth from low-SES families who also report SUD or history of sexual abuse could be at greater risk for sexual risk behavior. Patient-focused discussion of sexual behavior could aid in the prevention of more long-term repercussions such as unplanned pregnancy or acquisition of STIs. The protective nature of strong familial relationships also could be incorporated into treatment. Furthermore, ongoing discussion of patient life goals could provide individualized motivation for practicing safer sex.

Accepted November 21, 2017.

Ms. Krantz, Dr. T. Goldstein, Mr. Rooks, Mr. Merranko, Ms. Liao, Ms. Gill, Drs. Diler, Hafeman, Ryan, and Birmaher are with Western Psychiatric Institute and Clinic, University of Pittsburgh School of Medicine, Pittsburgh, PA. Dr. B. Goldstein is with Sunnybrook Health Sciences Centre, University of Toronto, Toronto, ON, Canada. Ms. Hower is with the Alpert Medical School of Brown University, Providence, RI. Dr. Yen is with the Alpert Medical School and Butler Hospital, Providence. Dr. Hunt is with the Alpert Medical School and Bradley Hospital, Providence. Dr. Keller is with Butler Hospital. Dr. Strober is with the David Geffen School of Medicine, University of California, Los Angeles. Dr. Axelson is with Nationwide Children's Hospital and The Ohio State College of Medicine, Columbus.

This research was supported by National Institute of Mental Health (NIMH) grants MH59929 (principal investigator Boris Birmaher, MD), MH59977 (principal investigator Michael Strober, PhD), and MH59691 (principal investigators Martin Keller, MD, and Shirley Yen, PhD).

Mr. Rooks and Mr. Merranko served as the statistical experts for this research.

The authors thank the families who participated in the COBY study, the COBY research team, and the faculty and staff of the Child and Adolescent Bipolar Spectrum Services clinic at the University of Pittsburgh. The authors also thank Shelli Avenevoli, PhD, from the NIMH for her support.

Disclosure: Dr. T. Goldstein has received research support from the NIMH, the American Foundation for Suicide Prevention, and the Brain and Behavior Research Foundation and royalties from Guilford Press. Dr. Diler has received research support from the NIMH. Dr. Hafeman has received research support from the NIMH and the Klingenstein Third Generation Foundation. Dr. Ryan has received research support from the NIMH and has served on the scientific advisory board of the Child Mind Institute. Dr. B. Goldstein has received grant or research support from the NIMH, the Canadian Institutes of Health Research, the Brain and Behavior Research Foundation (NARSAD), the Ontario Ministry of Research and Innovation, the Ontario Mental Health Foundation, the Heart and Stroke Foundation of Canada, and Brain Canada. Dr. Yen has received research support from the NIMH and has served as a consultant to Janssen Global Services. Dr. Hunt has received research support from the NIMH and has received honoraria from Wiley Publishers as a senior editor of *The Brown University Child and Adolescent Psychopharmacology Update*. Dr. Keller has received research support from the NIMH. Dr. Strober has received research support from the NIMH and as the Resnick Endowed Chair in Eating Disorders at the University of California, Los Angeles. Dr. Axelson has received research support from the NIMH, royalties from UpToDate, and has served as a consultant to Janssen Global Services, LLC. Dr. Birmaher has received research support from the NIMH. He has or will receive royalties from American Psychiatric Association Publishing, Random House, Inc., Lippincott Williams and Wilkins, and UpToDate. Ms. Krantz, Mr. Rooks, Mr. Merranko, Ms. Liao, Ms. Gill, and Ms. Hower report no biomedical financial interests or potential conflicts of interest.

Correspondence to Tina Goldstein, PhD, Department of Psychiatry, Western Psychiatric Institute and Clinic, University of Pittsburgh, 3811 O'Hara Street, BFT#531, Pittsburgh, PA 15213; e-mail: goldtr@upmc.edu

0890-8567/\$36.00/©2017 American Academy of Child and Adolescent Psychiatry

<https://doi.org/10.1016/j.jaac.2017.11.015>

REFERENCES

- Centers for Disease Control and Prevention. Youth risk behavior surveillance—United States 2013. *MMWR Morb Mortal Wkly Rep.* 2014;63:24-29.
- Bardone AM, Moffitt TE, Caspi A, Dickson N, Stanton WR, Silva PA. Adult physical health outcomes of adolescent girls with conduct disorder, depression, and anxiety. *J Am Acad Child Adolesc Psychiatry.* 1998;37:594-601.
- Baker DG, Mossman D. Potential HIV exposure in psychiatrically hospitalized adolescent girls. *Am J Psychiatry.* 1991;148:528-530.
- Ramrakha S, Caspi A, Dickson N, Moffitt TE, Paul C. Psychiatric disorders and risky sexual behaviour in young adulthood: cross sectional study in birth cohort. *BMJ.* 2000;321:263-266.
- Vigod SN, Dennis CL, Kurdyak PA, Cairney J, Guttman A, Taylor VH. Fertility rate trends among adolescent girls with major mental illness: a population-based study. *Pediatrics.* 2014;133:e585-e591.
- Tubman J, Gil A, Wagner E, Artigues H. Patterns of sexual risk behaviors and psychiatric disorders in a community sample of young adults. *J Behav Med.* 2003;26:473-500.
- Mellins C, Brackis-Cott E, Leu C, *et al.* Rates and types of psychiatric disorders in perinatally human immunodeficiency virus-infected youth and seroreverters. *J Child Psychol Psychiatry.* 2009;50:1131-1138.
- Brown LK, Hadley W, Stewart A, *et al.* Psychiatric disorders and sexual risk among adolescents in mental health treatment. *J Consult Clin Psychol.* 2010;78:590-597.
- Stewart AJ, Theodore-Okata C, Hadley W, Brown L, Donenberg G, DiClemente R. Mania symptoms and HIV-risk behavior among adolescents in mental health treatment. *J Clin Child Adolesc Psychol.* 2012;41:803-810.
- Sarver DE, McCart MR, Sheidow AJ, Letourneau EJ. ADHD and risky sexual behavior in adolescents: conduct problems and substance use as mediators of risk. *J Child Psychol Psychiatry.* 2014;55:1345-1353.
- Longmore MA, Manning WD, Giordano PC, Rudolph JL. Self-esteem, depressive symptoms, and adolescents' sexual onset. *Soc Psychol Q.* 2004;67:279-295.
- Spriggs AL, Halpern CT. Sexual debut timing and depressive symptoms in emerging adulthood. *J Youth Adolesc.* 2008;37:1085-1096.
- Drain PK, Smith JS, Hughes JP, Halperin DT, Holmes KK. Correlates of national HIV seroprevalence: an ecologic analysis of 122 developing countries. *J Acquir Immune Defic Syndr.* 2004;35:407-420.
- Panova OV, Kulikov AM, Berchtold A, Suris JC. Factors associated with unwanted pregnancy among adolescents in Russia. *J Pediatr Adolesc Gynecol.* 2016;29:501-505.
- Marengo E, Martino DJ, Igua A, *et al.* Sexual risk behaviors among women with bipolar disorder. *Psychiatry Res.* 2015;230:835-838.
- Marengo E, Martino DJ, Igua A, *et al.* Unplanned pregnancies and reproductive health among women with bipolar disorder. *J Affect Disord.* 2015;178:201-205.
- Birmaher B, Axelson D, Strober M, *et al.* Clinical course of children and adolescents with bipolar spectrum disorders. *Arch Gen Psychiatry.* 2006;63:175-183.
- Axelson D, Birmaher B, Strober M, *et al.* Phenomenology of children and adolescents with bipolar spectrum disorders. *Arch Gen Psychiatry.* 2006;63:1139-1148.
- Kaufman J, Birmaher B, Brent D, *et al.* Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version (K-SADS-PL): initial reliability and validity data [see comment]. *J Am Acad Child Adolesc Psychiatry.* 1997;36:980-988.
- Axelson D, Birmaher BJ, Brent D, *et al.* A preliminary study of the Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children mania rating scale for children and adolescents. *J Child Adolesc Psychopharmacol.* 2003;13:463-470.
- Chambers WJ, Puig-Antich J, Hirsch M, *et al.* The assessment of affective disorders in children and adolescents by semistructured interview. Test-retest reliability of the schedule for affective disorders and schizophrenia for school-age children, present episode version. *Arch Gen Psychiatry.* 1985;42:696-702.
- Keller MB, Lavori PW, Friedman B, *et al.* The Longitudinal Interval Follow-up Evaluation. A comprehensive method for assessing outcome in prospective longitudinal studies. *Arch Gen Psychiatry.* 1987;44:540-548.
- Warshaw MG, Dyck I, Allsworth J, Stout RL, Keller MB. Maintaining reliability in a long-term psychiatric study: an ongoing inter-rater reliability monitoring program using the longitudinal interval follow-up evaluation. *J Psychiatr Res.* 2001;35:297-305.
- Warshaw MG, Keller MB, Stout RL. Reliability and validity of the longitudinal follow-up evaluation for assessing outcome of anxiety disorders. *J Psychiatr Res.* 1994;28:531-545.
- Hollingshead A. Four-Factor Index of Social Status. New Haven, CT: Yale University; 1975.
- Peterson AC, Crockett L, Richards M, Boxer A. A self-report measure of pubertal status: reliability, validity and initial norms. *J Youth Adolesc.* 1988;17:133.
- Johnson JH, McCutcheon SM. Assessing Life Stress in Older Children and Adolescents: Preliminary Findings With the Life Events Checklist. Washington, DC: Hemisphere; 1980.
- Sarason IG, Johnson JH, Siegel JM. Assessing the impact of life changes: development of the Life Experiences Survey. *J Consult Clin Psychol.* 1978;46:932-946.
- Olsen DH, Portner J, Lavee Y. Family Adaptability and Cohesion Evaluation Scales (FACES-II). Minneapolis: University of Minnesota Press; 1985.
- Robin AL, Foster SL. The Conflict Behavior Questionnaire. In: Hersen M, Bellack AS, eds. *Dictionary of Behavioral Assessment Techniques.* New York: Pergamon; 1995:148-150.
- Liang K-Y, Zeger SL. Longitudinal data analysis using generalized linear models. *Biometrika.* 1986;73:13-22.
- Paul C, Fitzjohn J, Herbison P, Dickson N. The determinants of sexual intercourse before age 16. *J Adolesc Health.* 2000;27:136-147.
- Donahue KL, Lichtenstein P, Lundstrom S, *et al.* Childhood behavior problems and adolescent sexual risk behavior: familial confounding in the Child and Adolescent Twin Study in Sweden (CATSS). *J Adolesc Health.* 2013;52:606-612.
- Lowry R, Dunville R, Robin L, Kann L. Early sexual debut and associated risk behaviors among sexual minority youth. *Am J Preventive Med.* 2017;52:379-384.
- Cooper ML, Peirce RS, Huselid RF. Substance use and sexual risk taking among black adolescents and white adolescents. *Health Psychol.* 1994;13:251-262.
- Pflier JC, Cook EC, Nicolai LM, Connell CM. Racial/ethnic differences in patterns of sexual risk behavior and rates of sexually transmitted infections among female young adults. *Am J Pub Health.* 2013;103:903-909.
- Sales JM, Smearman EL, Swartzendruber A, Brown JL, Brody G, DiClemente RJ. Socioeconomic-related risk and sexually transmitted infection among African-American adolescent females. *J Adolesc Health.* 2014;55:698-704.
- Lowry R, Robin L, Kann L. Effect of forced sexual intercourse on associations between early sexual debut and other health risk behaviors among US high school students. *J School Health.* 2017;87:435-447.
- Cavazos-Rehg PA, Krauss MJ, Spitznagel EL, *et al.* Age of sexual debut among US adolescents. *Contraception.* 2009;80:158-162.
- Begley E, Crosby RA, DiClemente RJ, Wingood GM, Rose E. Older partners and STD prevalence among pregnant African American teens. *Sex Transm Dis.* 2003;30:211-213.
- Crosby RA, DiClemente RJ, Wingood GM, Sionea C, Cobb BK, Harrington K. Correlates of unprotected vaginal sex among African American female adolescents: importance of relationship dynamics. *Arch Pediatr Adolesc Med.* 2000;154:893-899.
- Goldstein TR, Birmaher B, Axelson D, *et al.* Psychosocial functioning among bipolar youth. *J Affect Disord.* 2009;114:174-183.
- Brown M, Masho S, Perera R, Mezuk B, Cohen S. Sex and sexual orientation disparities in adverse childhood experiences and early age at sexual debut in the United States: results from a nationally representative sample. *Child Abuse Neglect.* 2015;46:89-102.
- Siegel R, Freeman A, LaGreca A, Youngstrom E. Peer relationship difficulties in adolescents with bipolar disorder. *Child Youth Care Forum.* 2015;44:355-375.
- Goldstein BI, Strober MA, Birmaher B, *et al.* Substance use disorders among adolescents with bipolar spectrum disorders. *Bipolar Disord.* 2008;10:469-478.
- Ghanem K, Hutton H, Zenilman J, Zimba R, Erbeling E. Audio computer assisted self interview and face to face interview modes in assessing response bias among STD clinic patients. *Sex Transm Infect.* 2005;81:421-425.