Psychiatric Comorbidity in Hospitalized Adolescents With Borderline Personality Disorder

Carolyn Ha, MA; Jessica C. Balderas, BS; Mary C. Zanarini, EdD; John Oldham, MD; and Carla Sharp, PhD

ABSTRACT

Objective: The goal of this study was to carry out the first comprehensive assessment of psychiatric comorbidity in adolescents (aged 12–17 years) with *DSM-IV* criteria for borderline personality disorder (BPD) compared to a psychiatric comparison group without BPD. Complex comorbidity (a hallmark feature of adult BPD and defined as having any mood or anxiety disorder plus a disorder of impulsivity) was also examined as a distinguishing feature of adolescent BPD.

Method: Consecutively admitted patients (October 2008 to October 2012) to an inpatient psychiatric hospital received parental consent and gave assent for participation in the study (N = 418), with the final sample after exclusions consisting of 335 adolescent inpatients. A comprehensive, multimethod approach to determining psychiatric comorbidity was used, including both an interview-based (categorical) and a questionnaire-based (dimensional) assessment as well as both parent and adolescent self-report. Measures included the Diagnostic Interview Schedule for Children (NIMH-DISC-IV), Child Behavior Checklist (CBCL), Youth Self-Report (YSR), Car, Relax Alone, Forget, Friends, Trouble (CRAFFT), and the Childhood Interview for *DSM-IV* Borderline Personality Disorder (CI-BPD).

Results: Thirty-three percent of the final sample met criteria for BPD. Adolescent inpatients with BPD showed significantly higher rates of psychiatric comorbidity compared to non-BPD psychiatric subjects for both internalizing ($\chi^2_1 = 27.40$, $P < .001$) and externalizing ($\chi^2_1 = 19.02$, $P < .001$) diagnosis. Similarly, using dimensional scores for self-reported symptoms, adolescent inpatients with BPD had significantly higher rates of psychiatric comorbidity compared to non-BPD subjects for internalizing ($t_{329} = -6.63$, $P < .001$) and externalizing ($t_{329} = -7.14$, $P < .001$) problems. Parent-reported symptoms were significantly higher in the BPD group only when using a dimensional approach (internalizing: $t_{321} = -3.42$, $P < .001$; externalizing: $t_{321} = -3.32$, $P < .001$). Furthermore, significantly higher rates of complex comorbidity were found for adolescents with BPD ($\chi^2_1 = 26.60$, $P < .001$). Moreover, externalizing and internalizing problems interacted in association with borderline traits ($B = .25$; $P < .001$).

Conclusions: Similar to findings in adult studies of BPD, adolescents with BPD demonstrate significantly more complex comorbidity compared to psychiatric subjects without BPD.

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Corresponding author: *Carla Sharp, PhD, Department of Psychology, 126 Heyne Bldg, University of Houston, Houston, TX, 77204 (csharp2@uh.edu).*

A large body of literature has firmly established the notion that adults with criteria-defined borderline personality disorder (BPD) display increased rates of psychiatric disorder.[1–7] In particular, adult patients with BPD demonstrate higher rates of both current and lifetime diagnoses of comorbid mood, anxiety, eating, and somatoform disorders,[4] with a greater likelihood of having 3 or more psychiatric diagnoses compared to patients without BPD. Similarly, it has been well established that patients with BPD have high rates of substance use disorders (for a review, see Trull et al[8]). In addition, Zanarini and colleagues[3] found that complex comorbidity (ie, having any mood or anxiety disorder plus a disorder of impulsivity) is a hallmark feature of BPD in adults. Complex comorbidity has been defined as a confluence of internalizing and externalizing disorders, in which complex comorbidity increases the likelihood of receiving a BPD diagnosis.[9] Developmental models have proposed that early vulnerabilities to comorbid internalizing and externalizing disorders may place youths at greater risk for development of BPD.[10] Indeed, there is emerging evidence in support of this model, with research demonstrating that childhood externalizing problems predict BPD in adolescence and young adulthood[11,12] and overlap in internalizing and externalizing psychopathology predicts BPD in adolescents.[10]

Comorbidity with psychiatric disorders, especially complex comorbidity, has far-reaching implications for clinical outcomes in patients with BPD. Psychiatric comorbidity has been found to account for increased functional impairments and high rates of treatment seeking by these individuals.[7] Comorbidity also appears to be relatively persistent over time.[12] Understanding patterns of comorbidity is therefore important for planning and predicting treatment, even more so in youth samples in which increased fluidity in the boundaries between psychiatric disorders exists.[13] While few studies of psychiatric comorbidity have been conducted in adolescent populations,[14–18] it is clear from those that are available that high psychiatric comorbidity is associated with BPD in adolescence. For instance, the Children in the Community Study (CIC)[15] showed high occurrence of psychiatric comorbidity in youths, with 50% of adolescents with any personality disorders reported to have a comorbid psychiatric disorder.[19] In a study examining attention-deficit/hyperactivity disorder (ADHD) comorbidity with BPD, Speranza and colleagues[17] reported that 86% of their clinical sample had at least one other comorbid psychiatric disorder, with 55.3% having comorbid major depressive disorder (MDD), 31.8% having comorbid eating disorders, 25.9% having comorbid disruptive behavior disorders, and 20% having a comorbid substance use disorder. Similar rates of comorbidity were reported in other studies of adolescent BPD.[18]

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Clinical Points

- Patterns of comorbidity in adolescents with borderline personality disorder mirror those in adults.
- Clinicians should take a multimethod approach to the assessment and diagnosis of BPD in adolescents.
- Careful assessment of comorbidity (ie, complex comorbidity with internalizing and externalizing overlap) is essential in adolescents as this has important implications for identifying emerging BPD and effective treatment.

While the studies discussed above are important, their impact has been restricted by methodological limitations. First, very few studies have carried out comprehensive assessments of psychiatric disorders in the same sample. Thus, studies typically focused on a limited number of psychiatric disorders (eg, Chanen and colleagues[14]) or exclusively on affective disorders (eg, McManus and colleagues[20]). Second, very few studies have used interview-based and criteria-defined measures of BPD especially developed for adolescents because in many cases adolescent-specific diagnostic tools were not available at the time. Researchers also typically did not use psychiatric interviewers blind to BPD status (eg, Speranza and colleagues[17] and McManus and colleagues[20]) Studies also typically have not included standardized interview–based diagnostic measures of psychiatric diagnoses for adolescents, but instead have relied on diagnostic tools developed for adults.[14,20] Furthermore, studies typically have not incorporated both categorical and dimensional, as well as multi-informant, reports on psychiatric diagnoses. Multimethod assessment has been shown to be crucial when examining psychopathology in adolescents, as each source brings a unique perspective to the assessment of psychopathology.[21,22] Similarly, the integration of dimensional and categorical approaches to psychopathology is important to provide a full and valid picture of psychopathology. Finally, to date, no study has investigated whether complex comorbidity[3] is a hallmark feature of BPD in adolescents, as has been previously found for adults.

Against this background, the goal of the current study was to carry out a comprehensive assessment of psychiatric comorbidity in adolescents (aged 12–17 years) with BPD while addressing some of the methodological issues in prior studies through the inclusion of multiple methods and sources of assessment and of both categorical and dimensional approaches to psychopathology. Additionally, complex comorbidity was investigated as a hallmark feature of adolescent BPD as defined by Zanarini and colleagues[3] to include any mood or anxiety disorder in combination with a disorder of impulsivity. Disorders of impulsivity typically include externalizing disorders such as oppositional defiant disorder (ODD), conduct disorder (CD), and ADHD.[23] In addition, according to the definition of complex comorbidity outlined by Zanarini and colleagues,[3] disorders of impulsivity include substance abuse disorders and/or an eating disorder. Justification for including eating disorders is motivated by research that has linked eating disorders with other disorders of impulse control, including substance abuse disorders,[24] with reported similarities between anorexia and substance dependence disorders[25] and between bulimia and alcohol dependence.[26] Moreover, comorbid eating disorders and substance use disorders are especially common in individuals with BPD[24]; therefore, we include any diagnosis of an eating disorder as a disorder of impulsivity in identifying complex comorbidity. To facilitate comparison of complex comorbidity, we purposefully compared adolescents with BPD to a psychiatric group of adolescents without BPD (rather than healthy controls). We predicted that, similar to previous findings, adolescent inpatients with BPD will have significantly higher prevalence of mood, anxiety, substance abuse, ODD, and CD when compared to adolescent inpatients without BPD. Furthermore, we predicted that BPD patients will be overrepresented for complex comorbidity as defined by having any mood or anxiety disorder plus a disorder of impulsivity.

METHOD

Participants

Parental consent and adolescent assent for participation in the study were obtained for consecutively admitted patients (October 2008 to October 2012; N = 418) to an adolescent inpatient unit. The inpatient psychiatric hospital specializes in assessment and stabilization of adolescents aged 12 to 17 years with emotional and behavioral disorders. Although all families were approached for consent and assent, inclusion criteria consisted of (1) any adolescent patient 12 to 17 years of age and (2) sufficient fluency in English to complete all research. Exclusion criteria were (1) diagnosis of schizophrenia or any psychotic disorder that interfered with completion of assessments and/or (2) diagnosis of mental retardation.

A total of 26 subjects declined to participate in research, and 46 subjects were removed from the final analyses due to other reasons. These included patients whose families revoked consent (n = 2), patients with psychotic disorder or clinician-determined instability for testing (n = 21), patients with IQ < 70 or whose primary language was not English (n = 13), and patients with early discharge prior to completion of assessments (n = 10). An additional 11 patients were excluded due to missing BPD data. The final sample comprised 335 patients. Table 1 displays the demographic and clinical characteristics of the BPD group and non-BPD psychiatric comparison subjects.

Measures

Borderline personality disorder (dimensional and categorical). The Childhood Interview for *DSM-IV* Borderline Personality Disorder (CI-BPD)[27] is a semistructured interview developed specifically for use with adolescents to assess BPD. The interview was adapted from an adult assessment of *DSM-IV* personality disorders, with items modified from the borderline module of the Diagnostic Interview for *DSM-IV* Personality Disorders (DIPD-IV).[28] Nine criteria reflecting

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symptoms of BPD are rated using "0" for "absence of symptom," "1" if the symptom is "probably present," or "2" if the symptom is "definitely present." A minimum of 5 criteria scored at a "2" is required for a full diagnosis of BPD. In this study, BPD diagnosis was examined both categorically and dimensionally. In taking a categorical approach to the data, a dichotomous score on the CI-BPD was used to determine a diagnosis of BPD. Patients who met fewer than 5 criteria were coded with a "0," defining the non-BPD group, and patients who met 5 or more criteria received a full diagnosis of BPD, and were therefore coded as "1." For a dimensional approach to BPD diagnosis, a summed total score on the CIBPD was used (minimum = 0, maximum = 18).

In a recent study, confirmatory factor analysis supported a unidimensional factor structure for the CI-BPD, suggesting that the *DSM-IV* BPD diagnostic criteria are representative of a BPD diagnosis for adolescents.[29] The study also reported good reliability and validity of the measure,[29] and strong psychometric evidence has been reported in a community sample of children in the United Kingdom.[30] In the current study, interrater reliability was conducted with 12% of the sample for CI-BPD dichotomous scores with 2 independent raters, and κ values ranged from good ($\kappa = 0.77$; $P < .001$) to very good ($\kappa = 0.89$; $P < .001$) agreement.

Interview-based assessment of psychiatric diagnosis. The National Institute of Mental Health Diagnostic Interview Schedule for Children (NIMH DISC-IV)[31] is a highly structured interview-based assessment used to determine psychiatric diagnoses in children and adolescents. It has been widely used in epidemiologic and clinical studies, and adequate psychometric properties have been reported.[31] The interview is designed for lay interviewers without prior clinical training to conduct, and in this study we used a computer-based version of the interview, with the interviewer asking questions and entering answers directly on the computer. Questions require the interviewer to select a yes or no response, and, based on these answer choices, a computerized decision algorithm determines the next question and ultimately the diagnosis. Therefore, clinical decision making is limited, and given the highly structured nature of the measure, interrater agreement is not computed. Despite its highly structured nature, the NIM-DISC-IV has excellent validity and reliability data with more unstructured diagnostic approaches.[31] For analyses in this study, diagnoses based on the past year were used. Dichotomous scoring of diagnoses was used in the analyses with negative and intermediate diagnoses coded as "0," reflecting no diagnosis, and positive diagnoses coded as "1." Both parent- and youth-reported DISC-IV diagnoses provided a categorical measure of psychiatric disorders. Seventeen disorders were assessed using the NIMH-DISC-IV, including MDD, dysthymia, hypomania, mania, generalized anxiety disorder (GAD), agoraphobia, obsessive-compulsive disorder (OCD), panic disorder, posttraumatic stress disorder (PTSD), separation anxiety disorder (SAD), social phobia, specific phobia, anorexia, bulimia, ADHD, ODD, and CD.

The Car, Relax Alone, Forget, Friends, Trouble (CRAFFT)[32] is a 6-item self-report questionnaire used to screen for adolescent substance abuse or dependence. This measure has been validated for use in adolescent clinical populations.[32] A total score is created by summing the 6 items. Good internal consistency was found for the CRAFFT for this sample ($\alpha = .88$). In this study, we used the cutoff score of 2 to indicate the likelihood of substance use problems in adolescents.

Parent- and self-reported symptoms of psychiatric problems. At admission, parents of adolescent patients completed a symptom checklist using the Child Behavior Checklist (CBCL),[33] and adolescent patients completed a self-reported assessment of their symptoms using the Youth Self-Report (YSR).[33] Both of these measures are standardized and well-normed assessments of psychopathology in children and adolescents from 6 to 18 years of age and meet the criteria for evidence-based assessments of psychopathology in youths.[34] In this study, we used dimensional T-scores for both adolescent self-reported and parent-reported psychiatric symptoms. In both parent- and self- reported measures, the broad scales of internalizing and externalizing problems were examined as well as *DSM*-oriented scales of affective disorders, anxiety, somatic problems, ADHD, ODD, and CD.

Procedures

The study was approved by the local institutional review boards. Informed consent and assent were obtained from parents and adolescents upon the patient's admission to the hospital. Assessments and interviews were administered within a week of admission. Diagnostic interviews were administered individually and in private with patients by licensed clinicians, doctoral-level clinical psychology students, and trained research coordinators under the direct supervision of the principal investigator. To ensure staff adherence to scoring guidelines for the CI-BPD, the team met monthly with the principal investigator to review and code videos for interrater reliability. The average length of stay for the program is about 4 to 6 weeks.

RESULTS

Group Characteristics

Thirty-three percent of the sample met criteria for BPD (n = 110), with 225 psychiatric comparison subjects not meeting criteria. Table 1 provides an overview of demographic and clinical characteristics obtained from medical records and youth-reported sexual trauma and lifetime suicide attempts from the NIMH-DISC-IV for both patient groups. Preliminary analyses revealed no significant demographic differences between groups. Adolescents with BPD and comparison subjects were equally represented in race (white 83% vs 89.9%; $\chi^2_1 = 2.91$, $P = .088$) and were comparable in age ($t_{333} = .539$, $P = .59$) and IQ ($t_{189} = .929$, $P = .35$). However, a significantly higher percentage of patients with BPD (80%) than non-BPD psychiatric comparison subjects (52.9%) were female ($\chi^2_1 = 23.00$, $P < .001$). In addition, adolescents with a

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Table 1. Demographic and Clinical Characteristics of Patient Groups

Variable	BPD (n = 110)		Psychiatric Comparison Subjects (n = 225)	
	Mean	SD	Mean	SD
Age, y	15.35	1.51	15.44	1.40
IQ	105.41	15.47	107.45	12.88
	%	n[b]	%	n[b]
Sex				
Male	20.0	22 (110)	47.1	106 (225)
Female	80.0	88 (110)	52.9	119 (225)
Ethnicity				
White	83	83 (100)	89.9	178 (198)
Nonwhite	17	17 (100)	10.1	20 (198)
Previous hospitalizations (1–6)[a]	63.3	69 (109)	50	112 (224)
History of medical problemsa	58.7	64 (109)	54	121 (224)
History of psychiatric problems[a]	97.2	106 (109)	96.4	216 (224)
Sexual trauma (DISC-IV youth-report)	23.8	24 (101)	12.6	25 (199)
Lifetime suicide attempts (DISC-IV youth-report)	54.4	56 (103)	35.3	77 (218)

[a]Data were collected from medical records review to describe clinical characteristics of the inpatient sample. Adolescents had a history of a broad range of medical problems, such as sleep apnea, chronic fatigue syndrome, chronic headaches or migraines, anemia, or hypothyroidism.
[b]Sample sizes varied according to the variable examined; the total sample for each variable is reported in parentheses.
Abbreviations: BPD = borderline personality disorder, DISC-IV = Diagnostic Interview Schedule for Children.

diagnosis of BPD had significantly lower Global Adaptive Functioning (GAF)[35] scores (mean = 35.19, SD = 7.83) at admission ($t_{330} = 4.16$, $P < .001$) compared to non-BPD psychiatric subjects (mean = 38.84, SD = 7.35).

Of note, patients with BPD had significantly higher mean number of criteria met (mean = 6.37, SD = 1.25) than non-BPD patients (mean = 1.95, SD = 1.48) on the total CI-BPD continuous summed scores ($t_{331} = -26.72$, $P < .001$). In addition, when individual CI-BPD criteria were examined, a higher percentage of adolescents with BPD endorsed each criterion item compared to the non-BPD psychiatric comparison group. Table 2 displays all 9 criteria on the CI-BPD, with percentages and results of χ^2 analyses for the BPD group and non-BPD psychiatric comparison group on the individual CI-BPD items.

Comorbidity Between BPD and Other Psychiatric Diagnoses and Symptoms

Using the CI-BPD dichotomous score, we first took a categorical approach to psychiatric problems by using the DISC-IV interview-based diagnoses. Table 3 summarizes results from a comparison of adolescents with BPD and non-BPD on other psychiatric diagnoses as determined by the DISC-IV, reported separately by adolescents and their parents. To adjust for multiple comparisons, a Bonferroni-corrected α level of $P < .003$ was applied to 17 specific disorders. According to youth interview–based diagnoses, BPD patients were significantly more likely to have a comorbid diagnosis of mood, anxiety, and externalizing disorders compared to non-BPD subjects. In regard to specific disorders, BPD patients had higher rates of comorbid MDD, OCD, SAD, specific phobia, ODD, or CD compared to non-BPD subjects. In contrast, the parent-report version of the DISC revealed no significant group differences after correction for multiple comparisons was applied.

Chi-square analyses revealed significant group differences on a self-reported questionnaire of substance-related problems ($\chi^2_1 = 5.77$, $P = .016$), with BPD patients (54.5%) significantly more likely to have a substance-related problem than non-BPD psychiatric subjects (40.6%).

Again using the CI-BPD dichotomous score, we next undertook analyses with dimensional scores of the YSR and CBCL as dependent variables. A similar pattern of comorbidity emerged (Table 4). A Bonferroni correction ($P \leq .007$) was applied to the multiple comparisons. BPD patients had significantly higher scores on both parent- and self-reported symptoms of internalizing and externalizing problems than comparison subjects. Furthermore, BPD patients had significantly higher symptoms on *DSM*-oriented scales of affective disorders, anxiety, ADHD, ODD, and CD on self-report. Similarly, parent-reported symptoms on the *DSM*-oriented scales of affective, ADHD, and ODD symptoms were significantly higher for the BPD group. However, parents did not report significantly higher rates of anxiety or conduct problems for adolescents in the BPD group.

Complex Comorbidity

Complex comorbidity was examined first using interview-based diagnoses (DISC-IV) as reported by adolescents themselves given the null findings for parent-reported DISC diagnoses above. Complex comorbidity was defined as having any mood or anxiety disorder plus having a disorder of impulsivity (ADHD, CD, ODD, or eating disorder). Analyses of complex comorbidity in the overall sample revealed that 36.6% (n = 117) of patients had a mood or anxiety disorder in combination with a disorder of impulsivity (ADHD, CD, ODD, or eating disorder). Next, group comparisons revealed that a significantly higher percentage of BPD patients (56.9%) than non-BPD patients (27.1%) demonstrated complex comorbidity ($\chi^2_1 = 26.60$, $P < .001$).

Next, we were interested in examining complex comorbidity dimensionally by using the CI-BPD continuous scores as the dependent variable in a linear regression in which YSR internalizing and externalizing problems interact to predict higher levels of BPD symptoms. First, bivariate analyses were conducted to determine whether CI-BPD scores correlated with CBCL and YSR symptoms. CI-BPD scores correlated significantly with YSR internalizing ($r = 0.42$, $P < .001$) and externalizing ($r = 0.47$, $P < .001$) problems as well as CBCL internalizing ($r = 0.25$, $P < .001$) and externalizing ($r = 0.23$, $P < .001$) problems. Next, we centered the means for continuous predictor variables (YSR and CBCL internalizing and externalizing)[36] in order to run 2 separate regression analyses (one with YSR externalizing and internalizing as predictor variables and one with CBCL internalizing and externalizing predictor variables). Significant main effects were found for self-reported (YSR)

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Table 2. Comparison of Item-Level CI-BPD Diagnoses for BPD and Non-BPD Groups

CI-BPD Item	BPD, %	Psychiatric Comparison (non-BPD), %	Analysis* χ^2_1	Analysis* *P*
1. Inappropriate, intense anger or difficulty controlling anger	63.6	23.1	52.40	<.001
2. Affective instability due to a marked reactivity of mood	84.5	32.4	80.32	<.001
3. Chronic feelings of emptiness	63.3	17.8	69.22	<.001
4. Identity disturbance: markedly and persistently unstable self-image or sense of self	64.5	11.6	100.85	<.001
5. Transient stress-related paranoid ideation or severe dissociative symptoms	69.1	15.6	95.57	<.001
6. Frantic efforts to avoid real or imagined abandonment	51.4	6.2	90.37	<.001
7. Recurrent suicidal behavior, gestures, or threats, or self-mutilating behavior	83.5	36.4	65.08	<.001
8. Impulsivity in at least 2 areas that are potentially self-damaging	89.1	40.9	69.92	<.001
9. A pattern of unstable and intense interpersonal relationships characterized by alternating between extremes of idealization and devaluation	69.7	11.1	119.59	<.001

*The difference was statistically significant for each CI-BPD item.
Abbreviations: BPD = borderline personality disorder, CI-BPD = Childhood Interview for *DSM-IV* Borderline Personality Disorder.

Table 3. Psychiatric Diagnoses for BPD and Non-BPD Psychiatric Comparison Group Based on Diagnoses in the Past Year (interview-based), N = 335

	Youth-Report						Parent-Report					
	BPD (n = 110)		Psychiatric Comparison (non-BPD; n = 225)		Analysis		BPD (n = 110)		Psychiatric Comparison (non-BPD; n = 225)		Analysis	
Axis I Disorder	n[a]	%	n[a]	%	χ^2_1	*P*	n[a]	%	n[a]	%	χ^2_1	*P*
Mood disorder	72	70.6	85	39.2	27.40	<.001*	73	69.5	116	53.0	8.004	.005
MDD	64	62.7	81	37.3	18.08	<.001*	63	60.0	95	43.4	7.847	.005
Dysthymia	4	3.90	2	0.90	3.38	.066	9	8.6	15	6.8	.307	.580
Hypomanic	5	4.90	2	0.90	5.12	.024	2	1.9	4	1.8	.002	.961
Manic	9	8.80	7	3.20	4.56	.033	3	2.9	12	5.5	1.105	.293
Anxiety disorder	70	67.3	100	45.5	13.52	<.001*	60	57.1	98	45.0	4.213	.040
GAD	24	23.3	25	11.4	7.77	.005	16	15.2	32	14.7	.013	.908
Agoraphobia	13	12.6	18	8.20	1.59	.207	1	1.0	7	3.2	1.497	.221
OCD	41	39.8	43	19.5	14.97	<.001*	18	17.1	37	17	.001	.970
Panic disorder	25	24.3	29	13.2	6.11	.013	11	10.5	29	13.2	.502	.479
PTSD	17	16.5	13	5.9	9.26	.002*	10	9.5	7	3.2	5.664	.017
SAD	24	23.1	21	9.6	10.70	.001*	18	17.1	32	14.7	.329	.566
Social phobia	33	31.7	38	17.3	8.63	.003	23	21.9	22	10.1	8.247	.004
Specific	30	29.1	23	10.5	17.67	<.001*	19	18.1	20	9.2	5.312	.021
Eating disorder	12	11.7	12	5.5	3.82	.051	8	7.6	7	3.2	3.075	.080
Anorexia	9	8.70	12	5.5	1.20	.274	5	4.9	7	3.3	.434	.510
Bulimia	3	2.90	0	0	6.41	.011	3	2.9	0	0	6.176	.013
Externalizing disorder	62	60.2	75	34.4	19.02	<.001*	70	66.7	131	59.8	1.414	.234
ADHD	32	31.1	36	16.6	8.75	.003	28	26.7	76	34.7	2.103	.147
ODD	44	42.7	31	14.3	31.47	<.001*	65	61.9	105	48.2	5.366	.021
CD	37	35.9	33	15.1	17.72	<.001*	20	19.0	43	19.6	.016	.901

[a]Data were missing for several variables on the NIMH-DISC-IV in the youth- and parent-based interviews. Percentages were calculated only for available data.
*Application of the Bonferroni correction for multiple comparisons indicated statistical significance ($P < .003$) for specific disorders.
Abbreviations: ADHD = attention-deficit/hyperactivity disorder, CD = conduct disorder, GAD = generalized anxiety disorder, MDD = major depressive disorder, NIMH-DISC-IV = Diagnostic Interview Schedule for Children, OCD = obsessive-compulsive disorder, ODD = oppositional defiant disorder, PTSD = posttraumatic stress disorder, SAD = separation anxiety disorder.

internalizing ($B = .33$; $P < .001$) and externalizing ($B = .43$; $P < .001$) problems with BPD symptoms (CI-BPD total score), in which case higher scores were associated with higher levels of BPD symptoms. The interaction between YSR internalizing and externalizing problems was significant ($B = .25$; $P < .001$). Complex comorbidity, as determined by the interaction between internalizing and externalizing problems, was therefore found to be significantly associated with higher levels of BPD symptoms. A total of 33% of the variance in BPD was explained by the interaction term. For parent-reported internalizing and externalizing problems on the CBCL, results revealed significant main effects for internalizing ($B = .15$; $P < .001$) and externalizing ($B = .11$; $P = .001$) problems with BPD symptoms. However, no significant interaction was found for parent-reported (CBCL) internalizing and externalizing problems in predicting BPD ($B = .004$; $P = .29$). Complex comorbidity, as determined by the interaction between internalizing and externalizing disorders, therefore was not associated with BPD when parent-reported indices of psychopathology were used.

DISCUSSION

The current study used a multimethod approach to comprehensively examine rates of comorbid psychiatric disorders in addition to the presence of complex comorbidity in a sample of hospitalized adolescents with BPD compared

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Table 4. A Comparison of BPD Patients and Non-BPD Psychiatric Patients on Dimensional Psychiatric Symptoms as Reported by Youths and Parents Separately[a]

	Youth-Report						Parent-Report					
	BPD (n = 110)		Psychiatric Comparison (non-BPD; n = 225)		Analysis		BPD (n = 110)		Psychiatric Comparison (non-BPD; n = 225)		Analysis	
Axis I Disorder	Mean	SD	Mean	SD	t_{329}	*P*	Mean	SD	Mean	SD	t_{321}	*P*
Internalizing	69.55	10.05	60.76	13.61	−6.63	<.001*	72.79	6.98	69.88	7.31	−3.42	.001*
Externalizing	67.17	9.12	58.39	11.19	−7.14	<.001*	67.76	7.36	64.56	9.57	−3.32	.001*
Affective	74.41	10.35	65.91	11.33	−6.61	<.001*	78.91	7.50	73.81	8.59	−5.24	<.001*
Anxiety	64.69	8.75	60.33	9.23	−4.12	<.001*	67.54	8.22	66.10	8.32	−1.48	.414
Somatic	59.26	10.07	56.41	8.61	−2.55	.012	62.95	10.69	61.63	10.39	−1.07	.287
ADHD	65.24	7.69	59.28	7.16	−6.95	<.001*	65.60	8.15	62.89	8.15	−2.81	.005*
ODD	64.12	8.92	58.93	7.99	−5.35	<.001*	65.63	7.70	63.04	8.51	−2.75	.007*
CD	66.95	9.21	60.29	8.30	−6.64	<.001*	66.75	7.43	64.28	8.87	−2.63	.009

[a]*DSM*-oriented scales were used for the Youth Self-Report and Child Behavior Checklist.
*Application of the Bonferroni correction for multiple comparisons indicated statistical significance ($P < .007$).
Abbreviations: ADHD = attention-deficit/hyperactivity disorder, CD = conduct disorder, ODD = oppositional defiant disorder.

to non-BPD psychiatric inpatients. We found, consistent with existing adult and adolescent literature, that a significantly higher percentage of borderline patients met criteria for psychiatric disorders in the areas of externalizing problems (ADHD, oppositional and conduct disorders), substance abuse/dependence problems, internalizing disorders including mood (MDD), and anxiety disorders (OCD, PTSD, SAD, and specific phobia) as determined by youth interview–based psychiatric diagnoses. Therefore, our findings are consistent with those reported by Chanen and colleagues[14] and others[17,20] who found extensive psychiatric comorbidity in adolescents with BPD. Furthermore, we replicated findings of higher rates of comorbid PTSD in patients with BPD,[3,5] consistent with prior results reported in the adult BPD literature.

Our second major finding was that a significantly higher percentage of BPD patients (56.9%) met criteria for complex comorbidity (any mood or anxiety disorder plus a disorder of impulsivity) than comparison subjects. The results of a linear regression in which the interaction of internalizing and externalizing problems in predicting levels of BPD symptoms supported these findings derived from categorical approach to complex comorbidity analyses. Together, our results support the finding of Zanarini et al[3] in adults with BPD, suggesting that, oftentimes, the presence of multiple co-occurring psychiatric disorders across the internalizing-externalizing spectrum can indicate underlying borderline psychopathology and may serve as an early marker for clinicians to identify and treat patients. Further, that this pattern of complex comorbidity was replicated in adolescents with BPD provides initial support for the conceptualization of BPD as a confluence of internalizing and externalizing psychopathology.[9,37] Future research investigations into the underlying internalizing and/or externalizing dimensions of BPD, especially in adolescents, are important given these findings of the current study.

A third finding in the current study relates to discrepancies between self- and parent-report across interview- and questionnaire-based measures. When psychiatric symptoms were assessed through a categorical interview-based approach, clear group differences emerged for adolescent self-reported symptoms, but this was not the case for parent-reported symptoms. However, when pathology was assessed for using a dimensional questionnaire-based approach, both parent- and self-reported symptoms demonstrated significant group differences. These findings highlight two important points. First, these results point to the importance of obtaining interview-based assessments of symptoms from multiple sources including adolescents and parents, as each source provides unique information about symptoms.[21] Second, it is essential that both dimensional and categorical approaches are used to assess psychopathology, especially with regard to parent report, for which the dimensional measures yielded more useful information than the categorical measures. While it has been argued that parent report may provide less useful information when assessing psychopathology in adolescents,[38,39] as parents may be less aware of the full extent of the emotional and behavioral problems from which their adolescents suffer, obtaining multiple perspectives is central to valid assessment of psychiatric disorders,[21,40] in particular in obtaining accurate diagnosis of personality disorders in adolescents.[41] Furthermore, dimensional approaches may be more sensitive in identifying psychopathology in adolescents, offering a more fine-grained calibration and increasing sensitivity. In all, dimensional approaches to psychopathology may hold greatest promise for finding purported relationships between variables. Even so, when complex comorbidity was determined through dimensional self-report ratings (the YSR externalizing and internalizing problems interaction variable), clear associations emerged with BPD. These associations did not emerge when complex comorbidity was determined through dimensional parent-report (the CBCL internalizing and externalizing interaction variable). Clearly, the use of multiple informants and multiple methods requires sophisticated analytic and conceptual approaches as recently espoused in the Operations Triad Model of De Los Reyes and colleagues.[22]

Notwithstanding the above findings, there are several important limitations to the current study, including the generalizability of our findings to less severe populations such

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as the community or outpatient adolescents. Nevertheless, similar research in outpatient adults[4] and in a community sample of adults[42] have revealed similar comorbidity with BPD comparable to those reported in clinical populations.[4] A second limitation involves the cross-sectional nature of this study, which does not address issues relating to the longitudinal outcome of comorbid psychiatric disorders in adolescent BPD. Comorbid psychiatric disorders have been linked to significantly increased risk for a personality disorder diagnosis in young adulthood[43,44] and are associated with worse outcomes, including lower remission from anxiety and depressive disorders in adults.[45–48] It is therefore important to examine the longitudinal outcomes in adolescents with BPD who have comorbid psychiatric diagnoses. Finally, due to small sample size of adolescent boys who met criteria for BPD (n = 22), we were unable to examine gender differences in psychiatric comorbidity for the BPD patients.

Despite these limitations, findings from this study suggest that psychiatric comorbidity of adolescent BPD follows a pattern of comorbidity and complexity similar to that found in studies with adults. This study therefore further bolsters findings that BPD in adults and adolescents is comparable,[20,49] providing additional evidence toward the overall construct validity of BPD in adolescents. Furthermore, as demonstrated in adults with BPD, complex comorbidity may serve as a marker for identifying BPD in juvenile populations. That complex comorbidity is a hallmark feature of BPD in adults and adolescents provides additional insight into the phenomenology of BPD as well as its development and etiology. For example, multivariate approaches have examined the position of BPD within established models of common psychopathology, specifically the internalizing-externalizing spectrum.[9,37] These studies have suggested that BPD represents a confluence of internalizing and externalizing problems. In addition, from an etiologic perspective, longitudinal studies have emerged implicating the role of externalizing disorders in childhood in contributing to risk for the development of BPD in adolescence.[10–12] These findings, along with those from our study, highlight the importance of early identification of comorbid psychiatric diagnoses in adolescents, particularly at the intersection of internalizing and externalizing problems, so that specific interventions can be tailored to influence developmental trajectories for adolescents with emerging BPD. Most importantly, given that complex comorbidity may have differential effects on treatment outcomes as demonstrated in adults with BPD,[50] it is important to take into account psychiatric comorbidity in informing treatment development for adolescents with BPD.

Author affiliations: Department of Psychology, University of Houston (Mss Ha and Balderas and Dr Sharp) and The Menninger Clinic (Ms Ha and Drs Oldham and Sharp), Houston, Texas; and McLean Hospital; Harvard Medical School, Boston, Massachusetts (Dr Zanarini).
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