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The Relationship Between Adverse Childhood Experiences and Suicidal Ideation in Bipolar Disorder

Jake Gluckman
Rutgers, The State University of New Jersey
Noelle Foster
Rutgers, The State University of New Jersey
Rexella Gyambrah
Rutgers, The State University of New Jersey
Cole Whiteman
Rutgers, The State University of New Jersey
Carlos Pato
Rutgers, The State University of New Jersey
Michele Pato
mp1768@rutgers.edu

Rutgers, The State University of New Jersey

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Abstract

Background

Bipolar disorder is associated with one of the highest rates of suicide among psychiatric illnesses, underscoring the need to better identify factors that may contribute to suicidal ideation. Adverse Childhood Experiences (ACEs) have been associated with both bipolar disorder and suicidality, but the relative contributions of individual ACE subtypes remain understudied. This study examined the prevalence of ACEs in individuals with bipolar disorder compared with age- and sex-matched controls and evaluated the associations of cumulative and individual ACE categories with suicidal ideation.

Results

A total of 3,067 adults were included, comprising 746 individuals with bipolar disorder and 2,321 matched controls. Participants completed a standardized diagnostic assessment, a screening questionnaire, and a 10-item self-report ACEs questionnaire. Suicidal ideation was assessed via structured interviews for cases and screening measures for controls. Participants with bipolar disorder reported significantly higher rates of suicidal ideation than controls (70.6% vs. 2.6%, $p < 0.0001$) and substantially higher cumulative ACE scores (mean 4.34 vs. 1.10, $p < 0.0001$). Every ACE subtype was significantly more prevalent among individuals with bipolar disorder (all $p < 0.0001$), with the greatest differences observed for emotional abuse, physical abuse, and emotional neglect. Across the overall sample, higher cumulative ACE scores were significantly associated with suicidal ideation. In one logistical regression model, cumulative total ACE score (OR = 1.21, 95% CI 1.15–1.28), and psychosis (OR = 1.65, 95% CI 1.13–2.44) were the most significant predictors of suicidal ideation (AUC = 0.936). A reduced model incorporating only physical abuse, sexual abuse, and household mental illness demonstrated comparable predictive performance (AUC = 0.934).

Conclusions

These findings highlight the strong prevalence of childhood trauma in bipolar disorder particularly physical abuse, emotional abuse, and emotional neglect compared with controls, and the strong correlation between childhood trauma and suicidality. A brief ACE-based screening approach may aid clinicians in identifying high-risk individuals, particularly when time or clinical constraints limit a comprehensive assessment. Clinicians should further evaluate individuals for serious mental illness if they report two or more ACEs.

BACKGROUND

Bipolar disorder (BD) is a psychiatric condition characterized by intense shifts in mood, behavior, and energy. BD also carries the highest risk of suicide compared to all other psychiatric illnesses, and the

annual risk of suicide attempts has been estimated to be a 30- to 60- fold higher risk than the general population (1, 2). As a result, it is imperative to further understand what factors contribute to suicidality in this population.

One factor that has been found to correlate with suicidal ideation is Adverse Childhood Experiences (ACEs), which includes traumatic childhood events such as physical abuse, sexual abuse, substance use problems, and familial instability. Multiple studies have found that ACEs are associated with an increased risk of suicide attempts in the general population (3). Furthermore, multiple reviews and studies have shown associations between childhood trauma and the development of BD (4–7). However, Park et al. note that many of these studies failed to use structured clinical interviews for BD or the evaluation of ACEs (8).

One critical literature review of 28 studies on this topic found that the prevalence of early emotional trauma in BD is correlated with worse clinical outcomes, including suicidality (9). They found that traumas involving emotional neglect/abuse were the most frequent, with an average prevalence of approximately 35% (9). A recent systematic review on the association between adverse childhood experiences and suicidality in affective disorders found that exposure to ACEs nearly doubles the risk of suicide behaviors in individuals with affective disorders (10). However, they acknowledge that few studies have systematically compared subtypes, such as physical, emotional, and/or sexual abuse.

We aim to fill a gap in the literature by characterizing the prevalence of ACE subtypes among a BD population with matched controls, as well as the ACE subtypes' correlation with suicidal ideation among cases vs. controls. Our primary hypothesis was that individuals with BD in our sample will have a higher overall average ACE score as compared to controls, and that a higher ACE score will correlate with self-reported suicidal ideation. Our secondary hypothesis concerns the ACE subtypes; we predicted that ACE questions surrounding physical and emotional abuse will have an even stronger correlation for suicidal ideation as compared with other questions.

METHODS

This manuscript reports on 746 adult participants in the BD group (including BD with psychosis, without psychosis, and schizoaffective-bipolar), collected through the Genomic Psychiatry Cohort (GPC), along with 2,321 matched, for age and sex, controls. Our controls excluded anyone with more than 4 episodes of depression, self-report of psychosis, and anyone who had a first or second degree relative with BD, schizophrenia (SZ) or schizoaffective disorders.

The subjects were collected between July 10th, 2018 and September 15, 2025. Each case of BD received a Screening Questionnaire (SQ), the Diagnostic Interview for Psychosis and Affective Disorders (DI-PAD, or DQ), as well as a 10-item self-reported ACE instrument (11). Each control received only the SQ and the ACE.

Assessment for Adverse Childhood Experiences

Our ACE questionnaire comes from the original developers of the core ACE questions (11). While other similar studies have used different validated instruments to assess childhood traumas, such as the Childhood Trauma Questionnaire (12), all of these instruments ask about similar life events, such as physical abuse, emotional abuse, and sexual abuse.

Assessment for Suicidal Ideation

For our controls, we classified the presence of suicidal ideation as having answered “yes” to the following question on our screening questionnaire SQ24: “did you also have feelings of worthlessness, or feel too much guilt, or spend a lot of time thinking about death or dying, or have thoughts about hurting or killing yourself?”

For our cases, we classified the presence of suicidal ideation under question 21 on the DI-PAD. Cases were assigned as having experienced suicidality if they indicated suicidal ideation present for at least one week, or if they had a suicide attempt.

Statistical Analyses

3,236 subjects were extracted from the primary GPC data tables. 169 subjects were then excluded for being either below 18 at time of collection, missing or incomplete data, or having a final diagnosis of bipolar disorder type 2. The remaining 3,067 records were analyzed in R v.4.4.1 using tidyverse 2.0 and Deducer 0.9. Confirmation and validation analyses were run using pROC 1.18.5, caret 6.0, boot 1.3, Hmisc 5.2, and FSA 0.10. Figures were generated using ggplot v.2_4.0.

RESULTS

Demographics

Table 1 presents the demographic information for our participants. Our analysis included 746 individuals with BD group (mean age = 43.2, 47.2% male) and 2,321 controls (mean age = 44.1, 42.3% male).

Table 1
Demographics

N	***Total***	***BD Cases****	***Controls***
	3067	***746***	***2,321***
Male	***1334 (43.5%)***	***352 (47.2%)***	***982 (42.3%)***
Age, years (mean +- SD)	*43.9 ± 15.8*	*43.2 ± 13.5*	*44.1 ± 16.5*
Ancestry:			
African	*1963 (64.0%)*	*392 (52.5%)*	*1576 (67.9%)*
European	*276 (9.0%)*	*128 (17.1%)*	*149 (6.4%)*
Other/Mixed	*828 (27.0%)*	*226 (30.4%)*	*596 (25.7%)*

**Diagnoses to qualify as a case were Bipolar Disorder Type 1, Bipolar 1 with Psychosis, and Schizoaffective disorder – bipolar type. Bipolar Type 2 was excluded. Controls could not have more than four depressive episodes.*

Clinical Characteristics

Table 2 presents the clinical characteristics of our cases vs. controls. In our cases, 740 (99.2%) of participants had co-occurring depression, whereas only 134 (5.8%) of our controls reported depression. It should be noted that controls were only eligible if they had 4 or fewer episodes of depression. A chi-square test of independence was performed and found that our cases were significantly more likely to have co-occurring depression than our controls ($\chi^2 = 2413.5$, $p < 0.0001$). In our cases, 527 (70.6%) reported suicidal ideation compared to 60 (2.6%) of our controls. A chi-square test of independence found that our cases were significantly more likely to report suicidality than our controls ($\chi^2 = 1685.3$, $p < 0.0001$). Finally, the average total ACE score, out of 10, for our cases was 4.34 and 1.1 for controls. Since ACE scores were not normally distributed, a Mann-Whitney-Wilcoxon U test was conducted to evaluate the difference between both groups. We found that the average ACE score in our cases was significantly higher than our controls ($U = 1441032$, $p < 0.0001$). Figure 1 shows the distribution of how many cases vs. controls reported each cumulative ACE score.

Table 2
Clinical Characteristics and Prevalence of ACE Subtypes

Depression (% Present)	***BD Cases***	***Controls***	***Statistic***	***p value***
	740 (99.2%)	**134 (5.8%)**	**χ^2 = 2413.5**	**< 0.0001**
Psychosis (% Present)	593 (79.5%)	NA*	NA	NA
Suicidal Ideation (% Present)	527 (70.6%)	60 (2.6%)	χ^2 = 1685.3	< 0.0001
Average Total ACE Score	4.34	1.1	W = 1441032 z=-28.58	< 0.0001
	BD Cases (% responded 'Yes')	*Controls (% responded 'Yes')*	*Statistic*	*p value*
ACE Q1 – Emotional Abuse	**407 (54.6%)**	**298 (12.8%)**	χ^2 = 552.7	**< 0.0001**
ACE Q2 – Physical Abuse	**368 (49.3%)**	**235 (10.1%)**	χ^2 = 546.9	**< 0.0001**
ACE Q3 – Sexual Abuse	**277 (37.1%)**	**187 (8.1%)**	χ^2 = 369.4	**< 0.0001**
ACE Q4 – Emotional Neglect	**371 (49.7%)**	**200 (8.6%)**	χ^2 = 627.2	**< 0.0001**
ACE Q5 – Physical neglect	**189 (25.3%)**	**86 (3.7%)**	χ^2 = 320.9	**< 0.0001**
ACE Q6 – Parental Separation	**442 (59.2%)**	**752 (32.4%)**	χ^2 = 170.1	**< 0.0001**
ACE Q7 – Domestic Violence	**233 (31.2%)**	**141 (6.1%)**	χ^2 = 331.4	**< 0.0001**
ACE Q8 – Household drug use	**383 (51.3%)**	**319 (13.7%)**	χ^2 = 450.0	**< 0.0001**
ACE Q9 – Household Mental Illness	**337 (45.2%)**	**113 (4.9%)**	χ^2 = 729.3	**< 0.0001**
ACE 10 – Household incarceration	**232 (31.1%)**	**221 (9.5%)**	χ^2 = 207.1	**< 0.0001**

*A report of psychosis disqualified a subject from participating as a control.

Table 2 and Fig. 2 report the prevalence of each ACE subtype in our cases vs. our controls. The most common ACEs in the case group were parental separation (59.2%), emotional abuse (54.6%), and household drug use (51.3%). The most common ACE subtypes in the control group were the same:

parental separation (32.4%), household drug use (13.7%), and emotional abuse (12.8%), with household drugs abuse appearing only slightly more common than emotional abuse. Chi-square tests of independence found that our cases were significantly more likely to report each ACE subtype. Some of the greatest statistical differences were found with emotional abuse ($\chi^2 = 552.7$), physical abuse ($\chi^2 = 546.9$), and emotional neglect ($\chi^2 = 627.2$). Household mental illness had the highest chi-square value ($\chi^2 = 729.3$); however, this was by design given that controls were excluded if they had a first or second degree relative with serious mental illness (SMI).

For the total ACE score (out of 10) with reference to suicidality, chi-square tests were run over the overall population and then cases and controls separately, yielding a statistic of 827.96 (df = 10, $p < 0.0001$) for the overall group, 76.74 ($p = 0.0005$) for the controls, and 29.62 ($p = 0.00096$) for cases; as a result, a higher ACE score correlates with suicidality in both cases and controls. We then endeavored to determine if there were additional features within the overall demographics or at the individual question level that might identify more specific contributors to overall suicidality risk than just having had a generally tumultuous childhood. Specifically, we wanted to determine what, if any individual elements of the ACE inventory would particularly contribute to suicidality risk in adulthood. Multifactorial logistic regression was used combined with feature selection to determine an optimal model to predict suicidality using the smallest number of variables. As part of this, the cases were divided into two groups with and without psychosis (79.5% of cases [n = 593] had psychosis). Chi-square testing was used to determine that these groups are statistically discrete for suicidality ($\chi^2 = 8.43$, $p < 0.004$), meaning that the presence of psychosis significantly increases the risk for suicidality. Other features, such as race, sex, and age, were discarded because they did not demonstrate significance in the overall model, or exhibited high collinearity, such as the presence of depression in our BD cases.

Table 3 includes our analysis of variables, using two different models, that can be used to predict suicidality in our participants. The single greatest predictor for suicidality risk in both models was being a case (OR = 36.97, 95% CI [24.05, 57.40]; $p < 0.0001$, with similar statistics in our second model). In our first logistical regression model (AUC = 0.936), looking at total ACE score as a predictor of suicidality, we found that the total ACE score (OR = 1.21, 95% CI [1.15,1.28]; $p < 0.0001$) and the presence of psychosis (OR = 1.65, 95% CI [1.13,2.44]; $p = 0.01$) were the largest predictors of suicidality in both cases and controls; although, *only* cases exhibited psychosis, and cases were far more likely to report a higher ACE score (Fig. 1). Our second model (AUC = 0.934) revealed that three of the ACE questions had extremely high predictive value for suicidality in both cases and controls: physical abuse Q2 (OR = 1.86, 95% CI [1.35,2.53]; $p = 0.0001$), sexual abuse Q3 (OR = 1.77, 95% CI [1.26, 2.48]; $p = 0.001$), and household mental illness Q9 (OR = 2.08, 95% CI [1.49, 2.89]; $p < 0.0001$). The presence of psychosis in cases was also a significant risk factor (OR = 1.79, 95% CI [1.21, 2.61]; $p = 0.004$). Even though this model includes our entire samples, cases were far more likely to report physical abuse, sexual abuse, and household mental illness (Table 2, Fig. 2).

Table 3
Logistical Regression Analysis

Total ACE score model	**OR**	**2.5%**	**97.5%**	**p value**	**AUC**
					0.936
-ACE score	1.21	1.15	1.28	< 0.0001	
-Case	36.97	24.05	57.40	< 0.0001	
-Psychosis present	1.65	1.13	2.44	= 0.01	
3 question model					**0.934**
-Question 2: Physical Abuse	1.86	1.35	2.53	= 0.0001	
-Question 3: Sexual Abuse	1.77	1.26	2.48	= 0.001	
-Question 9: Household Mental Illness	2.08	1.49	2.89	< 0.0001	
-Case	34.12	22.20	52.99	< 0.0001	
-Psychosis Present	1.79	1.21	2.61	0.004	

Given the unusually high AUC value for both these models, these results were subjected to additional validation using a variety of methods. In addition to a Brier score of 0.065 (0 being a 100% perfect model and 1 being 100% imperfect) for the three-question model, k-fold validation was used (k = 100) to get an accuracy of 0.91 and Kappa of 0.73. Somers' delta was calculated at 0.868, and finally a bootstrap method (replication n = 2,000) was applied to generate a 95% confidence interval of 0.92–0.95 for the AUC. For the total ACE score model, the values were close to identical, with a Brier score of 0.067, accuracy = 0.91, Kappa = 0.73, Somers' delta = 0.872, and an AUC CI of 0.93–0.95. The predictive robustness of the models remains intact through all validation tests, with nearly identical performance.

DISCUSSION

Our results add to, and agreed with, the existing literature about the strong prevalence of childhood trauma in BD, as well as the association between childhood trauma and suicidality (13). However, our study is unique for its larger sample size, its use of matched controls, and its use of the original ACE questionnaire (compared with many other studies that used the Childhood Trauma Questionnaire). Our sample size is also significantly larger than a majority of the studies included in two different systematic reviews of childhood trauma and suicidality in bipolar disorder (10, 14). While our model shows that the ACE score strongly correlated with suicidality for our overall sample (including cases and controls *combined*) we found that each ACE subtype had a significantly higher prevalence in BD cases vs. controls (Table 2, Fig. 2), which corroborates one of our primary hypotheses. Thus, while clinicians should be concerned for suicidal ideation in adults without SMI if they report significant childhood trauma, the likelihood of reporting these childhood traumas is far greater if they are diagnosed with BD.

More specifically, our study corroborates the findings from one of these reviews, which highlighted sexual abuse as a significant risk factor for suicidal ideation in affective disorders, including BD, Major Depressive Disorder (MDD), and mixed diagnoses (10). This study also reported sexual abuse as the most frequently reported ACE in BD participants, whereas in our study the most frequently reported ACE was parental separation. This discrepancy may be because The Childhood Trauma Questionnaire, which was used in many of the studies in Baldini et al., does not explicitly assess for parental separation. Our results about ACE subtype frequency in controls corroborates current CDC data that reports emotional abuse, household substance use, and parental separation as the three most common ACEs in the general population (15), but these were also the three most prevalent ACEs in the cases. These results may indicate that some of the more common ACEs might not necessarily lead to as serious clinical symptoms as suicidality in controls the way they seem to in BD cases.

Both at the individual question level and the overall ACE score, cases demonstrated a marked variation from controls across all variables, illustrating the effect a disrupted childhood can have on one's subsequent mental illness. Thus, in subjects with high ACE scores but no previous mental health diagnoses, clinicians should further evaluate for serious mental illnesses like BD. Chi-square testing (X^2=704, $p < 0.0001$) suggests a value as low as 2 may have screening value for a BD diagnosis, or another form of SMI; only 20% of the cases had a score of 0 or 1, while 75% of the controls did. In the controls, 90% had a score < 4, while less than half that (41%) of the cases did. Figure 1 illustrates the dramatic population difference between the number of individuals who reported each cumulative ACE score.

Since one of our primary questions was whether or not individual questions were more or less important when compared to the overall ACE score as a predictor of suicidality, the results of the model using the ACE score as a single measure were compared with the results when compared to individual questions that had shown a higher degree of significance relative to the suicidality outcome. This final model relies on only three questions from the overall ACE inventory (Question 2 on physical abuse, Question 3 on sexual abuse, and Question 9 on household mental illness) and gave results very slightly less accurate as measured by received operator curve as those of the overall ACE score; this suggests that analyzing only these three questions may be as reliable as analyzing all 10 with respect to suicidality risk. Biological sex, somewhat surprisingly given the nature of Question 3 on sexual abuse, made no additional statistical contribution ($p = 0.96$ for the total score model and $p = 0.43$ in the three-question model). It is worth noting, however, that male cases were significantly more likely to endorse Question 3 at a rate of 28.7% compared to 3.6% of male controls endorsing Question 3. The ratio between males and females who say "yes" to Question 3 also changes from 36.5% male in cases to 18.7% male in controls. Overall, based on the results from our sample, we can predict suicidal ideation in cases and controls based simply on 3 questions from the ACE (sexual abuse, physical abuse, and household mental illness), the presence of bipolar disorder, and the presence of psychosis, although psychosis was *only* present in cases, and cases were far more likely to endorse those 3 questions on the ACE instrument. In fact, the presence of psychosis was a better predictor of suicidality than ACE score in our

model. Our reduced ACE subtype model in part corroborates one of our secondary hypotheses, which is that physical abuse would be a large risk factor for suicidality.

Our results prompt the question of whether a shortened ACE instrument might be useful to quickly and easily predict individuals that might be at risk for suicidal tendencies, similarly to how the PHQ-2 can be used to quickly screen for depression before administering the PHQ-9 (16). Some work has been done on shortened ACE measures; one research team discusses using the two items of household alcohol (part of ACE Q8) and emotional abuse (ACE Q1) might be appropriate for rapid identification of adults who have experienced significant childhood adversity (17). Using an 11-item ACE measure adapted from the CDC's Behavioral Risk Factor Surveillance System survey as the standard, which has a cut off of one or more ACEs, yielded a sensitivity of 99%, but specificity was low (66%). Thus, for the busy non-psychiatric clinician screening for possible referral to a psychiatrist or to assess for significant childhood adversity, we propose that the 3 questions surrounding sexual abuse, physical abuse, and household mental illness could help rule in or out the risk for suicidal tendencies. However, the ACE provides more than simply information about suicidality. It is still crucial that patients fill out the entire questionnaire so that health care providers can have a comprehensive understanding of not just suicide risk, but of their patient's early childhood stressors and how they might contribute to their overall mental health.

One of the greatest limitations of our study is the risk of recall bias when retrospectively assessing for ACEs. However, research has shown that if anything, retrospective reports in adulthood of major adverse experiences in childhood involve a substantial rate of false negatives (18). And while false positive reports are not as easily assessed, they are likely rare. Overall, researchers have found that recall bias is not sufficiently great to invalidate retrospective case-control studies of major adversities (18).

There also may be methodological bias based on the self-report nature of the ACE questionnaire. Many individuals with BD suffer from emotional dysregulation (19), so these individuals may have an increased tendency to judge/identify daily situations as traumatic, which may overinflate their ACE score. However, our statistical analysis reports such a great effect size that can't be fully explained by general emotional hyperreactivity.

There are a few other limitations in our study design. First, we excluded 4 of our BD cases because they did not meet the criteria for depression and thus did not receive the DIPAD question about suicidality; however, this was a small fraction (0.5%) of our sample. Studies have shown that suicidality in BD can be closely associated with depressive episodes (20, 21), so the presence of depression may have confounded our results about the impact of BD on suicidality. However, as illustrated by 0.5% of our BD sample not having MDD, it is a very common component of BD despite not being required to make the diagnosis. In addition, we measured suicidality differently between cases and controls. Cases were asked specific suicidal ideation questions through the DIPAD (DQ21), and controls were asked about suicidality through our screening question SQ#24. However, the control screener measure for suicidality would have only overestimated suicidal ideation, since respondents would have answered "yes" if they reported feelings of guilt, worthlessness, or suicidality.

Furthermore, our controls may not necessarily reflect the true general population. Controls were only eligible if they did not exhibit any kind of psychotic or manic symptom, had no first- and second-degree relatives with SMI, and had less than 4 depressive episodes. They also do not include anyone with chronic mood dysphoria or recurrent major depressive disorder. Recent epidemiological studies show that the lifetime prevalence of recurrent depression is about 10.3%, which is almost two times higher than our control sample (22). As a result, our odds ratio (OR) for cases may overestimate the impact of SMI on suicidality compared to the general population.

Lastly, we were unable to fully comment and analyze our results in the context of race. During the time period that the GPC was collecting information on ACEs, our NIMH funding was intended to enhance our understanding of serious mental illness in populations underrepresented in basic research (i.e. individuals of African and Latin ancestry). As a result, our volunteer sample overrepresents UBR (Underrepresented in Biomedical Research) populations when compared to the general population of the US. Therefore, our overall sample in this study was 64.0% of African ancestry, 9.0% of European ancestry, and 27.0% of other/mixed, and while the case and control samples were age and sex matched, they were not race matched (52.5% of the cases are of African ancestry, whereas 67.9% of the controls are of African ancestry). While these results do add to a body of literature that has largely excluded discussions of bipolar disorder in African American and Latin American populations (23), our sample does not include an adequate amount of participants with European ancestry to fully compare risk factors and suicidality between different racial groups. However, we hope our results highlight that ACEs, psychosis, and BD are significant predictors of suicidality in this population of majority African American and Latin American participants. Future analyses could include a European ancestry group that has also received the ACE.

Future prospective, longitudinal studies might better predict the impact of ACEs on suicidal ideation and behavior over time without risk of recall bias. In addition, future studies should more formally assess how positive childhood experiences may offset the effect of adverse childhood experiences on suicidal ideation in adolescence and later adulthood. The Positive Childhood Experiences Scale (PCES) includes items such as the ability to talk to their family about feelings, a sense of belonging, participating in community traditions, and feeling safe and protected by adults in their home (24).

Overall, our data shows that individuals with BD are significantly more likely to endorse suicidality than control subjects. Our BD cases were also significantly more likely to report each ACE subtype, particularly physical abuse, emotional abuse, and emotional neglect, as well as a higher overall ACE score, as compared to matched controls. These ACEs, specifically the presence of physical abuse, sexual abuse, and/or household mental illness, are a significant predictor of the presence of suicidality in individuals with BD. Participants with sexual abuse, physical abuse, and the presence of psychosis were almost two times more likely to endorse suicidality than those without; for participants with household mental illness, the risk for suicidality was over double. While these risk factors showed increased odds for suicidality in our overall sample, our BD cases were significantly more likely to report each ACE subtype, and only our BD cases reported psychosis. These results may help clinicians better screen for

suicidality in patients with BD when the time to discuss the full ACE may not be available due to time constraints and/or psychological discomfort. Given the heavy suicidal burden of BD, it is crucial for clinicians to be more acutely aware of how ACE answers can impact suicidal ideation and behavior in this vulnerable population, and it is important for us to better understand the relationship between adverse childhood experiences and suicidality.

ABBREVIATIONS

ACEs
Adverse Childhood Experiences
BD
Bipolar Disorder
DI-PAD or DQ
Diagnostic Interview for Psychosis and Affective Disorders
MDD
Major Depressive Disorder
GPC
Genomic Psychiatry Cohort
PCES
Positive Childhood Experiences Scale
SMI
Serious Mental Illness
SQ
Screening Questionnaire
SZ
Schizophrenia
UBR
Underrepresented in Biomedical Research

DECLARATIONS

Ethics Approval and Consent to Participate

All procedures involving human participants were conducted in accordance with the ethical standards of the institutional and national research committees. This study was approved by the Institutional Review Board at Rutgers University. Written informed consent was obtained from all participants prior to inclusion in the study.

Consent for Publication

Not applicable

Competing Interests

The authors declare that they have no known competing.

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Author Contribution

JG conceived and designed the study, interpreted the results, and drafted the original manuscript. NF curated the data, performed formal data analysis, designed the tables and figures, and assisted with drafting and editing the manuscript. RG and CW assisted with data curation. CP contributed to funding acquisition and project supervision. MP contributed to conception, funding acquisition, supervision, and writing and revising the final manuscript. All authors read and approved the final manuscript.

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Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request with Institutional Review Board (IRB) approval.

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Figures

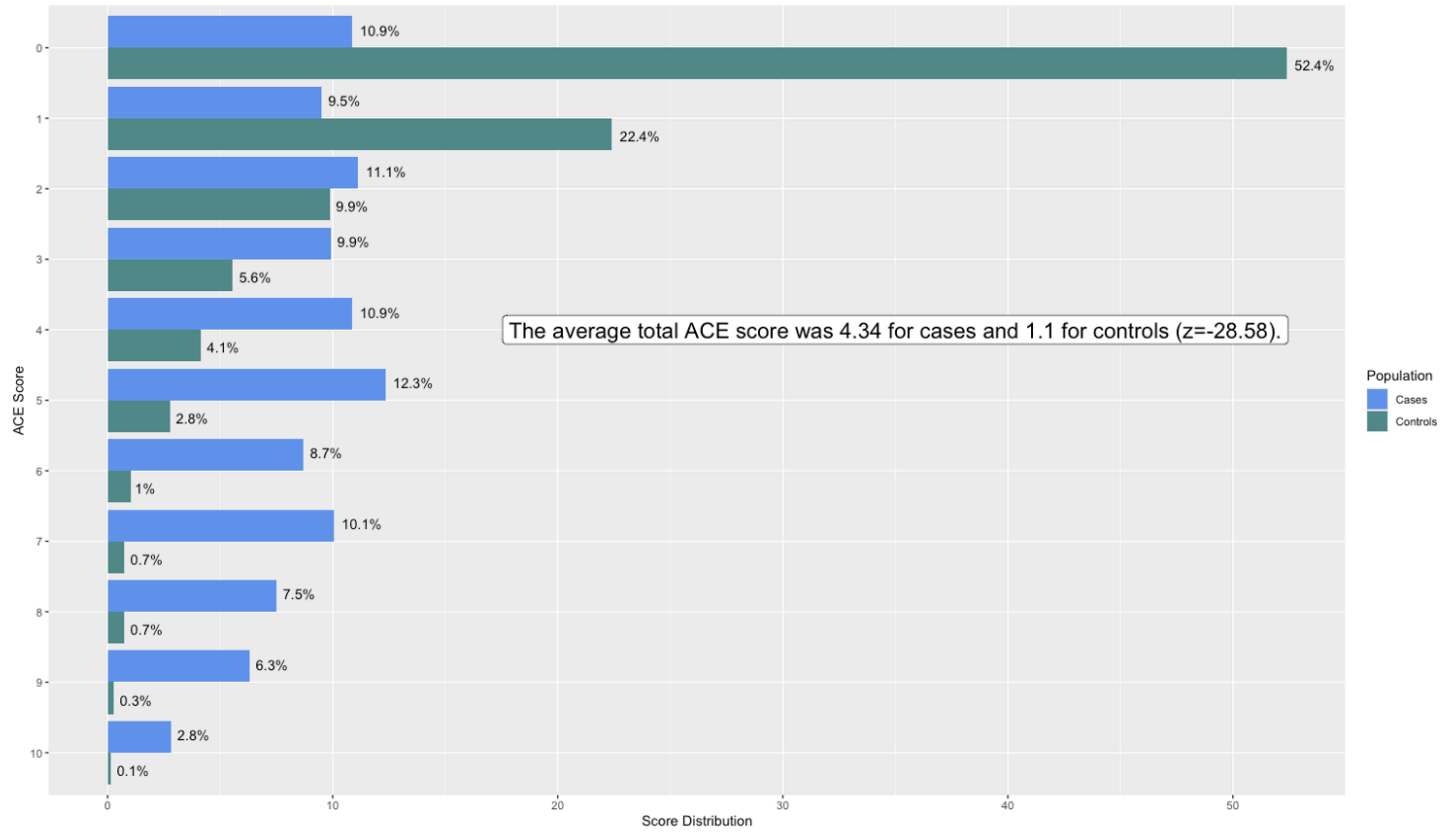


Figure 1

Cumulative ACE Scores in Cases vs. Controls

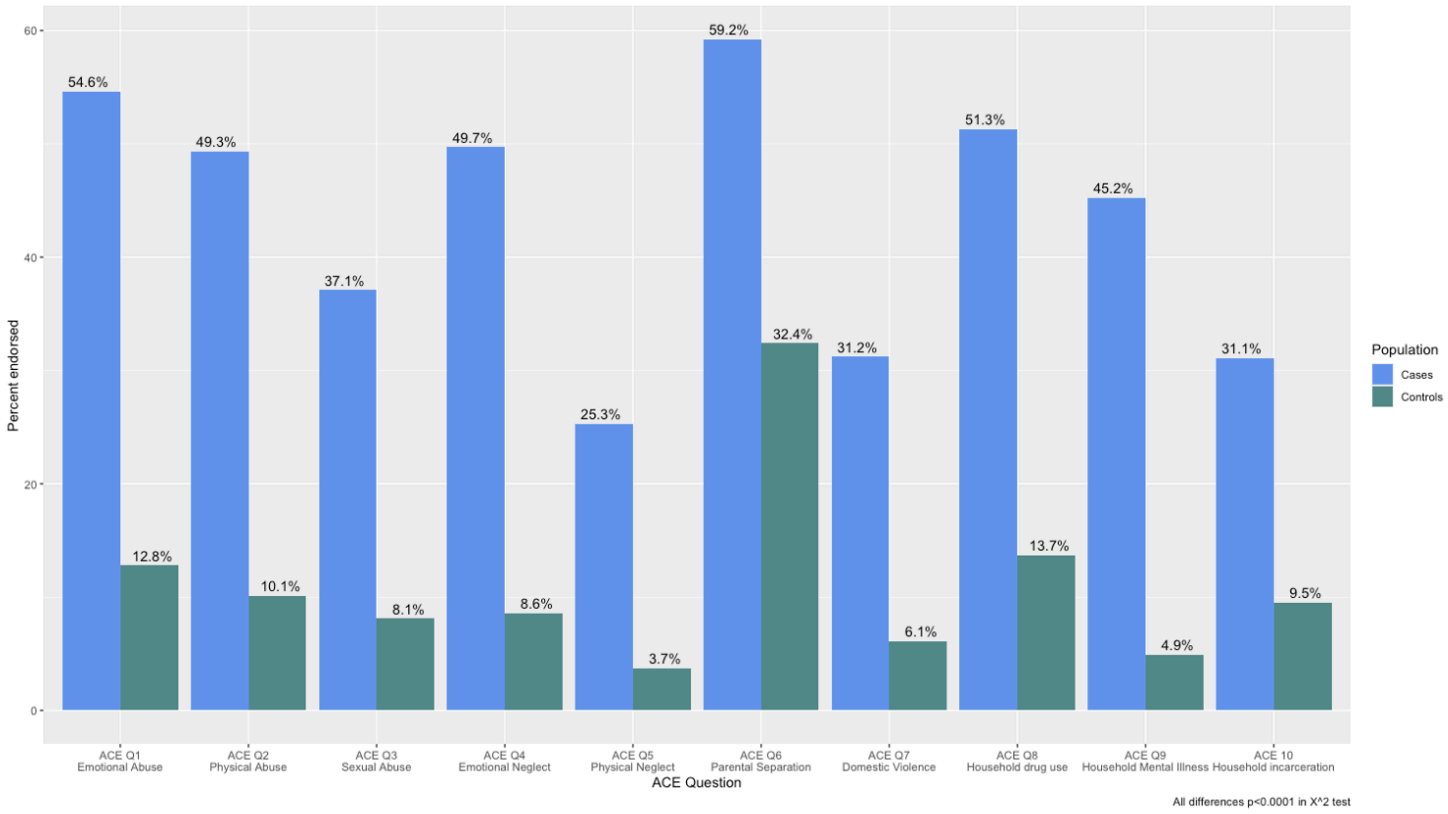


Figure 2

ACE Subtypes in Cases vs. Controls