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Research report

Prevalence and correlates of eating disorders in 875 patients with bipolar disorder ☆

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ABSTRACT

Objective: Relatively little is known about the co-occurrence of bipolar and eating disorders. We therefore assessed the prevalence and clinical correlates of eating disorders in 875 patients with bipolar disorder.
Method: 875 outpatients with DSM-IV bipolar I or II disorder were evaluated with structured diagnostic interviews and clinician- and self-administered questionnaires to determine bipolar and eating disorder diagnoses, other comorbid Axis I disorder diagnoses, and demographic and historical illness characteristics.
Results: 125 (14.3%) patients met DSM-IV criteria for at least one comorbid lifetime Axis I eating disorder, with binge eating disorder (N = 77) being more common than bulimia nervosa (n = 42) and anorexia nervosa (N = 27). There were no significant eating disorder comorbidity differences between bipolar I and bipolar II patients. Presence of a lifetime comorbid eating disorder was associated with female gender, younger age, earlier age of onset of mood symptoms and of bipolar disorder, presentation in a mixed episode, greater number of prior mood episodes, history of rapid cycling and suicide attempts, greater mean BMI, obesity and severe obesity, and family history of depression, bipolar disorder, alcoholism, and drug abuse. When the three eating disorder groups were compared, lifetime anorexia nervosa was associated with normal weight and a lifetime anxiety disorder, lifetime bulimia nervosa was associated with overweight, and lifetime binge eating disorder was associated with obesity and severe obesity.
Conclusions: Patients with bipolar disorder, especially women, not infrequently have comorbid eating disorders, and this comorbidity is associated with an earlier age of onset and more severe course of bipolar illness.

1. Introduction

Substantial clinical and community data indicate that bipolar disorder co-occurs with substance use, anxiety, and

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impulse control disorders, and that these comorbidities are associated with negative effects on the course, outcome, and treatment response of bipolar disorder (Frank et al., 2002; McElroy et al., 2001; Merikangas et al., 2007; Nierenberg et al., 2005; Simon et al., 2004b). Another comorbidity which has received far less systematic attention but which may also be important is that between bipolar disorder and eating disorders (Fornaro et al., 2009; McElroy et al., 2005; Wildes et al., 2007a, 2008). Thus, patients with bipolar disorder have been shown to have high rates of co-occurring anorexia nervosa, bulimia nervosa, and binge eating disorder (Fornaro et al., 2009; McElroy et al., 2005; Wildes et al., 2007a, 2008). Conversely, patients with eating disorders have been reported to have elevated rates of comorbid bipolar disorder (Halmi et al., 1991; Javaras et al., 2008; Simpson et al., 1992). Controlled family history studies have found elevated rates of bipolar disorders in the first-degree relatives of probands with anorexia nervosa, bulimia nervosa, and binge eating disorder (Gershon et al., 1984; Hudson et al., 2008; Hudson et al., 1987; Lilenfeld et al., 2008; Winokur et al., 1980). Community studies have found hypomania to be associated with binge eating (Angst, 1998; Lewinsohn et al., 2004). Recently, the National Comorbidity Survey-Replication found bipolar I and II disorders were associated with bulimia nervosa and binge eating disorder, but not anorexia nervosa (Hudson et al., 2007). Moreover, eating disorders, like bipolar disorder, frequently co-occur with substance use and anxiety disorders (Hudson et al., 2007).

Little is known, however, about the relationship between bipolar disorder and eating disorders. For example, few studies have systematically examined rates of different types of eating disorders (anorexia nervosa versus bulimia nervosa versus binge eating disorder) across different subtypes of bipolar disorder (e.g., bipolar I versus bipolar II disorder), or the effects of a comorbid eating disorder on the phenomenology, course, outcome, and treatment response of bipolar disorder. There were those who have suggested that bipolar patients with eating disorders have more weight disturbance, more depressive episodes or recurrences, and greater psychiatric comorbidity than bipolar patients without eating disorders (McElroy et al., 2002; Perlis et al., 2006; Wildes et al., 2007a).

To further evaluate the prevalence and correlates of eating disorders in bipolar disorder, we systematically assessed, using DSM-IV criteria, co-occurring lifetime eating disorders in 875 patients with bipolar I or II disorder who were consecutively enrolled in the SFBN, and the relationship of these disorders with selected demographic and illness variables. We hypothesized that eating disorders would be common in these patients, particularly women, and that the presence of these disorders would be associated with negative effects on the presentation and course of their bipolar disorder.

2. Methods

Details of the Stanley Foundation Bipolar Treatment Outcome Network (SFBN; 1995–2002) are described elsewhere (Leverich et al., 2001; Suppes et al., 2001). Briefly, outpatients with bipolar disorder were enrolled if they met the following inclusion criteria: 1) age at least 18 years; 2) willingness and ability to perform prospective daily mood charting and attend monthly evaluation appointments; 3) willingness to be in some form of ongoing treatment with a psychiatrist; 4) not requiring treatment for an active substance use disorder; and 5) provision of written informed consent after the study procedures had been fully explained. There was no payment for participation.

More than 900 patients enrolled in the naturalistic follow-up study. Baseline evaluation included completion of the Structured Clinical Interview for DSM-IV (SCID-P) (First, 1996) to establish the diagnosis of bipolar disorder, illness characteristics (e.g., bipolar disorder subtype and age of onset), and comorbid Axis I disorder diagnoses, including the following eating disorder diagnoses: anorexia nervosa, bulimia nervosa, and binge eating disorder. The evaluation also included completion of structured patient- and clinician-administered questionnaires to determine demographic factors (e.g., years of education, current level of occupational functioning), historical illness variables (e.g., age of onset of mood symptoms, rapid cycling, suicide attempts, and course of illness), family history of psychiatric illness, and height and weight. The SCID-P and questionnaires were administered by highly trained clinical research assistants at the individual sites. Excellent interrater reliability was achieved for the diagnosis of bipolar disorder with an overall kappa score of .917. Age of onset of bipolar, eating, and other comorbid disorders was defined as the first time the patient met DSM-IV criteria for the disorder.

The associations between categorical variables were analyzed using x^2 tests. Associations between continuous variables and categorical variables were analyzed using independent-sample t-tests or analyses of variance (ANOVA) as appropriate.

3. Results

Of the 908 patients who entered the naturalistic follow-up study, 875 patients with bipolar I or bipolar II disorder completed a SCID-P and had complete comorbid diagnostic information (674 and 675, respectively had completed patient and clinician questionnaires). 493 (56%) of the group were women, the mean current age was 41.1 years (SD 12) (range 14–86), the mean age of onset of illness was 20.8 years (SD 10.9) (range 0–72), and the mean duration of illness was 20.3 years (SD 13.2) (range 0–73). 576 (65.8%) patients reported limitation of occupational functioning from their bipolar illness, 513 (58.6%) reported one or more psychiatric hospitalizations, and 147 (16.8%) reported a first-degree relative with a mood disorder. These features are similar to those of the first 261 SFBN patients described in greater detail elsewhere (Suppes et al., 2001).

Table 1 shows that the rates of lifetime DSM-IV Axis I eating disorders in this group of bipolar patients were high, with 125 (14.3%) patients meeting criteria for at least one eating disorder. The most common eating disorder was binge eating disorder (8.8%), followed by bulimia nervosa (4.8%) and then anorexia nervosa (3.1%). Nineteen (2.2%) patients met lifetime criteria for at least two eating disorders. Restricting the analysis to women (n = 493), 104 (21%) had at least one eating disorder, 61 (12.4%) had binge eating disorder, 37 (7.5%) had bulimia nervosa, 27 (5.5%) had anorexia nervosa. Nineteen (3.8%) had two or more eating disorders. Bipolar I and bipolar II patients showed no differences regarding rates of lifetime comorbid eating disorders (see Table 1).

Table 2 compares eating disorder prevalence rates from the American patients with those from the National Comorbidity Survey-Replication general population sample (Hudson et al.,

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Table 1
Comorbid lifetime eating disorders of patients with bipolar I and II disorders.

Eating disorder	All patients with bipolar diagnoses (N = 875)		Bipolar I (N = 707)		Bipolar II (N = 168)		Comparison of bipolar I and bipolar II	
	N	%	N	%	N	%	x^2 (df = 1)	P
Any (≥1)	125	14.3	102	14.4	23	13.7	0.61	.80
Anorexia nervosa	27	3.1	20	2.8	7	3.1	0.75	.38
Bulimia nervosa	42	4.8	33	4.7	9	5.4	0.14	.71
Binge eating disorder	77	8.8	63	8.9	14	8.9	0.06	.81
Multiple (≥2)	86	9.8	69	9.8	17	10.1	0.02	.88

2007). Women from the SFBN had significantly higher rates of all three eating disorders than the comparable general population groups. Men from the SFBN had significantly higher rates of bulimia nervosa and binge eating disorder.

The relationships between the presence and absence of at least one lifetime eating disorder, and between patients diagnosed with exactly one of the three different eating disorder diagnoses, and selected demographic and historical illness variables are shown in Table 3. A lifetime eating disorder was associated with female gender, younger age, earlier age of onset of bipolar disorder and of first affective symptoms, more episodes of hypomania/mania and depression, history of suicide attempts and rapid cycling, comorbid anxiety disorders, elevated mean BMI, obesity and severe obesity, and family history of unipolar depression, bipolar disorder, alcoholism, and drug abuse. Despite these findings, patients with eating disorders reported receiving more years of education than patients without eating disorders. This difference was driven to a large extent by the fact that patients with multiple eating disorders had significantly higher education than any other group ($M = 17.1$, $SD = 1.9$, $t(719) = 3.12$, $p < .01$).

When compared with one another, the three eating disorder groups showed differences in both self reported current and normal (or ideal) weights. Patients with lifetime anorexia nervosa both reported and had normal mean BMIs; patients with lifetime bulimia nervosa reported their current and normal mean BMIs in the overweight range; while those with lifetime binge eating disorder reported their normal mean BMIs in the overweight range but had current mean BMIs in the obese range. Otherwise, there were relatively few differences among the three eating disorder groups. Though all eating disorder groups were more likely to be predominantly female, the anorexia nervosa group was 100% female, the binge eating disorder group 76% female, and the bulimia nervosa group was intermediate (85%). The anorexia nervosa group was youngest, the binge eating disorder group was oldest, and the bulimia nervosa group was again intermediate. Patients with lifetime anorexia nervosa had higher rates of anxiety disorders and significantly higher parental education than the other patient groups.

Age of onset data of eating disorder relative to bipolar disorder was available for 70 patients. Thirty nine (55.7%) of these patients had onset of bipolar disorder before the eating disorder (n = 5 of 9 with anorexia nervosa, 8 of 16 with bulimia nervosa, and 26 of 45 with binge eating disorder). Seven (10%) had both disorders beginning within the same year (n = 1 anorexia nervosa, 1 bulimia nervosa, and 5 binge eating disorder) and 24 (34.3%) had onset of bipolar disorder after the eating disorder (n = 3 anorexia nervosa, 7 bulimia nervosa, and 14 binge eating disorder).

4. Discussion

Our findings of apparently high rates of lifetime eating disorders in a population of patients with bipolar disorders are consistent with existing data from community and clinical samples suggesting that these disorders co-occur with bipolar disorder more often than expected by chance alone. Comorbidity with an eating disorder was associated with a more pathological course of bipolar disorder, with an earlier age of onset of mood symptoms and bipolar disorder, a greater number of past episodes, and higher rates of suicide attempts and rapid cycling. Moreover, a lifetime eating disorder was associated with a lifetime anxiety disorder.

Comorbidity with an eating disorder was also associated with greater weight disturbance. Specifically, a lifetime history of bulimia nervosa was associated with overweight and a lifetime history of binge eating disorder was associated with obesity and severe obesity. This is a notable finding because growing evidence suggests bipolar disorder shares a relationship with obesity and conditions related to obesity, such as metabolic syndrome and type 2 diabetes, that may not

Table 2
Lifetime rates of DSM-IV eating disorders.

Stanley Foundation Bipolar Treatment Network							National Comorbidity Survey-Replication					
Any eating disorder	Female		Male		Total		Female		Male		Total	
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
Anorexia nervosa	5.4	1.0	0		3.1	.5	.9	.3	.3	.1	.6	.2
Bulimia nervosa	7.5	1.1	1.1	1.0	4.7	.7	1.5	.3	.5	.3	1.0	.2
Binge eating disorder	12.4	1.4	4.3	1.1	8.8	.9	3.5	.5	2.0	.5	2.8	.4

These values are all significant when comparing women to men, and when comparing the Stanley Foundation numbers to the national sample (except for anorexia nervosa in males).

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Table 3
Demographic and clinical features for 875 bipolar patients with and without lifetime comorbid eating disorders.

Variable	No eating disorder (N = 750)		Any eating disorder (N = 125)		Analysis	Anorexia nervosa (N = 12)		Bulimia nervosa (N = 27)		Binge eating disorder (N = 77)		Analysis
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	Mean	SD	
Age (years)												
Current	41.4	12.2	38.9	12.0	$t(871) = 2.19$, $p = .03$	34.0	11.0	36.4	11.7	40.6	10.3	$F(2,103) = 2.81$, $p = .06$
At onset of bipolar disorder	21.3	11.3	18.2	7.9	$t(835) = 2.90$, $p < .01$	17.6	11.9	18.2	5.4	18.2	8.1	$F(2,101) = 2.21$, $p = .96$
First symptoms of depression affecting functioning	20.7	10.9	12.8	6.2	$t(686) = 4.69$, $p < .01$	12.8	6.2	16.4	7.0	15.7	7.3	$F(2,86) = 0.06$, $p = .95$
First symptoms of hypomania/ mania affecting functioning	23.8	11.6	15.5	7.1	$t(693) = 3.69$, $p < .01$	16.8	6.1	18.8	7.6	21.2	9.4	$F(2,86) = 1.4$, $p = .25$
	N	%	N	%		N	%	N	%	N	%	
Gender												
Female	389	53	104	83	$x^2(1) = 46.4$, $p < .01$	12	100	22	85	51	76	$x^2(2) = 4.06$, $p = .04$
Bipolar I diagnosis	605	81	102	82	$x^2(1) = 0.06$, $p = .80$;	9	75	24	89	56	84	$x^2(2) = 1.21$, $p = .56$
Presentation												
Euthymic	398	52	50	40	$x^2(5) = 26.41$, $p < .001$	6	50	11	41	28	42	$x^2(5) = 4.99$, $p = .89$
Manic	30	4	10	8		1	8	4	15	4	6	
Mixed/dysphoric	66	9	30	24		3	25	5	18	17	25	
Hypomanic	65	9	10	8		0	0	2	7	3	4	
Depressed	188	25	23	18		2	17	4	15	14	21	
Unspecified	12	2	2	2		0	0	1	4	1	1	
Limited occupational functioning	359	60.0	73	68.0	$x^2(1) = 2.4$, $P = .12$;	5	50.0	13	56.0	44	76.0	$x^2(2) = 4.4$, $p = .11$
Education (years)	15.6	2.0	16.0	2.0	$t(719) = 2.09$, $p = .04$	15.6	2.1	15.8	2.0	15.8	2.0	$F(2,88) = 0.6$, $p = .95$
Parents education (years)	15.0	3.0	15.3	3.0	$t(696) = 0.74$, $p = .46$;	17.8	1.7	15.1	3.4	14.6	3.0	$F(2,86) = 4.79$, $p = .01$
History												
Episodes of hypomania/mania	14.8	11.7	18.9	11.8	$t(699) = 3.15$, $p < .01$;	22.1	10.7	15.9	12.4	20.4	11.2	$F(2,87) = 1.57$, $p = .21$
Hospitalizations for mania	2.6	5.2	1.6	2.8	$t(697) = 1.98$, $p = .048$	0.5	1.1	2.3	2.9	1.6	3.2	$F(2,88) = 1.23$, $p = .30$
Episodes of Depression	17.2	12.2	21.1	11.9	$t(695) = 3.09$, $p < .01$	20.7	12.1	17.7	13.3	22.8	11.1	$F(2,88) = 1.56$, $p = .22$

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Hospitalizations for depression	2.2	4.5	2.8	5.4	$t(699) = 0.32$, $p = .29$	1.4	1.3	4.3	8.6	1.9	2.9	$F(2,87) = 2.22$, $p = .11$
Suicide attempts	1.63	1.12	1.94	1.3	$t(452) = 2.12$, $p = .03$	1.86	0.9	1.61	1.0	1.71	1.1	$F(2.57) = 0.16$, $p = .86$
Rapid cycling [a]	200	38.0	51	60.0	$x^2(1) = 13.19$, $p < .01$	4	40.0	9	50.0	9	20.0	$x^2(2df) = 6.22$, $p = .04$
Comorbidity												
Anxiety disorder	278	45	90	80	$x^2(1) = 43.7$, $p < .001$	12	100	19	76	46	75	$x^2(2) = 6.23$, $p = .04$
Substance use disorder	223	30	34	27	$x^2(1) = 0.38$, $p = .54$	4	33	7	26	13	19	$x^2(2) = 1.29$, $p = .52$
Body mass index												
Current	27.2	5.8	31.1	9.1	$t(697) = 5.6$, $p < .001$	20.1	1.6	27.8	5.5	35.2	8.9	$F(2,84) = 18.74$, $p < .01$
Normal	24.6	4.7	24.7	5.8	$t(640) = 0.26$, $p = .79$	19.8	1.1	25.3	5.5	26.3	6.5	$F(2,74) = 4.66$, $p = .01$
Difference	2.7	3.7	6.0	0.7	$t(635) = 6.75$, $p < .001$	0.9	0.7	2.8	2.9	8.7	7.3	$F(2,73) = 11.05$, $p < .01$
Body weight status												
Underweight (BMI <18.5)	12	2.0	2	2.0	$x^2(4) = 49.2$, $p < .001$	1	11.0	0	0	1	2.0	$x^2(8) = 39.15$, $p < .01$
Normal (BMI 18.5–24.9)	210	35.0	34	33.0		8	89.0	8	36.0	8	14.0	
Overweight (BMI 25–29.9)	225	38.0	14	14.0		0	0	7	32.0	6	11.0	
Obesity (BMI ≥30)	128	21.0	35	34.0		0	0	6	27.0	25	45.0	
Severe obesity (BMI ≥40)	20	3.0	19	18.0		0	0	1	4.0	16	29.0	
Psychiatric history in first-degree relatives												
Unipolar depression	320	52.0	74	78.0	$x^2(1) = 9.4$, $p < .01$	7	70.0	17	74.0	38	65.0	$x^2(2) = 0.56$, $p = .76$
Bipolar disorder	215	35.0	54	50.0	$x^2(1) = 8.6$, $p < .01$	7	70.0	8	35	30	52.0	$x^2(2) = 3.87$, $p = .14$
Suicide or serious suicide attempt	118	19.0	21	20.0	$x^2(1) = 0.1$, $p = .91$	2	20.0	5	23.0	11	19.0	$x^2(2) = 1.52$, $p = .47$
Alcoholism	210	34.0	50	46.0	$x^2(1) = 5.7$, $p = .02$	5	50.0	6	26.0	28	48.0	$x^2(2) = 0.14$, $p = .93$
Drug abuse	141	23.0	35	20.0	$x^2(4) = 4.5$, $p = .03$	2	20.0	4	17.0	24	41.0	$x^2(2) = 3.69$, $p = .16$

[a] Rapid-cycling — four or more episodes per year.
[b] Information from SCID unless otherwise noted.

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be entirely accounted for by psychotropic medication exposure (Fagiolini et al., 2008; McIntyre et al., 2007; McIntyre et al., 2008; Petry et al., 2008; Sicras et al., 2008; Simon et al., 2006). In light of research supporting links between BED and obesity (Hudson et al., 2006) and between BED and components of the metabolic syndrome (Hudson et al., 2010), our data suggest binge eating may contribute to the relationship between bipolar disorder, obesity, and metabolic disturbances. Conversely, second generation antipsychotic agents have been reported to induce or exacerbate binge eating, including BED, in patients receiving the drugs for psychotic disorders (Theisen et al., 2003). Further studies of the relationship between bipolar disorder, obesity, and metabolic disturbances, including those assessing for medication effects, should therefore also evaluate for the presence of eating disorders.

These findings should be considered in view of several methodological limitations. First, this study included only patients with bipolar disorder, and lacked direct comparisons with a normal control group, another psychiatrically-ill group, or an epidemiologic sample. Interviewers were not blind to patients having established diagnoses of bipolar disorder. The rates of comorbid eating disorders found in our group might therefore be falsely elevated due to Berkson's (1946) bias or to interviewer bias. Because historical illness variables reported here were obtained retrospectively, sometimes by self report, it is also possible that patients with eating disorders were biased towards over reporting earlier age of onset and more severe course of their bipolar symptoms.

A second limitation is that SFBN bipolar patients may not be representative of all persons with bipolar disorder; and results based on them might not be generalizable to other bipolar populations, including those who are hospitalized or those who are not in treatment. Comparison of the SFBN bipolar patients to other clinical populations, including those of Winokur et al., the NIMH Collaborative Study, the National Depressive and Manic-Depressive Association (DMDA), and STEP, however, reveals many similarities (Katz et al., 1979; Lish et al., 1994; Simon et al., 2004a; Winokur, 1975).

Despite these limitations, our study has several strengths. First, this is one of the largest cohorts of persons with bipolar disorder to be systematically assessed for co-occurring eating disorders and their correlates. Second, structured interviews and diagnostic criteria were used to diagnose a broad spectrum of both bipolar and eating disorders, including bipolar II disorder and binge eating disorder. Third, patients were drawn from seven different geographical sites, including four sites from the United States and three sites from Europe. Fourth, relationships among eating disorder comorbidity and demographic, historical illness, and medical history variables were systematically evaluated.

Our findings of high rates of eating disorders in patients with bipolar disorder have several important clinical implications. The first is that a comprehensive evaluation of patients with bipolar disorder should include a systematic assessment for eating disorders. Also, persons with uncomplicated bipolar disorder, especially females, need to be observed carefully for the development of eating disorders. Conversely, patients presenting with eating disorders should be carefully evaluated for mood disorders, including bipolar disorder. Second, in young persons with a family history of bipolar disorder, the emergence of an early-onset eating disorder should trigger consideration of a prodromal mood disorder, including bipolar disorder. Third, in bipolar patients with pathological weight changes, occult comorbid eating disorders should be considered. Conversely, in patients with treatment-resistant eating disorders, occult comorbid bipolar disorder should be considered (Simpson et al., 1992).

Our findings, however, do not permit conclusions about the comparative treatment of bipolar disorder with and without comorbid eating disorders. To our knowledge, no prospective, controlled treatment study has assessed the effect of a comorbid eating disorder on the outcome of bipolar disorder, or compared the efficacy of different mood-stabilizing agents in bipolar patients with and without eating disorders (McElroy et al., 2006; Singh and Zarate, 2006; Wildes et al., 2007b). Conversely, no prospective treatment studies have assessed the effects of comorbid bipolarity on the outcome of eating disorders. Such prospective data would be needed to determine whether differential treatment based on comorbidity improves the outcome of patients with bipolar or eating disorders. Furthermore, greater attention should be focused on the efficacy of agents with antimanic or mood-stabilizing properties in the treatment of eating disorders (McElroy et al., 2010; McKnight and Park, 2010).

How might the overlap of bipolar and eating disorder be explained? One possibility is that these disorders are in fact distinct but unrelated disease entities, representing either nonspecific risk factors for each other or the sharing of similar end-states from different etiologic mechanisms. Another possibility, however, is that bipolar disorder and eating disorders are related. This possibility is supported by a growing body of research suggesting that eating disorders are associated with elevated familial rates of bipolar disorder (Gershon et al., 1984; Hudson et al., 2008; Hudson et al., 1987; Lilenfeld et al., 2008; Winokur et al., 1980) and may respond to agents with thymoleptic (antidepressant and/or mood-stabilizing) properties (McElroy et al., 2010; McKnight and Park, 2010). Thus, the binge eating of bulimia nervosa and binge eating disorder responds to antidepressants while the preoccupation with food and weight of anorexia nervosa may respond modestly to second generation antipsychotics (McElroy et al., In press; McKnight and Park, 2010). Indeed, preliminary research suggests that dysregulation in several common neurotransmitter and neurotrophin systems may be important in the pathophysiology of both disorders. Abnormalities in brain-derived neurotrophic factor (BDNF), which is involved in the regulation of mood and appetite, have been found in persons with bipolar disorder and those with eating disorders (Lin, 2009; Monteleone et al., 2005; Petryshen et al., 2009). Similarly, variants of the neurotrophic tyrosine kinase receptor 3 (NTRK3) gene have been associated with early-onset bipolar disorder and eating disorders (Feng et al., 2008; Mercader et al., 2008). Further research examining the overlap of these disorders would therefore appear to be just as important as further research into their differences.

In sum, our findings are consistent with others suggesting that bipolar disorder may co-occur with eating disorders, and this relationship likely has clinical and theoretical significance.

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collection, analysis, or interpretation of data; in the writing of the report; or in the decision to submit the paper for publication.

Conflict of Interest Disclosure Statement

The following investigators have the following potential conflicts of interests.

SL McElroy is a consultant to, or member of the scientific advisory boards, and/or a principal or co-investigator on research studies sponsored by Abbott Laboratories, Alkermes, Astra Zeneca, Bristol-Myers Squibb, Cephalon, Eli Lilly Inc., Forrest Laboratories, GlaxoSmithKline, Jazz Pharmaceuticals, Marriott Foundation, National Institute of Mental Health (NIMH), Orexigen Therapeutics, Schering-Plough, Shire, and Takeda Pharmaceutical Company.

She is also inventor on United States Patent No. 6,323,236 B2, Use of Sulfamate Derivatives for Treating Impulse Control Disorders, and, along with the patient's assignee, University of Cincinnati, Cincinnati, OH, has received payment from Johnson & Johnson Pharmaceutical Research & Development, L.L.C., which has exclusive rights under the patent. Filed February 18, 2000; approved November 27, 2001.

MA Frye is a consultant to, or member of the scientific advisory boards, and/or a principal or co-investigator on research studies sponsored by Astra Zeneca Pharmaceuticals, Bristol-Myers Squibb, Cephalon, Dainippon Sumittomo Pharma, Eli Lilly Inc., GlaxoSmithKline, Janssen Pharmaceutical, Johnson & Johnson, Mayo Foundation, Merck, National Alliance Alliance for Schizophrenia and Depression (NARSAD), National Institute of Alcohol Abuse and Alcoholism (NIAAA), National Institute of Mental Health (NIMH), Otsuka Pharmaceuticals, Pfizer, Sanofi-Aventis, and Schering-Plough.

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She has royalties with Jones and Bartlett (formerly Compact Clinicals).

PE Keck is a consultant to, or member of the scientific advisory boards, and/or a principal or co-investigator on research studies sponsored by Abbott Laboratories, Alkermes. Astra Zeneca Pharmaceuticals, Bristol-Myers Squibb, Cephalon, Eli Lilly Inc., Forrest Laboratories, GlaxoSmithKline, Janssen Pharmaceutical, Jazz Pharmaceuticals, Marriott Foundation, Medco, Schering-Plough, National Institute of Mental Health (NIMH), National Institute of Drug Abuse (NIDA), QuantiaMD, Orexigen, Organon, Pfizer, Sepracor, and Shire.

He is also inventor on United States Patent No. 6,387,956: Shapira NA, Goldsmith TD, Keck, PE Jr. (University of Cincinnati) Methods of treating obsessive-compulsive spectrum disorder comprises the step of administering an effective amount of tramadol to an individual. Filed March 25, 1999; approved Mary 14, 2002.

WA Nolen is a member of the scientific advisory boards, and/or honoraria/speaker for AstraZeneca, Cyberonics, Eli Lilly, Pfizer, Servier, and Wyeth.

R Kupka receives honoraria and/or research support from Astra Zeneca Pharmaceuticals, Bristol-Myers Squibb, and Eli Lilly.

RM Post is a consultant and/or speaker for Astra Zeneca Pharmaceuticals, GlaxoSmithKline, Johnson & Johnson, and Valledas.

G Hellemann, L Altshuler and GS Leverich have no conflicts of interest.

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