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Eating Disorders and Illness Burden in Patients with Bipolar Spectrum Disorders

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Abstract

Objectives—To evaluate the clinical significance of lifetime eating disorder co-morbidity in a well-defined sample of patients with bipolar spectrum disorders and to describe cognitive correlates of disordered eating in this group.

Method—Twenty-six bipolar patients with a lifetime history of a *DSM-IV* defined eating disorder ($n = 17$) or a clinically significant subthreshold eating disorder ($n = 9$) (ED group) were compared to 46 bipolar patients with no history of an eating disorder (No ED group) on demographic and clinical characteristics at study presentation, history of bipolar illness, and other psychiatric co-morbidity. Measures included the Structured Clinical Interview for *DSM-IV* Axis I Disorders (SCID-I), the Clinical Global Impression-Severity Scale-Bipolar Version (CGI-S-BP), and the Eating Disorder Examination (EDE). Height and weight were recorded to calculate body mass index (BMI).

Results—Patients in the ED group were heavier and were rated as more symptomatic on the CGI-S-BP than were patients in the No ED group. The ED group also had a higher number of lifetime depressive episodes and greater psychiatric co-morbidity, excluding eating and mood disorders. Finally, after controlling for BMI and CGI-S-BP rating, patients in the ED group had significantly higher EDE Restraint, Eating Concern, Shape Concern, Weight Concern, and Global scores than did patients in the No ED group.

Conclusions—These findings highlight the need for a renewed emphasis on the evaluation and management of weight and eating in the mood disorders. In particular, this research suggests that eating disorder co-morbidity may be a marker for increased symptom load and illness burden in bipolar disorder.

1. Introduction

Accumulating evidence indicates that eating disorder symptoms are prevalent in patients with bipolar disorder. Clinical studies of bipolar patients have found rates of binge eating from 13% to 38% (1,2). Moreover, epidemiologic research has demonstrated an association between subsyndromal (i.e., “soft spectrum”) bipolar disorders and eating disorders in community samples of adolescents and adults (3,4).

We recently used a state-of-the-art clinical interview (i.e., the Eating Disorder Examination) (5) to evaluate the full range of eating disorder psychopathology in a well-defined sample of patients with bipolar spectrum disorders (6). Our results confirmed that eating disorder

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symptoms are prevalent in bipolar patients and that current (i.e., within the past 6 months) binge eating is associated with obesity and other psychiatric morbidity in this group. These findings converge with the results of previous investigations that have documented an association between eating disorder symptoms and obesity (7), suicidal ideation (8), and residual mood disorder symptoms (9) in patients with bipolar disorder.

In this report, we expand upon previous work by examining the relationship of lifetime eating disorder co-morbidity to two additional indices of illness burden in bipolar patients: 1) history of bipolar illness (i.e., age at onset and number of previous mood episodes); and 2) other psychiatric co-morbidity. Although it is well-documented that both eating disorders and bipolar disorder co-occur with substance use and anxiety disorders (3), no study has evaluated the relationship between other psychiatric co-morbidity and eating disorders in bipolar patients. Finally, we evaluate cognitive correlates of disordered eating in bipolar patients to more fully characterize aberrant eating in this group.

2. Methods

2.1. Participants

Participants were 72 patients age ≥ 18 years enrolled at the Pittsburgh site of the Bipolar Disorder Center for Pennsylvanians (BDGP), a multi-center randomized controlled trial comparing the efficacy of guideline-based pharmacotherapy alone to pharmacotherapy plus psychosocial intervention in the treatment of patients with bipolar I, bipolar II, bipolar not otherwise specified, and schizoaffective disorder bipolar type. Recruitment procedures have been described in detail elsewhere (6). After complete description of the study, participants signed written informed consent forms approved by the University of Pittsburgh Institutional Review Board.

ED group—Twenty-six patients with a lifetime history of a *DSM-IV* defined eating disorder ($n = 17$) or a clinically significant subthreshold eating disorder ($n = 9$) comprised the ED group. Threshold-level eating disorder diagnoses included anorexia nervosa (AN; $n = 3$), bulimia nervosa (BN; $n = 4$), and binge eating disorder (BED; $n = 6$). Four patients met criteria for more than one lifetime eating disorder as follows: AN + BN ($n = 1$); AN + BED ($n = 1$); BN + BED ($n = 1$); and AN + BN + BED ($n = 1$).

It is well-documented that subthreshold eating disorder diagnoses are prevalent among individuals presenting for outpatient eating disorders treatment and are associated with clinically significant levels of impairment (10,11). Thus, bipolar patients meeting the following empirically supported eating disorder not otherwise specified (EDNOS) criteria were included in the ED group: 1) All *DSM-IV* criteria for BN except the frequency of binge eating and purging is less than 2/week (12) ($n = 1$); or 2) Objective binge episodes occurring 1/week on average for at least 6 months in the absence of purging or other recurrent compensatory behaviors (13) ($n = 8$). There were no patients in our sample with a lifetime history of subthreshold AN. Preliminary analyses found no significant differences between bipolar patients with threshold and subthreshold eating disorders on demographic and clinical characteristics at presentation for the current study (p 's $\geq .26$), history of bipolar illness (p 's $\geq .25$), or other psychiatric co-morbidity (p 's $\geq .18$). Patients with a history of threshold-level eating disorder psychopathology reported more eating concerns during the past 4 weeks than did patients with a history of subthreshold eating disturbance ($p = .02$). There were no other significant differences between the threshold and subthreshold eating disorder groups with respect to current eating disorder cognitions (p 's $\geq .17$).

No ED group—Participants in the No ED group ($n = 46$) had no history of clinically significant lifetime eating disorder psychopathology. (Note: Nine patients who completed our

initial study (6) were excluded from the current investigation because they did not meet inclusion criteria for the ED or No ED group. Although these patients did not meet established criteria for EDNOS, they reported subthreshold eating disorder psychopathology of sufficient severity that they could not be considered non-eating disordered. Specifically, 4 patients reported weekly episodes of loss of control without the consumption of an objectively large amount of food (i.e., subjective binge episodes), and 5 reported monthly loss of control episodes).

2.2. Measures

Patients provided demographic information and completed the Structured Clinical Interview for *DSM-IV* Axis I Disorders (SCID-I) (14) at entry into the BDCP protocol. Severity of current (i.e., past week) depressive and manic/hypomanic symptoms was assessed using the Bipolar Disorder Visit Form, a clinician-rated instrument that includes the Clinical Global Impression – Severity Scale – Bipolar Version (CGI-S-BP) (15). Participants' heights and weights were measured after completion of the eating disorder assessment, and body mass index (BMI) was calculated as weight (kg)/height (m)².

Eating disorder psychopathology was assessed using the 12th edition of the Eating Disorder Examination (EDE) (5), a standardized, investigator-administered interview designed to evaluate *DSM-IV* criteria for AN and BN, and cognitive correlates of disordered eating as measured by four subscales (Restraint, Eating Concern, Shape Concern, Weight Concern) and a Global scale calculated by taking the mean of the four subscale scores. The version of the EDE employed in the present study also included items to evaluate BED, a provisional diagnostic category in *DSM-IV* (16), as well as lifetime history of eating disorder behaviors (i.e., binge eating, purging, dietary restraint). The EDE has acceptable internal consistency ($\alpha = .68$ to $.90$) and inter-rater reliability ($\kappa = .70$ to $.99$) and has been shown to discriminate between eating-disordered individuals and asymptomatic controls (5). Although traditionally used to document current eating disorder psychopathology, recent research using the EDE as a retrospective measure has found excellent reliability, particularly for the assessment of specific eating disorder behaviors and threshold-level diagnoses (17).

EDE interviews were conducted by a trained clinical psychologist, or a psychiatric social worker. Interviewers were blind to demographic and clinical characteristics of participants. Training in EDE administration was provided by a highly experienced EDE interviewer (J.E.W.) under the supervision of the head of the eating disorders program at the research site (M.D.M.), and included listening to tape-recorded interviews conducted by expert raters, discussion of item coding, practice interviews, and coding to reliability. Ratings of eating disorder symptomatology and severity were done by research team consensus at weekly rating meetings (Note: The rating team included all EDE interviewers in the second author's laboratory [$n = 8$]). Lifetime eating disorder diagnoses were made using retrospective data collected by the EDE; threshold-level diagnoses were confirmed using the SCID-I, which was administered independently of the current study.

2.3. Data Analyses

We performed a series of chi square analyses (categorical variables) and independent samples t-tests (continuous variables) comparing patients in the ED and No ED groups on: 1) demographic and clinical characteristics at study presentation; 2) age at onset and number of lifetime depressive and manic/hypomanic episodes; and 3) lifetime prevalence of other psychiatric diagnoses (excluding eating and mood disorders). A Welch *t* correction was performed on the BMI comparison because these data violated the homogeneity of variance assumption. Information regarding age at first depressive episode and age at first manic/hypomanic episode was available for 68 (94.4%) and 59 (81.9%) patients, respectively. Data concerning number of lifetime mood episodes were available for 70 patients (97.2%).

Consistent with previous research (18), we dichotomized number of lifetime depressive and manic/hypomanic episodes as “few” (≤ 5) versus “many” (> 5) because the accuracy of reporting likely decreases with an increasing number of mood episodes, and there is some evidence that having more than 10 total mood episodes (depressive + manic/hypomanic) is associated with greater functional impairment in bipolar patients (19).

Finally, we used one-way analysis of covariance (ANCOVA) to evaluate differences between patients in the ED and No ED groups with respect to the severity of current (i.e., within the past 28 days) eating disorder symptoms as measured by the EDE Restraint, Eating Concern, Shape Concern, Weight Concern, and Global scales. Covariates were BMI and CGI-S-BP rating at study presentation, as patients in the ED and No ED groups differed on these variables and BMI and current illness severity might influence reporting of eating disorder symptoms. All tests were two-tailed with alpha level set at .05. Statistics were conducted using SPSS 14.0 for Windows.

3. Results

3.1. Demographic and Clinical Characteristics at Presentation

Demographic and clinical characteristics of the sample are presented in Table 1. Patients in the ED group were heavier ($t' [38.8] = 2.88, p < .01$) and were rated as more symptomatic on the CGI-S-BP ($X^2 [1] = 4.16, p < .05$) at presentation for the current study than were patients in the No ED group. There were no significant differences between patients with and without lifetime eating disorder co-morbidity in age ($p = .21$), sex ($p = .16$), ethnicity ($p = .62$), marital status ($p = .22$), years of education ($p = .70$), or bipolar disorder diagnosis ($p = .84$).

3.2. History of Bipolar Illness

Patients in the ED group reported significantly more lifetime depressive ($X^2 [1] = 4.87, p < .05$), but not manic/hypomanic ($X^2 [1] = 1.15, p = .28$) episodes than did patients in the No ED group. Specifically, 88.4% ($n = 23$) of patients in the ED group reported more than 5 lifetime depressive episodes as compared to 67.4% ($n = 31$) of patients in the No ED group. Results remained the same after controlling for age (analyses available upon request). There were no significant differences between the ED and No ED groups with respect to age at first depressive ($M[SD] = 17.9[6.8]$ vs. $20.8[8.8]$ years; $p = .16$) or manic/hypomanic ($M[SD] = 22.2[7.9]$ vs. $24.5[10.3]$ years; $p = .37$) episode.

3.3. Other Psychiatric Co-morbidity

Table 2 presents lifetime psychiatric diagnoses, excluding eating and mood disorders, in the ED and No ED groups. Patients in the ED group had significantly more total psychiatric co-morbidities than did patients in the No ED group ($M[SD] = 2.7[1.6]$ vs. $1.4[1.4]$; $t [70] = 3.64, p = .001$). As presented in Table 2, patients in the ED group were significantly more likely than were patients in the No ED group to have at least one ($X^2 [1] = 3.93, p < .05$), two ($X^2 [1] = 9.52, p < .01$), or three ($X^2 [1] = 9.47, p < .01$) additional Axis I diagnoses, excluding eating and mood disorders. Patients in the ED group also were significantly more likely to have a lifetime anxiety disorder as compared to patients in the No ED group ($X^2 [1] = 6.93, p < .01$).

3.4. Cognitive Correlates of Disordered Eating

A series of one-way analyses of covariance (ANCOVAs) were conducted to evaluate differences between the ED and No ED groups with respect to cognitive correlates of disordered eating at the time of the current study. The dependent variables were the EDE Restraint, Eating Concern, Shape Concern, Weight Concern, and Global scores, and the covariates were BMI and CGI-S-BP rating at study presentation. As shown in Table 3, after controlling for BMI and

CGI-S-BP rating, patients in ED group received significantly higher scores on all five EDE scales as compared to patients in the No ED group.

4. Discussion

This study contributes to a growing body of literature documenting the clinical significance of eating disorder symptoms in patients with bipolar spectrum disorders. Consistent with previous research (7,9), we found a positive association between lifetime eating disorder co-morbidity and obesity and current illness severity in bipolar patients. Moreover, the present findings extend previous investigations by demonstrating that eating disorders are associated with a higher number of depressive episodes and increased rates of other psychiatric co-morbidities, particularly anxiety disorders, in this group. Elevated rates of additional psychiatric co-morbidity in patients with 2 versus 1 presenting disorder have been documented in a number of psychiatric populations (e.g., 20,21). Nevertheless, given that both obesity and anxiety co-morbidity have been shown to correlate with indicators of poor prognosis in bipolar patients (e.g., delayed response to treatment, shorter time to recurrence) (22,23), future studies are needed to determine the impact of aberrant eating on the clinical course of bipolar disorder and its treatment. In addition, research to tease apart the temporal and pathophysiological relationships among eating disorder symptoms, obesity, mood disorder history, and other psychiatric co-morbidity seems warranted.

The present study is the first to evaluate systematically the cognitive correlates of disordered eating in patients with bipolar spectrum disorders. Although *DSM-IV* diagnostic criteria for AN and BN require overvaluation of eating, weight or shape, no study of which we are aware has documented the characteristics or severity of the cognitive aspects of eating disturbance in bipolar patients. Our results indicate that eating disorder co-morbidity in bipolar patients is not limited to the behavioral features of aberrant eating (i.e., binge eating, purging, dietary restriction). Indeed, even after controlling for BMI and current bipolar illness severity, patients with a lifetime history of clinically significant eating disturbance endorsed significantly more eating (e.g., eating in secret, guilt about eating), weight (e.g., desire to lose weight), and shape (e.g., feelings of fatness) concerns during the past month than did patients with no history of a threshold or subthreshold eating disorder. EDE scores in patients with lifetime eating disorder co-morbidity also were higher than established community norms for this measure (5,24). These findings highlight the need for more careful evaluation of the full range of eating disorder psychopathology in patients with bipolar spectrum disorders. In light of evidence suggesting that the cognitive correlates of disordered eating are amenable to both psychotherapeutic and pharmacologic interventions (25,26), the present findings also may have implications for the treatment of patients with co-occurring eating disorders and bipolar disorder.

One somewhat surprising finding of the current study is the relatively high percentage of male bipolar patients (i.e., 25.9%) with a lifetime history of clinically significant eating disturbance. Previous research has indicated that eating disorders are significantly more common among female bipolar patients as compared to males (27), a finding that is consistent with prevalence estimates from epidemiologic studies (28,29). One explanation for our discrepant results concerns the elevated rate of threshold and subthreshold BED in the present sample relative to rates of AN or BN. Epidemiologic research has indicated that rates of recurrent binge eating in the absence of inappropriate compensatory behaviors are comparable in males and females (30). Moreover, there is some evidence that subthreshold binge eating disorders are more prevalent in men as compared to women. For example, using data from the National Comorbidity Survey replication, Hudson and colleagues (29) found that the lifetime prevalence of subthreshold BED (i.e., twice weekly binge eating for at least 3 months in the absence of compensatory behaviors, distress, or other features associated with BED) was 3 times higher

in males versus females; in contrast, lifetime rates of threshold-level eating disorders were between 1.75 (for BED) and 3 (AN and BN) times higher in women.

The current findings must be interpreted in light of the limitations of this research. First, and most significantly, participants were enrolled in a clinical trial (the BDCP) and responded to advertisements for an ancillary study; therefore, they may not be representative of the population of individuals with bipolar spectrum disorders. Although one strength of the BDCP is that it employs broad inclusion criteria and targeted recruitment strategies designed to ensure enrollment of patients typically under-represented in clinical trials (e.g., Blacks, individuals age ≥ 65 years), it is well-known that individuals presenting for treatment are more likely than are those in the community to have more than one psychiatric disorder (31). Thus, rates of eating disorder psychopathology and other psychiatric co-morbidity in the present sample are likely higher than would be documented in an epidemiologic survey. Second, the sample size was small, particularly in the ED group, which may limit the stability and generalization of the findings. Future studies with larger sample sizes are needed to: 1) replicate the current research; 2) evaluate the clinical significance of threshold versus subthreshold eating disorder co-morbidity in patients with bipolar spectrum disorders; and 3) examine differences between bipolar patients with AN versus BN and BED on indices of illness burden. Third, the present study focused exclusively on adult bipolar patients. Future research is needed to document the prevalence and correlates of eating disorder symptomatology in children and adolescents with bipolar disorder.

In conclusion, lifetime eating disorder co-morbidity was associated with increased BMI and current illness severity, a greater number of depressive episodes, and more psychiatric co-morbidity in a well-defined sample of patients with bipolar spectrum disorders. Bipolar patients with co-occurring eating disorders also endorsed more cognitive correlates of disordered eating than did patients with no history of clinically significant eating disturbance. These findings highlight the need for a renewed emphasis on the evaluation and management of weight and eating in the mood disorders. In particular, our research suggests that eating disorder co-morbidity may be a marker for increased symptom load and illness burden in bipolar disorder. Given the abundance of recent work documenting the convergence of medical and psychiatric co-morbidities in bipolar patients (e.g., 32-35), future research is needed to elucidate the endopathology of increased symptom load in this population.

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Table 1
Demographic and Clinical Characteristics of Bipolar Patients with and Without Lifetime Eating Disorder Co-Morbidity

	Eating Disorder (<i>n</i> = 26)	No Eating Disorder (<i>n</i> = 46)
Age (years)	<i>M</i> (<i>SD</i>) = 44.9(11.1)	<i>M</i> (<i>SD</i>) = 41.7(10.1)
BMI (kg/m ²)	<i>M</i> (<i>SD</i>) = 34.5(9.2)	<i>M</i> (<i>SD</i>) = 28.7(6.4)
Sex		
Female	73.1% (<i>n</i> = 19)	56.5% (<i>n</i> = 26)
Male	26.9% (<i>n</i> = 7)	43.5% (<i>n</i> = 20)
Ethnicity		
Black	26.9% (<i>n</i> = 7)	21.7% (<i>n</i> = 10)
White	73.1% (<i>n</i> = 19)	78.3% (<i>n</i> = 36)
Marital Status [†]		
Never married	53.8% (<i>n</i> = 14)	32.6% (<i>n</i> = 15)
Married or Cohabiting	23.1% (<i>n</i> = 6)	37.0% (<i>n</i> = 17)
Widowed, divorced or separated	23.1% (<i>n</i> = 6)	28.3% (<i>n</i> = 13)
Years of Education		
High school or less	15.4% (<i>n</i> = 4)	10.9% (<i>n</i> = 5)
Some college/technical school	42.3% (<i>n</i> = 11)	37.0% (<i>n</i> = 17)
4-year college degree +	42.3% (<i>n</i> = 11)	52.2% (<i>n</i> = 24)
Bipolar Disorder Diagnosis		
Bipolar I	73.1% (<i>n</i> = 19)	76.1% (<i>n</i> = 35)
Bipolar II	23.1% (<i>n</i> = 6)	19.6% (<i>n</i> = 9)
Bipolar NOS	3.8% (<i>n</i> = 1)	2.2% (<i>n</i> = 1)
Schizoaffective, bipolar type	0	2.2% (<i>n</i> = 1)
CGI-S-BP, Past Week		
In remission or mildly ill	76.9% (<i>n</i> = 20)	93.5% (<i>n</i> = 43)
Moderately or markedly ill	23.1% (<i>n</i> = 6)	6.5% (<i>n</i> = 3)

BMI = Body mass index

NOS = Not otherwise specified

CGI-S-BP = Clinical Global Impression — Severity Score — Bipolar Version

[†] Marital status data missing for one patient in the No Eating Disorder group

Table 2

Lifetime Psychiatric Diagnoses (Excluding Eating and Mood Disorders) in Bipolar Patients with and Without Lifetime Eating Disorder Co-morbidity

Disorder	Eating Disorder (n = 26)		No Eating Disorder (n = 46)	
	n	%	N	%
GAD	5	19.2	5	10.9
OCD	1	3.8	1	2.2
Panic Disorder	7	26.9	6	13.0
PTSD	4	15.4	5	10.9
Social Phobia	6	23.1	6	13.0
Specific Phobia	5	19.2	1	2.2
Anxiety Disorder NOS	3	11.5	0	0
Any Anxiety Disorder	18	69.2	17	37.0
Alcohol Use Disorder	15	57.7	18	39.1
Cannabis Use Disorder	7	26.9	11	23.9
Cocaine Use Disorder	5	19.2	4	8.7
Hallucinogen/PCP Use Disorder	1	3.8	0	0
Opioid Use Disorder	3	11.5	0	0
Polysubstance Use Disorder	0	0	3	6.5
Sedative-Hypnotic-Anxiolytic Use Disorder	3	11.5	1	2.2
Stimulant Use Disorder	4	15.4	0	0
Any Substance Use Disorder	16	61.5	20	43.5
Other DSM-IV Axis I Disorder	2	7.7	4	8.7
At Least 1 Axis I Disorder	23	88.5	31	67.4
At Least 2 Axis I Disorders	20	76.9	18	39.1
At Least 3 Axis I Disorders	15	57.7	10	21.7

GAD = Generalized anxiety disorder

OCD = Obsessive-compulsive disorder

PTSD = Post-traumatic stress disorder

NOS = Not otherwise specified

Table 3

Cognitive Correlates of Disordered Eating in Bipolar Patients with and Without Lifetime Eating Disorder Comorbidity

EDE Scale	<u>Eating Disorder</u> <i>M (SD)</i>	<u>No Eating Disorder</u> <i>M (SD)</i>	<i>F (1, 68)</i>	<i>p</i>
Restraint	2.2 (1.3)	0.9 (1.1)	9.65	.001
Eating Concern	0.9 (1.0)	0.1 (0.3)	19.17	< .001
Shape Concern	2.5 (1.2)	1.3 (1.0)	13.46	< .001
Weight Concern	2.4 (1.1)	1.5 (1.1)	10.78	.002
Global	2.0 (0.8)	1.0 (0.7)	24.61	< .001

EDE = Eating Disorder Examination