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Suicidality in pediatric bipolar disorder: predictor or outcome of family processes and mixed mood presentation?

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Abstract

Objective—Pediatric bipolar disorder (PBD) involves a potent combination of mood dysregulation and interpersonal processes, placing these youth at significantly greater risk of suicide. We examined the relationship between suicidal behavior, mood symptom presentation, family functioning, and quality of life (QoL) in youth with PBD.

Methods—Participants were 138 youths aged 5–18 years presenting to outpatient clinics with DSM-IV diagnoses of bipolar I disorder ($n = 27$), bipolar II disorder ($n = 18$), cyclothymic disorder ($n = 48$), and bipolar disorder not otherwise specified ($n = 45$).

Results—Twenty PBD patients had lifetime suicide attempts, 63 had past or current suicide ideation, and 55 were free of suicide ideation and attempts. Attempters were older than nonattempters. Suicide ideation and attempts were linked to higher depressive symptoms, and rates were even higher in youths meeting criteria for the *mixed* specifier proposed for DSM-5. Both suicide ideation and attempts were associated with lower youth QoL and poorer family functioning. Parent effects (with suicidality treated as outcome) and child effects (where suicide was the predictor of poor family functioning) showed equally strong evidence in regression models, even after adjusting for demographics.

Conclusions—These findings underscore the strong association between mixed features and suicidality in PBD, as well as the association between QoL, family functioning, and suicidality. It is possible that youths are not just a passive recipient of family processes, and their illness may play an active role in disrupting family functioning. Replication with longitudinal data and qualitative methods should investigate both child and parent effect models.

Keywords

bipolar disorder; family; quality of life; suicide

Suicide is one of the leading causes of death in adolescence, yet it also is preventable. Suicide and related behaviors are associated strongly with psychiatric disorders, and the field is making significant progress in the understanding the pathophysiology of these phenomena (1). Adults with early onset of bipolar disorder (age < 18 years) have greater

likelihood of suicide attempts (SA) (2-4). Case control studies (5,6), longitudinal data (7-10), and retrospective evaluations (11-16) place youths with pediatric bipolar disorder (PBD) at significantly greater risk of suicide than other youths, and also document higher rates of mixed episodes (4,17,18). Impulsivity and mood dysregulation are core features of both bipolar disorder (19) and suicidal behaviors (20), and their combination may increase the risk of acting on suicide ideation (SI).

Whereas descriptions of ‘classical’ presentations of bipolar disorder suggest that both manic and depressive symptoms occur as distinct episodes, adult research finds that episodes characterized by mixed mood *symptoms*, not mixed *episodes*, are significantly more common than prototypical distinct episodes (21). Mixed moods combine the energy, agitation, and impulsivity of mania with the irritability and hopelessness of depression. Clinically, these presentations sometimes present as agitated depressions, on occasion as ‘manic stupors’ and at times as irritable hypomanias, as well as instances that meet full DSM-IV criteria for a mixed episode (19,22). Given the heterogeneity of clinical presentations, the proposal for DSM-5 is to replace the category of *mixed episodes* with a *mixed* specifier that could be coded with any other mood episode (www.dsm5.org/ProposedRevisions/Pages/MoodDisorders.aspx). Mixed clinical presentations appear to be related acutely to suicide (19) and early-onset bipolar disorder (17,23-25). Mixed mood features could explain why bipolar disorder is associated both with a high rate of SA (2,26-29) and a high ratio of attempts to completion—three attempts to one completion, versus 30:1 in the community (27).

The association between bipolar disorder and suicidality is likely to involve psychosocial processes as well as shared neurobiological pathways. These may include vulnerability to stressful life events as triggers of SI and behavior, as well as disruptions in family processes that may decrease social support or even increase the amount of negative expressed emotion and conflict. For example, PBD patients with suicidality showed a greater number of stressful family events over the prior attempt year (12). Patients attempting suicide report more conflict with their mother, frequent arguments with parents, and less adaptable family environments than do nonattempters (30).

Poor quality of life (QoL), defined as decrements in a person's ability to function in different domains and maintain a good sense of subjective well-being, is also strongly associated with suicide (31). Poor functioning and a sense of hopelessness may in fact be stronger correlates of suicidal behavior than either depressive or manic symptoms are (32-34). PBD is associated with substantially lower average QoL than found with many other major medical illnesses, and worse than other mental illnesses in youth except for major depression (35). Although it is likely that QoL and family functioning are also related, to our knowledge previous studies have not investigated whether poor QoL might contribute to suicidal behaviors independently of family functioning. Several lines of evidence suggest that multiple factors may have a cumulative effect on adolescent suicidal behaviors (36-38).

Most studies have conceptualized suicidal behavior as the outcome, with factors such as family functioning and QoL as predictors that may change suicide risk. However, when data are correlational, it is possible that the actual relationships run in either direction, or are reciprocal. Is it possible that suicidal behavior could lead to disrupted family functioning or reduced QoL? Data from adult patients with schizophrenia indicate that lifetime SA reduce QoL (39,40).

Similarly, a child's SI or behavior would be extremely distressing to most parents. Death of a child is one of the single most stressful life events a person could experience (41). For that reason, suicidal behavior could lead to an increase in family conflict as parents react to the

distress associated with the threat of suicidality. These dyadic interactions could take the form of a *coercive cycle*, a phenomenon extensively studied in the development of externalizing, antisocial behavior, where the child acts in increasingly aggressive and disinhibited ways until the parents change their behavior (42). The analogy to mood disorders would be that the youth's behavior of making intolerable threats against oneself disrupts family functioning and coerces parents into relinquishing control. In contrast to the more common model that treats suicidality as an outcome of parent and family variables (43,44), it also may be worth considering a *child effects model*, where suicidal behaviors may be a mechanism through which a biologically driven illness in the youth influences family processes. The conceptualization of bipolar disorder as a heritable and biologically driven illness suggests that a child effects model also deserves consideration.

The goal of the present study was to examine the relationship between suicidal behavior in youths with bipolar disorder with regard to mood features, family functioning, and QoL. In light of previous data we formulated the following hypotheses:

Hypothesis 1: Mixed features, defined as the presence of subthreshold symptoms from both opposing poles (consistent with the DSM-5 proposed definition), will be associated with higher rates of SI and SA.

Hypothesis 2: History of SI or behavior will be associated with lower family functioning levels and lower QoL in youths affected by bipolar disorder.

Hypothesis 3: Poor family functioning, poor youth QoL, and mixed features will each make unique contributions to suicidality as an outcome variable. These incremental increases in risk of suicidality will remain even after controlling for youth age, gender, and ethnicity. Exploratory analyses will also test whether these unique effects remain even after controlling for current depressive and manic symptoms.

Hypothesis 4: Consistent with the child effects model, suicidality will predict incremental decreases in family functioning, even after controlling for youth demographics and current mood symptoms.

Methods

Participants

Inclusion criteria—The Institutional Review Board (IRB) of the University Hospitals Case Medical Center and the IRB of Applewood Centers (Cleveland, OH, USA) both approved the procedures. Enrolled participants were youth (age 5-18 years) and their primary caregiver seeking outpatient evaluation for the youth. All caregivers gave their informed consent and all youth gave assent. Out of 828 participating families, 138 had youths meeting criteria for a bipolar spectrum disorder and thus were eligible for inclusion in this secondary analysis.

Exclusion criteria—Families needed to be able to complete questionnaires and interviews in English.

Measures

Family Assessment Device (FAD)—The FAD global scale score (45-47) measured family functioning based on 27 items. Higher scores reflect greater dysfunction in communication and problem solving. Sample items include: “In times of crisis we can turn to each other for support” and “People come right out and say things instead of hinting at them.” In the present sample, the total score showed $\alpha = 0.93$.

KINDL-R—The Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents—Revised (KINDL-R) measures QoL in both healthy and ill youth populations (48) and has age-appropriate content and versions. There are 24 items scored on a 5-point Likert scale (0 = never, 4 = all the time). Six subscales measure specific aspects of QoL: Physical, Emotional, Self-esteem, Family, Friends, and School, with higher scores indicating better QoL (e.g., “*My child was liked by other kids*”). The KINDL has been validated in a wide range of physical ailments and languages; youths with PBD show worse functioning than youths with most other medical illnesses and mental health diagnoses investigated, with the exception of unipolar depression (35).

Diagnoses and mood severity ratings—Formal diagnoses were made based on an expert review consensus process including the results of an interview using the Schedule for Affective Disorders and Schizophrenia for School-Age Children Present and Lifetime Version (KSADS-PL) (49) combined with the mood modules from the Washington University version (to gather additional information about mood symptoms and suicidality) (50). Highly trained research assistants conducted all semistructured interviews with an item-level $\kappa \geq 0.85$ [details regarding training are provided in an earlier preliminary publication (51)]. Interviewers met with the caregiver and the youth sequentially, reinterviewing each as necessary to resolve reporting discrepancies using clinical judgment. A licensed psychologist reviewed the interviews and assigned final consensus diagnoses, blind to scores on the rating scales. Bipolar disorder diagnoses followed DSM-IV criteria for bipolar I, bipolar II, and cyclothymic disorders. Bipolar disorder not otherwise specified (NOS) typically resulted from youths not showing at least one-week durations of mania or four-day durations of hypomanic episodes, rather than having an insufficient number of manic symptoms or low intensity of symptoms. Although we did not require elated mood or grandiosity (as would be necessary for a *narrow* phenotype), more than 80% of families reported clear occurrences of one or the other, even though irritable mood and aggression were more commonly perceived as the presenting problem. The mixed-features specifier followed DSM-5 criteria (www.dsm5.org/ProposedRevisions/Pages/MoodDisorders.aspx), requiring the full criteria for a manic episode or hypomanic episode, and the presence of at least three depression symptoms every day during the episode.

The same interview was used to complete the Young Mania Rating Scale (YMRS) (52) and Child Depression Rating Scale-Revised (CDRS-R) (53) as measures of mood symptoms, characterizing the current mood symptom presentation as euthymic, hypomanic, manic, depressed, or mixed using established thresholds from prior phenomenological investigations and clinical trials (54). In this secondary framework, mood symptoms were considered *mixed* if CDRS-R scores were greater than 28 and YMRS scores were ≥ 12 during the same time period, with the lower YMRS threshold also capturing *hypo-mixed* presentations.

Suicidality—In order to build a crosswalk with other research, the present study used the same algorithms as the Course and Onset of Bipolar Youth (COBY) project (12). The operational definition of *suicide attempt* was ‘a self-injurious act that includes some degree of seriousness and /or lethality’ based on information gathered from the K-SADS interview with both the caregiver and youth. The primary outcome combined items assessing ‘seriousness of suicidal actions’ and ‘medical lethality of suicidal acts’, using the worst lifetime instance as the score to define three different categories: (i) no suicidal history; (ii) SI, to identify those bipolar disorder cases with past or current SI only (without SA); and (iii) SA, comprised of those who reported any past or current SA.

Procedures

Primary caregivers (79% biological mothers) completed the FAD and KINDL-R questionnaires to assess 138 PBD patients (ages 5-18) presenting for outpatient mental health evaluations. Highly trained raters interviewed both the youth and caregiver with the semistructured KSADS interview. Raters and diagnoses were blind to the scales scores.

Data analyses

Descriptive statistics examined distributions against the assumptions for each of the proposed analyses. All measures were transformed into percentage of maximum possible (POMP) scoring in order to facilitate comparisons across measures (55). Associations between sociodemographic variables, mood symptom presentation, and suicide history were evaluated using chi-square analyses and one-way ANOVA with the Games-Howell post-hoc test (which does not assume equal variances across subgroups). Block entry regression analyses tested Hypotheses 3 and 4 by controlling for demographic and mood variables in earlier blocks before testing the incremental effects of suicidality or family functioning. Regression analyses checked for influential outliers and other violations of underlying assumptions. Because the majority of caregivers were biological mothers, analyses were repeated with only mothers included to see if results changed. Because the results did not change substantively during this *sensitivity analysis*, findings from the complete data set are reported to maximize power and avoid possible bias due to exclusion of participants (56). Primary analyses used the proposed DSM-5 definition for the mixed specifier, and secondary analyses used the prior alternate research definition to compare the new definition with prior results.

Results

Demographics and preliminary analyses

A total of 27 participants received a diagnosis of bipolar I disorder, 18 had bipolar II disorder, 48 had cyclothymic disorder, and 45 had bipolar disorder NOS (see Table 1). A total of 63 PBD patients showed past or current SI, 20 had past or current records of SA, and 55 had no lifetime history of suicide symptoms (non-SI/SA). Table 2 provides details on current versus past suicidality.

The SA group was older (mean age 13.6 ± 2.5 years) than the non-SI/SA group (mean age 10.5 ± 3.5), and the SI group (mean age 11 ± 3.6 years), $p < 0.005$. There was a significant association with race/ethnicity due to the Hispanic and other groups having higher rates of attempts, versus the Caucasian group having higher rates of SI, $p < 0.01$ (see Table 1). There were no significant differences between suicide categories in terms of bipolar disorder subtypes or the mean number of comorbid Axis I diagnoses.

Hypothesis 1: Mixed-features specifier and suicidality

A high rate of youths with bipolar I and II disorder (76%) met criteria for mixed-features specifier ($n = 34$). A total of 79% of the group meeting the mixed specifier had lifetime SI and SA [$\chi^2(1) = 7.98$, $p = 0.005$]; and 27% had a history of SA [$\chi^2(1) = 5.22$, $p = 0.02$], 16 percentage points above the group without mixed features.

The suicide groups showed significantly higher average amounts of depression based on clinical interviews (CDRS-R), $p < 0.005$. All three groups showed similar elevations on the YMRS, $p > 0.05$ (see Table 1).

Hypothesis 2: Suicidality associations with family functioning and youth QoL

As hypothesized, average family functioning was significantly worse in families where the youth had past or current SA, even after Games Howell post-hoc correction. Family QoL ($p < 0.005$) and Total QoL ($p < 0.05$) scales were significantly worse in the SA group. Nonsignificant differences were observed amongst groups for the Physical, Emotional, Self-esteem, Friends, Disease, or School QoL scales (all $p > 0.05$), and the Total QoL was no longer significantly different after controlling for Family QoL (Table 1 and Fig. 1).

Hypothesis 3: Mixed features, poor family functioning, and low QoL each contribute uniquely to suicidality

Table 3 reports the correlations between suicidality and the different demographic and clinical characteristics as well as predictors of interest. As hypothesized, having mixed features, poor family functioning, and low QoL all were significantly correlated with increased suicidality. Suicidality was significantly more elevated in females, older adolescents, and youths with more severe depression. Hierarchical regression found that age, gender, and race accounted for 11% of the variance in suicidality ($p < 0.005$), with age making a significant unique contribution but gender not being significant. When mixed features, family functioning, and QoL entered as the second block, they accounted for another 10% of the variance ($p < 0.005$). Reversing the order of the blocks, the combination of mixed features, family functioning, and QoL accounted for 16% of the variance, indicating that ~4% of the variance in suicidality was shared with both the clinical predictors and demographic characteristics, reflecting the correlation among these predictors (see Table 3). Even after controlling for demographics and the other clinical predictors, mixed features made a unique contribution to the prediction of suicidality—part $r = 0.23$, $p < 0.05$; as did poorer family functioning, part $r = 0.19$, $p < 0.05$. Additional analyses added current mood symptom severity, measured as YMRS and CDRS-R total scores to the model. They did not account for significant additional variance after controlling for demographics and mixed mood status, R^2 change = 0.03, $p = 0.10$.

Hypothesis 4: Suicidality makes a unique contribution to disrupted family functioning

Suicidality and lower youth QoL both were significantly associated with worse family functioning, as expected. However, family functioning was also significantly correlated with youth age (worse functioning in families of adolescents) and female status—though adolescents were also more likely to be female (see Table 3). Regression analyses found that demographic characteristics (age, race, gender) explained 9% of the variance in family functioning independent of the clinical predictors (mixed features, QoL, and suicidality), $p < 0.05$; the block of clinical predictors accounted for 7% above the demographic variables, $p < 0.05$; and the two blocks jointly accounted for a total R^2 of 0.16, $p < 0.05$. The single predictor making significant unique contributions to the final model was suicidality, with part $r = 0.20$, $p < 0.05$. Additional analyses found that suicidality continued to make significant unique contributions even after controlling for CDRS-R and YMRS scores. Surprisingly, severity of mood symptoms did not show any significant increment in prediction of family functioning after controlling for demographics and mixed features plus suicidality. When controlling for CDRS-R and YMRS scores, QoL also added unique information, $p < 0.05$.

Sensitivity analyses—Several additional analyses evaluated whether the pattern of findings was influenced by specific cases or by choice of measure or definition of *mixed*. Outlier diagnostics identified one case as having an unusual combination of scores: One of the lowest youth QoL raw scores (14.6) combined with fairly good family functioning (raw score 1.33) and no history of SI or SA. This case had high leverage when QoL was used as a

predictor (e.g., Mahalanobis' Distance of ≥ 12 , $p < 0.003$) and high studentized deleted residuals when used as an outcome (≥ 4 , where ≥ 3.67 would exceed a Bonferroni-corrected critical value) (57). Omitting this case increased the size of all correlations, but did not change the pattern of findings. We decided to present the results with the outlier included as a more conservative approach, avoiding concerns about overfitting the data.

A second set of analyses examined the effect of predicting SA instead of the combination of SI and SA. In these analyses, family functioning showed a significant relationship to SA, but QoL did not. Conversely, QoL showed a stronger relationship to SI than did family functioning.

A third set of analyses examined whether results changed when focusing only on SI and SA in the current episode, versus lifetime. As shown in Table 2, the majority of SI and behavior occurred in the present episode, and relatively few cases had past history without also having suicidality in the present episode. Scores on present and lifetime suicidality were highly correlated ($r = 0.82$), but there was lower variability in current episode events. This restriction of range reduced the size of correlations between suicidality and other variables slightly, but did not change the pattern of results. We chose to present the lifetime history results because of the psychometric advantages of having a definition with greater variability across cases, and because of the clinical advantage of using a more sensitive and inclusive definition of suicidality.

A fourth set of analyses examined whether results changed when focusing only on the biological mothers instead of including the full range of caregivers. The findings were essentially identical, with no significant changes in coefficients.

A fifth set of analyses examined whether using the composite definition of *mixed presentation*, based on concurrent elevations on the YMRS and CDRS-R, produced markedly different findings. Results were highly similar, i.e., using the older research definition identified ~80% of cases as showing mixed mood symptom presentations at intake. This alternate definition also was significantly associated with suicidality history, $\chi^2(6) = 13.16$, $p = 0.04$ and particularly with SA, such that 17% of those with mixed mood symptoms had lifetime suicidality. All patients who met the proposed DSM-5 definition also met the prior research definition, but the DSM-5 definition was narrower than the prior research definition. Despite significant agreement, $p < 0.0005$, the DSM-5 definition identified only a third as many cases as mixed, because it excluded cases with NOS or cyclothymic disorder.

Finally, considering the lack of consensus about a comprehensive definition of suicidal behaviors (58), we tested if suicidality might simply be a marker of illness severity, associated with poor family functioning and QoL. Regression analyses covaried the Children's Global Assessment Scale (C-GAS) (59) as a measure of current global functioning. The C-GAS did not account for significant variance in suicidality ($R^2 = 0.002$), whereas family functioning and QoL continued to show significant correlations with suicidality even after adjusting for C-GAS.

Discussion

This study is one of the first that evaluates the relations between suicidality, family functioning, and the youth's perceived QoL within a sample affected by PBD. To our knowledge, this is also the first study to examine whether suicide behaviors might plausibly be conceptualized as a predictor of disrupted family processes, versus suicidality only being an outcome variable. An additional novel contribution is that, to our knowledge, this is the

first study to evaluate the proposed DSM-5 mixed specifier in a sample of youths diagnosed with bipolar disorder.

A high rate of youths with bipolar I and II disorder met criteria for the proposed mixed-features specifier. The proposed DSM-5 definition is more specific than the prior research definition that had been used in clinical trials as well as phenomenological studies, and it excluded cases with cyclothymic disorder or bipolar disorder NOS. Strikingly, a quarter of the DSM-5 mixed specifier group showed past or current SA, a significantly higher prevalence than among those without mixed features. In line with previous studies, suboptimal family functioning was observed in the family of those who endorsed SA. Similarly, QoL for youths with bipolar disorder was lower than the healthy control average across all areas assessed by the KINDL, with the deficit always being a large effect size compared to healthy norms (60). SI or SA were associated with even further decrements in terms of total QoL and QoL in the family domain, even after post-hoc corrections.

Consistent with hypotheses, youth suicidality was significantly related to poor family functioning, low youth QoL, and mixed features. More importantly, regression analyses showed that mixed features and poor family functioning each made unique contributions to suicidality, even when controlling for demographic characteristics such as age, gender, and race, and even when competing with each other in the same model. Also of note was the finding that scores for the severity of depression or mania did not add significant incremental value to the regressions after controlling for mixed features, family functioning, and demographics.

These findings also supported a variation on the theme of *child effects models*, suggesting that youth behavior may disrupt family functioning. Regression models predicting family functioning found that youth suicidality played a significant unique role, even after controlling for demographics, QoL, and current mood features. Although findings always need independent replication, confidence in the stability of these results was enhanced through sensitivity analyses that examined the effects of multivariate outliers, changes in definition of suicidality (SI or SA versus SA only), changes in the time frame of suicidality (lifetime versus current episode only), changes in the definition of mixed presentation (DSM-5 versus a prior research definition) and caregiver informant (biological mother versus other).

Overall, findings support an association between family functioning and suicidality within families where youths have bipolar disorder (61). Results suggest that it is plausible that the youth's illness may play an active role in disrupting family processes. Bipolar disorder may involve a potent combination of mood dysregulation and interpersonal processes where threats of harm—against oneself or another—may occur both impulsively and/or instrumentally. SI and suicidal behavior may be a way that the youth can influence family processes, perhaps even without deliberate forethought or intent. Threats to oneself can be made even when the youth is too young or small physically to threaten an adult. The extreme mood lability and impulsivity associated with bipolar disorder may amplify the risk of enacting the attempt, leading to the high rate of mortality seen in the illness (62,63).

Limitations and strengths

A major limitation of the present study is that the data were cross-sectional. Prospective longitudinal data would help to clarify the causal order of the variables, with four or more repeated measures providing the necessary information to examine trajectories over time (57). The cross-sectional models examined here provide an important first step by demonstrating that some child effects models deserve further consideration. Clearly, many other factors could be added to the model, including substance use, parent history of mood

disorder, and a variety of other variables. Another limitation was the use of a caregiver report as a measure of QoL. Two independent reviews of the construct picked the measure used, the KINDL, as one of the two best available (64), and the caregiver KINDL has demonstrated sensitivity to the effects of more than a dozen different medical conditions (65). In addition, the caregiver KINDL has shown sensitivity to the effects of bipolar disorder as opposed to other mental health conditions (35). Thus the KINDL also represents a strength as a primary measure of QOL in youth. Another strength of the present study was identification of suicidality via direct clinical interview with both the caregiver and the youth. This approach is more sensitive than relying on either informant alone and avoids ambiguity about intent that can arise with record reviews or adverse-event reporting (66). Another limitation was the lack of a generally accepted definition of *mixed presentation*. The present study addressed this by using the proposed definition for DSM-5, and also comparing it to a prior research definition that had been used in multiple published clinical trials and phenomenological studies. Although there were differences in the rate at which cases met criteria for the two definitions of mixed presentation, both definitions showed similar associations with suicidality and family functioning.

Clinical implications and future directions

The present findings have several important clinical implications. First, the findings underscore the strong association between mixed features and SI and behavior in youths. Clinicians may want to be vigilant in assessing mixed features as part of their risk management when working with youths with mood disorder. Such assessment is made more challenging by the fact that rating scales tend to assess manic and depressive symptoms separately, requiring extra work and inference on the part of the clinician to combine the information and detect mixed feature presentations. A second major implication is that clinicians may consider an active role for the youth's illness in disrupting family processes. Rather than viewing youths as passive recipients of a biological illness, or targets that are hit with the cumulative effects of negative family environment until they contemplate suicide, present data suggest that it is equally possible that suicidal behaviors could lead to increased family disruption and stress, consistent with other work indicating that social processes may actually reinforce some of these behaviors in distressed families (67). The findings corroborate the clinical report of some family members 'walking on eggshells' around the youth out of fear that the youth's mood will become labile and the youth will threaten suicide. It could be helpful to focus on how suicidal behavior may be a toxic dynamic in families, with the potential to either be an outcome or a mechanism that may increase stress on the family and further disrupt family functioning (68). The potential analogy to the coercive process in the development of aggressive behavior suggests that therapists may want to be alert to both possibilities, and to consider carefully the antecedents and consequences of suicidal behavior in each family to better understand how to reduce risk and promote better outcomes.

Future directions in research include replicating these findings in new data and with more extensive measures of family processes. The present study used measures and operational definitions that link to ongoing longitudinal projects, which should make it easier to test longitudinal models as the additional panels of data become available. Longitudinal data also might help illuminate the potential mediating roles that suicidality and family functioning might play. Qualitative methods may also be powerful tools for elucidating the role of suicidal behavior in family functioning, helping bridge the divide between quantitative studies and the clinical experience of working with a family at high risk of a suicide.

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Fig. 1.

Profiles of quality of life across domains of functioning for youth with pediatric bipolar disorder and different categories of suicidality compared to normal healthy benchmarks. '1 SD below' indicates 1 SD below the normal healthy average, corresponding to a large effect size for impairment, putting someone in the bottom 16th percentile or lower in terms of quality of life.

Table 1

Sociodemographic and clinical features and associations with suicidality (n = 138)

Variable	No suicide history (n = 55), 40%	Suicide ideation (n = 63), 46%	Suicide attempts (n = 20), 14%	X ² or F
Age, mean (SD)	10.5 (3.5) ^a	11 (3.6) ^c	13.6 (2.5)	$F = 5.98^{***}$
Sex (female), n (%)	19 (34)	29 (46)	13 (65)	$X^2(2) = 5.67$
Race, n (%)				
African American	34 (50)	25 (37)	9 (13)	$X^2(6) = 17.50^{**}$
Hispanic	3 (38)	1 (12)	4 (50)	
European American	14 (28)	31 (62)	5 (10)	
Other	4 (33)	6 (50)	2 (17)	
Bipolar subtype, n (%)				
Bipolar I disorder	9 (16)	13 (21)	5 (25)	$X^2(6) = 11.02$
Bipolar II disorder	4 (7)	8 (13)	6 (30)	
Cyclothymic disorder	23 (42)	23 (36)	2 (10)	
Bipolar disorder NOS	19 (35)	19 (30)	7 (35)	
Comorbidity, mean (SD)	4.1 (1.4)	4.5 (1.7)	4.6 (1.8)	$F = 0.987$
Any ADHD, n (%)	40 (43)	44 (47)	9 (10)	
Any ODD, n (%)	28 (50)	24 (43)	4 (7)	
Any CD, n (%)	6 (22)	14 (52)	7 (26)	
Any PTSD, n (%)	3 (27)	5 (46)	3 (27)	
Any ANX, n (%)	17 (34)	23 (46)	10 (20)	
Percentage of maximum possible (POMP) scores Mean (SD)				
Young Mania Rating Scale	51.7 (20.4)	51.3 (22.4)	57.3 (19.2)	$F = 0.70$
Child Depression Rating Scale	29.5 (16.0) ^{a,b}	41.2 (18.8)	42.8 (18.0)	$F = 7.86^{***}$
Quality of Life				
Physical	65.6 (18.6)	58.2 (18.7)	59.3 (18.1)	$F = 2.44$
Emotional	66.9 (15.6)	60.1 (15.6)	60.9 (21.4)	$F = 2.65$
Self-esteem	48.1 (17.5)	44.5 (16.7)	47.5 (21.0)	$F = 0.663$
Family	53.9 (15.4) ^{a,b}	45.6 (17.2)	36.0 (19.3)	$F = 8.87^{***}$
Friends	54.0 (18.1)	53.1 (17.6)	59.0 (21.0)	$F = 0.79$
School	52.5 (19.1)	47.6 (16.7)	49.6 (13.8)	$F = 1.15$
Total	57.0 (11.6) ^b	51.4 (9.6)	52.1 (12.3)	$F = 4.03^*$
Family Assessment Device Total	32.1 (14.3) ^a	36.6 (14.3)	44.3 (16.8)	$F = 5.16^{**}$

NOS = not otherwise specified; ADHD = attention-deficit hyperactivity disorder; ODD = oppositional defiant disorder; CD = conduct disorder; PTSD = posttraumatic stress disorder; ANX = anxiety disorders.

^a No Suicide group significantly different than Suicide Attempts group.

^b No Suicide group significantly different than Suicide Ideation group.

^c Suicide Ideation group significantly different than Suicide Attempts group.

* $p < 0.05$

**
 $p < 0.01$

 $p < 0.005$, two-tailed.

Table 2

Breakdown of past versus current episode suicidal ideation or attempts

	No suicidality	Past history Ideation	Attempts	Total
Current episode				
No suicidality	55	8	4	67
Ideation	39	16	7	62
Attempts	7	0	2	9
Total	101	24	13	138

Past and current episodes strongly associated; $\chi^2(4) = 10.59$, $p < 0.05$; 80% of all suicidality captured in present episode.

Table 3

Correlations between suicidality, family environment, youth quality of life, and demographic and mood feature variables (n = 128, listwise deletion)

	Suicidality	Family functioning	Youth quality of life	Youth age (years)	Female	White	CDRS-R total score	YMRS total score	DSM-5 mixed feature
Suicidality	1.00	0.30***	-0.21*	0.30***	0.24**	0.08	0.33***	0.08	0.27***
Family functioning	0.30***	1.00	-0.25***	0.33***	0.19*	0.06	0.08	-0.08	0.02
Youth quality of life	-0.21*	-0.25***	1.00	-0.30***	-0.16	0.01	-0.40***	-0.17	-0.18*
Youth age (years)	0.30***	0.33***	-0.30***	1.00	0.34***	0.01	0.20*	-0.16	0.13
Female	0.24**	0.20*	-0.16	0.34***	1.00	-0.07	0.20*	-0.04	0.17
White	0.08	0.06	0.02	0.01	-0.07	1.00	-0.09	-0.04	-0.06
CDRS-R total score	0.33***	0.08	-0.40***	0.20*	0.20*	-0.09	1.00	0.31***	0.46***
YMRS total score	0.08	-0.08	-0.17	-0.16	-0.04	-0.04	0.31***	1.00	0.27***
DSM-5 mixed feature	0.27***	0.02	-0.18*	0.13	0.17*	-0.06	0.46***	0.27***	1.00

CDRS-R = Child Depression Rating Scale-Revised; YMRS = Young Mania Rating Scale.

*
p < 0.05

**
p < 0.01

p < 0.005, two-tailed.