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Increased Risk for Suicidal Behavior in comorbid Bipolar Disorder and Alcohol Use Disorders

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Abstract

Objective—Bipolar Disorder (BD) has a high rate of suicide attempt, and Alcohol Use Disorders (AUD) have also been associated with elevated risk for suicidal behavior. Whether risk for suicidal behavior is elevated when these conditions are comorbid has not been addressed in epidemiologic studies.

Methods—1643 individuals with a lifetime diagnosis of Bipolar Disorder were identified from 43,093 general population respondents who were interviewed in the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions. Lifetime prevalence of reported history of suicide attempt and suicidal thoughts among Bipolar Disorder respondents with and without DSM IV lifetime alcohol use disorders (abuse or dependence) was assessed using X^2 and adjusted odds ratios and confidence intervals calculated. Logistic regression was used to test relevance of other comorbid clinical conditions to suicide risk in BD respondents with and without comorbid AUD

Results—More than half (54%) of respondents who met criteria for BD also reported AUD. BD individuals with comorbid AUD were at greater risk for suicide attempt than those without AUD (Adjusted Odds Ratio =2.25) and were more likely to have comorbid nicotine dependence and drug use disorders. Nicotine dependence and drug use disorders did not increase risk for suicidal behavior among those with BD, nor did they confer additional risk among BD respondents who also reported AUD. Despite greater psychopathological burden, individuals with comorbid BD and AUD did not receive more or more intensive treatment.

Conclusions—Suicidal behavior is more likely in bipolar respondents who also suffer from AUD. Interventions to reduce suicide risk in BD need to address the common and high-risk comorbidity with AUD.

Keywords

Bipolar Disorder; Alcohol Use Disorders; comorbidity; suicide attempt

Introduction

Bipolar Disorder (BD) I and II, are estimated to manifest in 2.1% of the US population and if sub-threshold cases are included, the lifetime rate may be as high as 4.5%¹. Alcohol use disorders (AUD), including both abuse and dependence, are estimated to affect between 13.5% and 30.3% of the adult US population^{2,3}. BD is commonly associated with AUD. Epidemiologic samples report that lifetime AUD is present among 46%–58% of those who meet criteria for BD I, and 19%–39% for BD II^{1,2,4}, and in clinical studies lifetime estimates range between 10–40% (see Bauer⁵ for a review). This co-occurrence has significant negative consequences for the individual. For example, in a clinical sample, work disability rates for BD comorbid with AUD are about 46.5% compared to 25.8% for those with BD alone⁶.

Perhaps the most worrisome sequelae associated with both conditions is suicidal behavior. In a population sample, 29% of all respondents who met criteria for BD also acknowledged at least one suicide attempt in their lifetime⁷, and rates of suicide completion for BD samples are among the highest for any psychiatric disorder, with an estimated range between 8 to 15%⁸. Rates of suicidal behavior in AUD are also high, with 16–29% of individuals seeking treatment for AUD reporting at least one lifetime suicide attempt^{9–12}, and rates of suicide completion range between 2.4 and 7%^{13,14}.

Studies examining the co-occurrence of BD and AUD with respect to risk for suicidal acts in clinical samples report increased probability of suicidal behavior in BD individuals with comorbid lifetime AUD compared to BD individuals with no AUD comorbidity^{15–18}. From a different vantage, BD suicide attempters are reported to be more likely to meet criteria for comorbid AUD (ORs = 2.44 – 3.25) compared to BD non-attempters^{19,20}.

Use of substances other than alcohol has also been associated with elevated risk of suicidal behavior in both clinical and population studies. For example, cigarette smoking has been shown to be associated with elevated risk for suicidal behavior among mood-disordered individuals both cross-sectionally^{21,22} and prospectively^{23,24}. As well, drug use disorders (DUD) have long been observed to be a factor in suicide attempt and death^{25,26}. Given that patients with BD have a propensity towards DUD, the impact of these disorders on suicidal behavior in BD warrants investigation. To date, epidemiologic studies have not examined the effect of AUD on suicidal behavior in BD, or any additional effects of nicotine dependence or other DUD.

We analyzed data from respondents who met criteria for lifetime BD I or II in the National Epidemiologic Study of Alcohol Related Conditions (NESARC) to test three hypotheses. We hypothesized that BD respondents with co-morbid lifetime AUD (abuse or dependence) would be more likely to report a lifetime suicide attempt than those without AUD. The second hypothesis is that the contribution of AUD comorbidity to suicide attempt risk is independent of any contribution that lifetime DUD (abuse or dependence) or nicotine dependence may have to suicide attempt risk. Finally, we hypothesized that comorbid DUD and/or nicotine dependence would further increase risk for suicidal behavior in BD respondents with AUD. We also examined whether treatment rates among BD respondents with AUD were lower than for those without AUD, as we have observed in our clinical samples²⁷.

Methods

The methods utilized to collect and adjust NESARC data have been published elsewhere⁴. Briefly, data was collected from 43,093 adult respondents not residing in institutions between 2001 and 2002. The response rate was 81%. African-Americans and Hispanics

were over-sampled. Data were weighted and adjusted to be representative of the US population for variables such as age, sex, region, ethnicity, and race based on the 2000 Decennial Census. DSM IV Axis I and Axis II disorders were assessed using the National Institute on Alcohol Abuse and Alcoholism Alcohol Use Disorder and Associated Disabilities Interview Schedule–*DSM-IV* Version (AUDADIS-IV), a structured diagnostic interview designed for use by lay interviewers²⁸. Lifetime bipolar I disorder was defined as having at least one manic or mixed episode with or without one or more major depressive or hypomanic episodes on a lifetime basis⁴. Lifetime bipolar II disorder was defined as having at least one hypomanic episode with or without one or more major depressive or hypomanic episodes. Lifetime diagnoses of alcohol abuse required one or more of the four abuse criteria in the 12 months prior to the interview or previously, and lifetime alcohol dependence diagnoses required three or more of the seven *DSM-IV* dependence criteria in the prior 12 months or during any previous 12 month period.³ Professional interviewers from the U.S. Census Bureau conducted interviews and test-retest reliability of the instrument was assessed. Kappas for AUD and DUD were excellent ($k = 0.74$ and $k = 0.79$, respectively) and were good for BD and other mood and anxiety disorders ($k=0.59$ and $k= 0.40$ to 0.65 respectively) (for more details see Grant et al⁴). Individuals who screened into the major depressive episode section in the NESARC survey were asked the following questions: During that time when your mood was at its lowest/you enjoyed or cared the least about things, did you: 1) have thoughts of death?; 2) think about committing suicide?; 3) attempt suicide?. We used the second question to assess a lifetime history of suicidal ideation, while the third was used to assess a lifetime history of suicide attempt. One thousand six hundred and forty three lifetime BD respondents completed the suicide questions. Wave I of NESARC, used for the present analyses, also assessed the following personality disorders: avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic, and antisocial.

Statistical Analysis

Demographic and clinical variables were compared between BD without AUD (BD-AUD) and BD with AUD (BD+AUD) groups using χ^2 or t-tests as appropriate. Odds ratios and confidence intervals were calculated and for comparisons of clinical and suicide related variables ORs and confidence intervals were adjusted for demographic characteristics that differed between the two groups. To test hypothesis one, we compared suicidal thoughts and attempts between BD+AUD and BD–AUD groups using χ^2 and calculated odds ratios and confidence intervals, adjusted for demographic differences between the two groups. Logistic regression was used to test hypothesis two. Suicide attempt was the response variable, while AUD, DUD and nicotine dependence were the independent variables of interest, and additional clinical factors associated with suicide attempts, specifically, age of onset of BD²⁹, number of depressive episodes^{30–32}, comorbid antisocial personality disorder (ASPD)³³, and comorbid panic disorder³⁴, were included to examine their possible effect. The model also controlled for clinical and demographic variables that differed between the BD+AUD and BD–AUD groups. To test hypothesis three, logistic regression models were constructed for respondents with BD+AUD only, with suicide attempt as the dependent variable and DUD, nicotine dependence, age of onset of BD, number of depressive episodes, comorbid ASPD, comorbid panic disorder, use of alcohol to self-medicate³⁵, and demographic variables described above as independent variables.

Results

Demographic and clinical characteristics Bipolar Disorder with and without comorbid Alcohol Use Disorder

Among NESARC respondents, 1643 individuals met criteria for lifetime BD and completed the major depressive episode module. Over half of those meeting criteria for BD (54%,

n=881) also met DSM-IV criteria for lifetime AUD. Compared to BD-AUD respondents, BD+AUD respondents were more likely to be male, have a middle income, be US born, and less likely to be over age 65, African-American or Hispanic, or to be from the southern US (see Table 1). Regarding clinical characteristics, BD+AUD respondents were more likely than BD-AUD respondents to report an earlier age of onset of mania or hypomania and to have other lifetime comorbid conditions including nicotine dependence, DUD, antisocial personality disorder and panic disorder, and to endorse use of alcohol and other drugs to self-medicate (Table 2).

Despite their more frequent history of suicidal behavior and higher rates of comorbid conditions, BD+AUD respondents had almost identical lifetime rates of mental health treatment, emergency department visits, psychiatric hospitalization, and prescription of medication as BD-AUD (Table 3).

Suicidal behavior in Bipolar Disorder with and without comorbid Alcohol Use Disorders

Confirming the first hypothesis, BD+AUD respondents were more likely to report thoughts of death, suicidal ideation, and suicide attempts, compared to BD-AUD respondents (Table 4), despite no difference in the frequency of depressive episodes. Among BD+AUD individuals, there was no difference between those with comorbid alcohol abuse and those with comorbid alcohol dependence in reported prevalence of suicidal ideation or suicide attempts (adjusted OR 0.76% CI: 0.51–1.14, and OR 0.82, 95%CI: 0.51–1.3, respectively).

Supporting the second hypothesis, in logistic regression, controlling for demographic differences between groups, AUD remained independently associated with lifetime history of suicide attempt (adjusted OR 1.63, 95% CI: 1.04–2.55, $p=0.033$), while DUD and nicotine dependence were not (adjusted OR 1.16, 95% CI: 0.77–1.74, $p=0.47$ and 1.21, 95%CI: 0.85–1.72, $p=0.28$, respectively). In the sample as a whole, greater number of depressive episodes increased the probability of a past suicide attempt, with each depressive episode increasing risk by approximately 2% (adjusted OR 1.02, 95% CI 1.01–1.03, $p<0.001$). Similarly, presence of lifetime ASPD and panic disorder also independently increased the probability of suicide attempt (adjusted OR 1.56, 95% CI: 1.04–2.35, $p=0.03$ and OR 2.13, 95%CI: 1.52–2.99, $p<0.001$, respectively), but age of onset of BD did not (adjusted OR 0.98, 95%CI: 0.96–1.00, $p=0.089$).

The third hypothesis was not confirmed. Among BD+AUD respondents the presence of other lifetime DUD (adjusted OR 0.98, 95% CI: 0.60–1.60, $p=0.93$) or nicotine dependence (adjusted OR 1.08, 95% CI: 0.66–1.77, $p=0.76$) had no effect on risk for suicide attempt, controlling for number of depressive episodes, age, sex, race, nativity, personal income, and region. However, use of alcohol to self-medicate was independently associated with suicide attempt (adjusted OR 1.71, 95%CI: 1.06–2.75, $p=0.029$), as were comorbid lifetime panic disorder (adjusted OR 1.91, 95%CI: 1.25–2.93, $p=0.003$), and number of depressive episodes (adjusted OR 1.02, 95% CI: 1.01–1.03, $p=0.003$), with the same approximate 2% increase in risk for suicide attempt per episode observed in sample as a whole. Lifetime ASPD did not increase the likelihood of suicide attempt in this model (adjusted OR 1.40, 95%CI: 0.88–2.21, $p=0.152$).

Discussion

In this community sample of individuals who met lifetime criteria for BD, those who reported having an AUD were substantially more likely to report a lifetime history of suicide attempts. This effect was independent of the number of major depressive episodes, presence of earlier age of onset of BD, comorbidity with DUD or nicotine dependence, and endorsement of alcohol use as self-medication. Disturbingly, despite the presence of

comorbid AUD and suicidal behavior, these individuals did not report receiving more psychiatric treatment. This was the case even though BD respondents with AUD had considerably higher rates of DUD and were more often afflicted with character pathology.

Alcohol Use Disorder and Bipolar Disorder

That 54% of respondents meeting criteria for BD also acknowledged AUD is in line with reports from other US epidemiologic studies. Several reports note lifetime AUD comorbidity ranging from 38% to 56% among those with BD I 1,2,4, although lower rates (39% in males and 7.9% in females) were reported in a smaller Australian epidemiologic study³⁶. Of interest, rates among community respondents with BD are higher than the 10–40% reported in clinical samples 5,17,37–40. This may reflect a reported tendency for BD patients with AUD to be less likely to seek, or stay in, clinical treatment^{41,42}. Whether difficulties with treatment adherence in this population relate to difficulties in recognizing the need for treatment or to additional barriers to accessing clinical care, such as trouble keeping appointments is not known. Alternatively, it may be that individuals with comorbid BD and AUD seek help in alcohol treatment facilities and therefore are not present in clinics focusing on mood disorders. This possibility is supported by the work of Albanese and colleagues⁴³ who reported that, among men who met criteria for BD and were being cared for in a substance abuse treatment program, 49% had not been identified as bipolar. Instead, most carried a diagnosis of unipolar depression. Nonetheless, the similar rate of treatment observed in the NESARC sample for BD respondents with and without AUD, suggests that regardless of where they obtain treatment, those with BD+AUD are seriously under-treated an observation we have seen in our clinical samples as well²⁷.

Alcohol Use Disorders and Bipolar Disorder: A comorbidity that increases risk for suicide attempt?

The prevalence of lifetime suicide attempt in this sample (21%) was somewhat lower than that reported in other epidemiologic studies (29%)⁷. However, it is within the range reported in clinical studies (21–42%) 15,19,37,38. As hypothesized, we found that among those with BD+AUD, 25% acknowledged a suicide attempt, compared to 15% among those with BD –AUD. This finding is consistent with most clinical studies of BD^{15,17,19,20}. Clinical studies that do not find a relationship between AUD and suicidal behavior in BD have included mostly or exclusively subjects suffering manic or mixed episodes^{44,45}. Given that suicide attempts in BD are more likely to occur in the context of depression^{30–32}, use of a manic or mixed sample may select for individuals with fewer depressive episodes, and thus make it difficult to identify variables key to risk for suicidal behavior.

It is worth noting that among BD–AUD respondents, the rate of suicide attempt (15%) is close to that cited for unipolar depression: 15.9% in the ECA study⁷, and 16.9% in the NESARC data itself³³. An intriguing possibility is that BD has the highest rate of suicide attempt and completion among all psychiatric diagnoses due to the staggering rate of AUD comorbidity among individuals with this disorder. However, Bolton et al (2008) report that although rates of any AUD were high among Major Depressive Disorder respondents (55%), the odds of being a suicide attempter were not related to the presence of AUD (AOR=1.11, C.I.0.72, 1.73). Thus, simply suffering from AUD comorbid with a mood disorder does not lead to increased risk for suicidal behavior. Whether the increased risk for suicide attempts observed among BD+AUD respondents is related to an interaction between the impulsivity reported among BD subjects⁴⁶ and the disinhibiting effects of alcohol intoxication is an area for further study.

Alcohol Use Disorder, Drug Use Disorder, Nicotine Dependence and Risk for Suicidal Behavior in Bipolar Disorder

Drug use disorders (DUD) are associated with suicidal behavior and are frequently comorbid with BD. In the community, 36–41% of BD individuals also report DUD^{2,4}, and in clinical samples lifetime rates of drug abuse or dependence range from 14–65%⁴⁷. The prevalence of nicotine dependence in BD is also elevated, with a 12 month prevalence of 35% and 33% in BD I and II respectively, compared to 13% in the general population⁴⁸. In this sample, 56% of BD respondents had a lifetime DUD and 42.8% had nicotine dependence. Given the association of DUD and nicotine dependence with increased risk for suicidal behavior, and the frequent comorbidity of DUD and AUD³, one might expect cumulative effects of multiple comorbidities on risk. However, our data did not support this hypothesis, as neither DUD nor nicotine dependence independently increased the risk for suicide attempt among BD individuals, over and above that associated with AUD. These findings stand in contrast to most clinical studies focused on this question, possibly due to methodological issues such as differences in sampling or differences in ascertainment. For example, clinical studies linking nicotine dependence to suicide attempt in mood disorders generally exclude individuals who are currently alcohol or drug dependent^{21,23,24}, and a study of the association between DUD and suicidal behavior in BD included patients with schizoaffective disorder⁴⁹ making comparisons with the current data problematic. As well, postmortem studies of suicide victims with DUD do not address the presence of affective disorders⁵⁰.

Thus, although clinical studies report a relationship between DUD and/or nicotine dependence and suicide attempts^{22,51}, we could find no study that examined additive risk for suicidal behavior with abuse of or dependence on multiple substances. Whether the lack of additive effects observed in the current study would also hold in clinical samples using a similar design requires further inquiry.

Other psychiatric comorbidities: Panic Disorder and ASPD

Panic Disorder is common (20.8%) in epidemiologic samples of BD⁵², and is associated with suicidal behavior independent of the presence of other psychiatric disorders⁵³. A similar association is reported in clinical populations^{54–56}, although not all studies, including ours, agree^{57,58}. In this sample, the BD+AUD group had higher lifetime prevalence of panic disorder than the BD–AUD group. As well, panic disorder was independently associated with increased risk for suicide attempt. It has been suggested that comorbidity of AUD and anxiety disorders may reflect an attempt to self-medicate anxiety. National epidemiological studies have shown that 3–23% of panic disorder respondents endorse the use of substances to ease anxiety symptoms^{35,59}. Moreover, anxiety disordered respondents who use substances to self-medicate tend to have higher rates of comorbid BD than non self-medicators (12.6% vs. 2.8%), and higher rates of suicide attempt (21.7% vs. 6.2%)³⁵, suggesting that Panic Disorder, use of substances to self medicate, and suicidal behavior are closely linked.

Although we found higher rates of comorbid antisocial personality disorder (ASPD) among the BD+AUD compared to the BD–AUD group, ASPD independently increased risk for suicide attempt in the BD group as a whole, but not within the BD+AUD subgroup. This counterintuitive finding raises the question of whether the increased risk for suicidal behavior conferred by ASPD in BD is due to the heightened aggression and impulsivity, a hallmark of ASPD and shown in clinical samples to be closely related to suicidal acts^{23,46}. Perhaps there is a ceiling effect in terms of aggression and impulsivity, such that once the individual meets criteria for AUD, the presence of ASPD does not confer additional risk, because of the already high level of aggression and impulsivity in the BD+AUD

subpopulation. The current data cannot address this question. However, the findings suggest there may be related underlying mechanisms driving these associations, rather than a simple additive effect from disease burden.

Self Medication with Alcohol and Other Drugs

We found that reported use of alcohol to self-medicate was associated with a further increased risk for suicide attempt among BD respondents with AUD. A small number of studies examining reasons given for substance use in BD samples find that the majority of BD patients with substance use disorders (including alcohol) report using substances to self-medicate^{60–63}. None of these studies examined alcohol use separately from other drugs, nor did they focus on risk for suicidal behavior. One possible mechanism for this association could be that suicide attempters have cognitive difficulties that impair decision-making^{64,65}. This impaired decision-making may lead such individuals to use suicidal behavior or alcohol as a maladaptive way of managing painful feelings. Alternatively, use of alcohol to self-medicate feelings of distress may lead to disinhibition resulting in more suicidal behavior. We do not have data to address these possibilities, but neuropsychological studies of this population would be instructive.

Mental Health Care Utilization

The rates of mental health care received by BD participants for their mood disorder were generally low. Only 27% of respondents had received any kind of treatment and fewer than 25% had received pharmacotherapy, considered the cornerstone of treatment for BD. That the presence of AUD was not associated with higher rates of treatment in this sample is of concern for two reasons: (1) increased morbidity and mortality is well-documented when these conditions co-occur; and (2) there is greater frequency of personality, anxiety, and other substance use disorders among those with BD+AUD. Two potential reasons for the observed under-treatment include the low overall treatment rate for AUD³, possibly creating a floor effect in terms of additional treatment received when comorbid with BD, and/or that BD+AUD is more common in males, who are less likely to seek treatment for all disorders⁶⁶. These findings are consistent with those of an Australian epidemiologic study, which found that impaired functioning was not associated with more care utilization³⁶. Clearly, interventions to improve adherence and venues to make care more accessible for this population with high disease burden would be of utility.

Limitations

Concerns have been raised about the use of lifetime diagnoses from epidemiologic studies to determine rates of comorbidity, because of the possibility that such associations may be spurious⁶⁷. However, both BD and AUD are diagnoses that are considered enduring. That is, once a diagnosis of BD or AUD is established, the diagnosis stands even though episodes may remit. When diagnoses are considered part of an ongoing diathesis, rather than being constituted of discrete, unrelated, episodes the concern regarding pseudocomorbidity is obviated. Moreover, NESARC data regarding 12 month prevalence showed a the strong association between BD and AUD further supporting the notion that the relationship between the two disorders is real³.

The proportion of BD individuals reporting a past suicide attempt was somewhat lower than in other epidemiological studies. It is possible that the NESARC did not identify all suicidal behavior because the question for suicide attempts was posed only to those who screened into the major depressive episode module. Thus, individuals who had not experienced at least 2 weeks of low mood or anhedonia, but had made a suicide attempt would not be included in our sample. However, as suicidal behavior is overwhelmingly associated with depression in BD^{30–32}, it is likely that the bulk of attempters are identified with this

strategy. Moreover, in the National Alcohol Longitudinal Epidemiologic Study (NLAES), which examined a representative sample of the US household population (1991–1992), the number of individuals who did not screen into the major depressive module but reported a suicide attempt was very low: less than 0.1% of the NLAES sample. This suggests that had we been able to include those who did not screen into the major depressive episode module, the results would have likely remained unchanged⁶⁸. Data on suicide attempt was limited to presence or absence, with no data available on frequency or medical sequelae of suicide attempts, which would have been informative on the relationship of comorbid AUD to severity of suicidal behavior.

The AUDADIS-IV structured interview has demonstrated good diagnostic validity and reliability. Nevertheless there may be differences in terms of illness course and characteristics between BD individuals identified by this method and those who come to clinical attention. Such differences may, in part, explain the low levels of treatment reported in the community, even among BD individuals with multiple comorbidities and suicidal behavior. Further research is needed to examine differences between individuals with bipolar in the community and those seen in clinical settings.

Conclusion

In summary, data from this study suggest that the presence of AUD in the context of Bipolar Disorder is a risk factor for suicidal behavior. This effect is independent of that of earlier onset of BD, frequency of depressive episodes, presence of Panic Disorder and ASPD, and of the use of alcohol to self-medicate BD symptoms. Moreover, drug use disorders and nicotine dependence were not independently related to suicide attempts in BD in the community and did not increase risk further in those with BD and comorbid AUD. Given the high disease burden suffered by these individuals and the increased risk for morbidity and mortality when BD and AUD are comorbid, targeting them for treatment is a public health imperative.

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Table 1
Demographic characteristics of Bipolar Disorder respondents with and without Alcohol Use Disorders (AUD)

	Bipolar + AUD (N=881)		Bipolar - AUD (N=762)		OR*	CI
	%	95% CI	%	CI		
Age						
18–29	33.74	29.53, 38.23	35.44	31.00, 40.15	1.00	1.00, 1.00
30–44	37.71	33.76, 41.84	31.15	27.03, 35.59	1.27	0.92, 1.76
45–64	26.25	23.03, 29.76	27.24	23.81, 30.96	1.01	0.75, 1.37
65+	2.29	1.47, 3.56	6.17	4.57, 8.28	0.39	0.22, 0.70
Sex						
<i>Male</i>	51.11	47.29, 54.92	28.21	24.16, 32.65	2.66	2.07, 3.42
Race-ethnicity						
White, non Hispanic	76.08	72.09, 79.66	66.97	61.35, 72.15	1.00	1.00, 1.00
<i>Black, non Hispanic</i>	9.53	7.39, 12.21	14.78	12.07, 17.97	0.57	0.41, 0.79
Native American or Asian/Pacific Islander	6.96	4.87, 9.86	6.16	4.03, 9.32	0.99	0.55, 1.81
<i>Hispanic</i>	7.43	5.53, 9.91	12.09	8.99, 16.06	0.54	0.37, 0.79
Born						
<i>US born</i>	93.92	90.87, 96.00	86.72	81.69, 90.54	2.37	1.40, 4.00
Marital status						
Married/cohabiting	47.06	43.04, 51.12	50.16	45.95, 54.36	1.00	1.00, 1.00
Widowed/separated/divorced	22.39	19.70, 25.34	19.63	16.80, 22.80	1.22	0.92, 1.61
Never married	30.55	27.09, 34.24	30.22	26.24, 34.51	1.08	0.82, 1.42
Education						
Less than high school	18.15	15.31, 21.38	18.83	15.80, 22.27	0.96	0.70, 1.33
High school graduate	30.64	26.77, 34.79	30.08	26.50, 33.91	1.02	0.77, 1.34
Some college or higher	51.21	46.73, 55.68	51.10	46.97, 55.21	1.00	1.00, 1.00
Personal income, \$						
0–19, 999	55.80	51.46, 60.04	68.21	64.13, 72.03	1.00	1.00, 1.00
20, 000–34, 999	24.07	20.73, 27.76	16.25	13.35, 19.64	1.81	1.33, 2.46
35, 000–69, 999	16.78	14.02, 19.95	12.42	10.05, 15.25	1.65	1.18, 2.31
70, 000+	3.36	2.13, 5.26	3.12	1.93, 4.99	1.32	0.68, 2.54

	Bipolar + AUD (N=881)		Bipolar – AUD (N=762)		OR*	CI
	%	95% CI	%	CI		
Urbanicity						
Urban	77.98	72.37, 82.72	79.18	73.87, 83.65	1.00	1.00, 1.00
Rural	22.02	17.28, 27.63	20.82	16.35, 26.13	1.07	0.80, 1.44
Region						
Northeast	17.20	11.63, 24.68	19.77	13.27, 28.41	0.69	0.43, 1.11
Midwest	27.44	20.87, 35.17	21.19	15.45, 28.36	1.03	0.74, 1.42
South	27.57	21.93, 34.04	37.04	29.91, 44.78	0.59	0.43, 0.80
West	27.79	20.56, 36.39	22.00	15.30, 30.58	1.00	1.00, 1.00

Table 2
Clinical Characteristics of Bipolar Disorder respondents with and without Alcohol Use Disorders (AUD)

	Bipolar + AUD (n=881)			Bipolar – AUD (n=762)			Adj OR*	CI
	%	CI		%	CI			
<i>Nicotine dependence</i>	61.69	57.26	65.94	23.99	20.46	27.91	5.14	3.83
<i>Any drug use disorder</i>	53.59	49.31	57.83	11.46	8.92	14.62	9.39	6.60
<i>Prescription drug use disorder</i>	42.37	38.25	46.60	11.74	9.20	14.86	5.08	3.63
<i>Antisocial Personality Disorder</i>	29.52	25.81	33.52	7.89	5.88	10.52	4.52	3.03
<i>Panic Disorder</i>	29.32	25.99	32.89	24.77	21.55	28.29	1.39	1.05
Course of Illness	mean	CI		Mean	CI		T Test	P value
Number of Depressive Episodes	8.21	6.84	9.59	6.76	5.51	8.01	1.45	0.1519
Number of Manic Episodes	7.65	6.23	9.07	6.36	5.18	7.55	1.35	0.1807
Age at first depressive episode, mean (SE), years	23.59	22.75	24.43	24.45	23.33	25.58	-1.27	0.2092
Age at first manic or hypomanic episode, mean (SE), years	24.09	23.21	24.98	25.62	24.49	26.76	-2.29	0.0255
Age at first mood episode, mean (SE), years	20.88	20.15	21.60	21.94	20.89	22.98	-1.72	0.0899
Self Medication	%	CI		%	CI		Adj OR*	CI
<i>Reports alcohol use to self medicate</i>	28.94	25.13	33.08	4.67	3.13	6.92	7.66	4.87
<i>Any medicine or drug use as self medication</i>	14.02	11.17	17.45	2.39	1.53	3.73	5.92	3.46

* Adjusted for age, sex, race, US born, individual income, and region.

Table 3

Treatment received by Bipolar Disorder respondents with and without Alcohol Use Disorders (AUD)

	Bipolar + AUD (n=881)		Bipolar - AUD (n=762)		Adj OR*	CI
	%	CI	%	CI		
Any mental health treatment	34.12	30.48	33.37	29.55	1.05	0.80
Any psychiatric hospitalization	11.52	9.20	8.70	6.56	1.43	0.93
Any emergency room visit	8.67	6.79	7.45	5.62	1.25	0.81
Any prescribed psychotropic medication	25.77	22.11	26.79	23.20	0.98	0.71
Age at first treatment for depression, mean (SE), years	28.13	26.76	29.09	27.73	-1.03 (T-test)	0.3090 (p-value)

* Adjusted for age, sex, race, US born, individual income and region

Table 4
Suicide related characteristics of Bipolar Disorder respondents with and without Alcohol Use Disorders (AUD)

	Bipolar + AUD (n=881)		Bipolar – AUD (n=762)		Adj OR*	CI
	%	CI	%	CI		
Thoughts about death	71.26	67.42 74.82	58.19	53.37 62.86	1.90	1.45 2.49
Suicidal ideation	56.90	52.73 60.97	41.80	37.33 46.42	1.81	1.42 2.30
Suicide attempt	25.29	21.82 29.10	14.78	12.19 17.80	2.25	1.61 3.14

* Adjusted for age, sex, race, US born, individual income and region