Published in final edited form as:

Arch Suicide Res. 2016 ; 20(2): 219–232. doi:10.1080/13811118.2015.1004489.

The Association of Alcohol Use Disorders with Suicidal Ideation and Attempts in a Population-based Sample

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Abstract

Objectives—Using population-based data, we examined associations of alcohol use disorders (AUD) with suicidality, assessing modification by mood disorders, and mediation by drinking level.

Methods—Analyses were completed for drinkers with 2-weeks of low mood (n=9173) using the 2001-02 National Epidemiologic Survey on Alcohol and Related Conditions.

Results—Independent of mood disorder status, alcohol dependence, but not abuse, was associated with suicidal ideation (adjusted odds ratio [AOR]=1.64; 95% confidence interval (CI)=1.25-2.14; p=0.001), and suicide attempts (AOR=2.02; CI=1.43-2.85; p<0.001) relative to those without AUD. Findings indicate partial mediation by heavier consumption.

Conclusions—AUD associations with suicidality are not explained by comorbid mood disorders, but are partially mediated by drinking level. Future studies should evaluate transitions in suicidality with changes in consumption.

Keywords

alcohol; alcohol use disorders; alcohol dependence; epidemiology; suicidal ideation; mood disorders

Introduction

Study findings from prior surveys such as the National Comorbidity Survey (NCS) indicate that individuals with alcohol abuse or dependence are more likely to report suicidal ideation and suicide attempts relative to those without these alcohol use disorders (AUD) (Kessler, Borges & Walters, 1999). Suicidal behavior, such as attempted or completed suicide, is considered to be the endpoint of a spectrum that is preceded by suicidal ideation and/or suicide planning (Conner et al., 2007). However, a lack of understanding persists as to what characteristics are associated with the specific stages in the spectrum from suicidal ideation to behavior. There is also a general paucity of research assessing the specific associations between alcohol use disorders with suicidality in general population samples. A better characterization of these relationships and their intervening factors may offer improved prevention strategies targeting suicidal ideation and behavior.

A number of studies have shown associations between major depressive disorder (MDD) and the occurrence of suicidal ideation or behavior (Chartrand et al., 2012; Nock et al., 2009; Sokero et al., 2008; Kessler et al., 1999). For example, in a cross-national analysis conducted using WHO World Mental Health Surveys to examine the associations of individual mental disorders and suicidal thoughts and behavior, major depressive disorder was one of the strongest predictors of suicidal ideation in some industrialized countries (Nock et al., 2009). Moreover, many clinical and population-based studies have shown the comorbid occurrence of alcohol dependence with depression (Lambert, Griffith & Hendrickse, 1996; Chen et al., 2011; Lejoyeux & Leher, 2011; Grant et al., 2004), indicating that alcohol dependence is associated with both depression and suicidality, and may play a significant role in their association.

Previously, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) dataset has been used to examine these interrelationships by assessing associations between alcohol use disorders and suicidality among individuals with specific mood disorders, such as bipolar disorder (Oquendo et al., 2009) and major depressive disorder (Bolton et al., 2008). Other studies have used the NESARC to examine risk factors for suicide attempts among those with major depressive disorder (Chartrand et al., 2012; Bolton et al., 2010; Bolton et al., 2008). The presence of a mood disorder might explain or possibly modify the relationship between alcohol abuse and/or dependence with suicidality. However, this has not been adequately explored since a number of these prior assessments have evaluated the AUD/suicidality relationship exclusively among individuals who met criteria for depression or other mood disorders.

Associations between AUD and suicidality also might be explained by the alcohol consumption level, which may act as a mediator linking alcohol use disorders and suicidality. Individuals with AUD typically drink more heavily, and higher drinking levels are associated with greater risk for impaired judgment and increased alcohol-related disinhibition (Rose & Duka, 2007; Claus et al., 2013). Furthermore, higher consumption may increase risk for depressed mood (Fergusson et al., 2009; Hasin et al., 2002; Boden & Fergusson, 2011) and suicidal ideation, as well as impulsive behavior resulting in self-harm attempts. Previous multivariate analyses examining the associations between alcohol

dependence and suicidality have not taken into account level of drinking, which is not a specific diagnostic criterion for alcohol abuse or alcohol dependence (American Psychiatric Association, 1994; 2013).

In the current report, we aimed to extend prior findings and further evaluate the associations of AUD with suicidality by assessing specific hypotheses not previously examined in population-based samples. We hypothesized that both alcohol abuse and dependence would be associated with suicidal ideation as well as suicide attempt. Yet, consistent with prior evidence indicating weaker associations of internalizing symptoms with alcohol abuse (Kessler et al., 1997; Grant et al., 2009), it was hypothesized that alcohol dependence would be more strongly associated with suicidality than alcohol abuse. We further hypothesized that the association of AUD with suicidality would be mediated by drinking level. In addition, because suicidality is one of several diagnostic criteria for major depressive disorder (American Psychiatric Association, 1994; 2013), we expected that the association of AUD with suicidality would differ by participants' mood disorder history such that the presence of a mood disorder would strengthen AUD/suicidality association. To complete these analyses, we used data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a large, nationally representative sample of United States residents. By not restricting the sample to those with a specific DSM-defined mood disorder, as has been done previously with this dataset (Oquendo et al., 2009; Bolton et al., 2008), we were able to examine the association between AUD and suicidality in a population-based sample of individuals with subclinical mood symptoms, as well as those who met the full criteria for a mood disorder.

Methods

Data source and sample

We used data from wave 1 of the NESARC, a nationally representative survey conducted between 2001-02 by the National Institute of Alcohol Abuse and Alcoholism (NIAAA). A total of 43,093 respondents from the U.S. non-institutionalized adult population were interviewed. The sampling frame entailed interviewing one individual in each household. African Americans, Hispanics, and young adults ages 18-24 years were oversampled. The interviews were conducted face-to-face. The survey contained questions on participants' past and present substance use disorders, mood, anxiety, and selected personality disorders based on DSM-IV criteria (American Psychiatric Association, 1994). The overall response rate for the NESARC Wave 1 was 81%. The analyses of the de-identified data were exempt from review of the institutional review board. The data were weighted to account for sampling strategy and for representativeness of the U.S. population. Detailed information about the NESARC methodology and sampling design can be found elsewhere (Grant & Dawson, 2006; Grant et al., 2003; 2009).

The present study sample was restricted to individuals who were current drinkers. The sample was further limited to those who had experienced a 2-week period of low mood in their lifetime (n=9173), because questions about suicidality were asked only from these participants. Low mood was assessed with the questions "Have you ever had a 2-week period when you felt sad, blue, depressed, or down most of the time?" or "Have you ever

had a 2-week period when you didn't care about things you usually cared about?" Endorsement of either question indicated a positive screen for low mood. If participants answered 'no' to the above screening questions, they were excluded from further analyses, and were not asked about suicidality.

Assessment of substance and psychiatric disorders

Lay interviewers used a structured diagnostic interview to obtain information on lifetime and 12-month substance use and psychiatric disorders. Mental disorders were ascertained based on DSM-IV criteria (American Psychiatric Association, 1994) using the NIAAA's Alcohol Use Disorder and Associated Disabilities Interview Schedule–DSM-IV Version (AUDADIS-IV) (Grant et al., 1995; Ruan et al., 2008). Alcohol dependence is marked by cognitive, behavioral, and psychological symptoms indicating that the individual continues to consume alcohol despite significant alcohol-related problems. To be diagnosed with alcohol dependence according to DSM-IV, an individual must meet criteria for three of the following seven categories with regards to alcohol: tolerance; withdrawal; drinking larger amounts or for a longer period than was intended; persistent desire or unsuccessful efforts to cut down or control alcohol use; spending a great amount of time obtaining alcohol; giving up or reducing important social, occupational, or recreational activities; and continued drinking despite a recurrent or persistent physical or psychological problem.

Alcohol abuse is different from alcohol dependence in that abuse only includes the harmful consequences of repeated use instead of a pattern of compulsive use. To be diagnosed with alcohol abuse, an individual must meet one of the following criteria with regard to alcohol: recurrent drinking resulting in failure to meet responsibilities at work, school, or home; recurrent alcohol use in situations where it is physically dangerous; recurrent alcohol-related legal problems; and continued alcohol use despite persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol. Alcohol use disorder (abuse and/or dependence) criteria were assessed in two time frames: current (past 12 months) or past (any time prior to past 12 months); for the purposes of this study, we combined the two time frames to define lifetime alcohol use disorders.

Lifetime mood disorders included major depressive disorder, bipolar disorder, and dysthymia. Other DSM-IV disorders included in the analyses were lifetime non-alcohol substance use disorders (heroin, other narcotics, cocaine, stimulants, hallucinogens, and/or marijuana), nicotine dependence, and anxiety disorders (generalized anxiety, panic, specific, and/or social anxiety).

Suicidality

Queries concerning suicidal ideation (SI) and suicide attempts (SA) were included in the low mood section of the survey. Participants were categorized as making a suicide attempt if they responded positively to the following query: "During that time (when your mood was lowest/you cared the least about things) did you attempt suicide?" Participants who responded positively to any of the following items were categorized as having suicidal ideation: 1) "During that time (when your mood was the lowest/you cared the least about things) did you think about committing suicide"; 2) "During that time (when your mood was

the lowest/you cared the least about things) did you feel like you wanted to die?"; and 3) "During that time (when your mood was the lowest and you cared the least about things) did you think a lot about your own death?" In this study, we combined the three suicidal ideation questions to create one binary variable for SI. Additionally, a binary suicidality variable was created, representing "1" for reporting SA or SI and "0" for no suicidality. Individuals with a history of SA were classified in that category regardless of whether or not they had a history of SI.

Sociodemographic characteristics

Age was categorized (18-29, 30-39, 40-49, 50 years) to show possible differences by age group in exploratory analyses and as a centered variable in the regression analyses. Other variables included in the analyses were sex, race/ethnicity (non-Hispanic white and non-white), income (\$0-19,999 and \$20,000 or greater), education (less than high school and high school or greater), and family history of depression and alcoholism. Mood disorders and other psychiatric disorders were dichotomized and defined as having a lifetime episode or not. For example, to define lifetime major depressive disorder (MDD), we combined the two variables for "major depression in the last 12 months" and "major depression prior to the last 12 months", excluding any depression that was solely due to medical illness or substance withdrawal or intoxication. Family history of alcoholism was assessed by asking the participants whether any first-degree relatives had ever been an "alcoholic or problem drinker." Family history of depression was assessed by asking the participants whether any first-degree relatives had ever been depressed for a period of at least 2 weeks.

Statistical analyses

The NESARC used a complex sampling design. Analyses used the *svy* routines of STATA 12.0 to take into account survey weights, clustering and stratification of the data. The analyses were conducted in five stages. First, sociodemographic characteristics, alcohol consumption, psychiatric and substance use disorders, and family history were compared across participants reporting SI or SA vs. those without any suicidality. Second, these same characteristics, with the exception of alcohol use disorders, were compared between participants with no alcohol use diagnosis, with alcohol abuse, and with alcohol dependence with or without abuse to identify potential confounders. In the third stage of the analyses, a univariate logistic regression analysis was conducted to examine separately the crude odds ratios for the association of alcohol abuse and alcohol dependence with suicidal ideation and attempts. This served as the base model. The odds of reporting suicidal ideation or attempts were compared between alcohol dependence, alcohol abuse, and no alcohol disorders, using no alcohol disorders as the reference group. Each covariate was then singly inserted into the base model to assess how they affected the relationship between the AUDs and SI/SA and to determine their inclusion in the final model. Multiple logistic regression was then conducted to examine the relationship between alcohol abuse and alcohol dependence with SI and between alcohol abuse and dependence with SA, while adjusting for confounders identified in the prior stage (sociodemographic, psychiatric, substance use, and family history covariates). In the fourth stage, we tested for mediation of the AUD/suicidality association by alcohol consumption level with a series of multivariate logistic regression models within the 3-step Baron and Kenny framework (Baron & Kenny, 1986) and formally with the

Sobel-Goodman test (MacKinnon et al., 2002). For the last stage of the analyses, to evaluate our hypothesis that the AUD/suicidality association would be stronger among those with mood disorders, we examined mood disorders as an effect modifier by including interaction terms of mood disorder with each AUD in the regression model. A stratified analysis was also conducted to examine whether the association between AUD and suicidality was stronger among individuals with mood disorders or those without mood disorders. Goodness of fit was assessed and compared across models using the Hosmer-Lemeshow goodness-of-fit test.

Results

Characteristics of respondents with suicidality and AUD

Within our study sample, a total of 5093 individuals had no suicidal thoughts or behavior, 4000 had thoughts about suicide, and 716 had attempted suicide. The characteristics associated with suicidal ideation and suicidal attempts are presented in Table 1. In the initial bivariate analyses, individuals ever reporting suicidal ideation and suicidal attempts were more likely to have a family history of alcoholism and depression than participants without suicidality. They were also more likely to have mood and anxiety disorders, drug abuse and dependence, and alcohol dependence (for all differences, $p < 0.001$). The presence of the following characteristics increased in proportion to suicidality severity (no suicidality to suicidal ideation to suicidal attempts): mood disorders, anxiety disorders, alcohol dependence, illicit drug abuse and dependence, and nicotine dependence, as confirmed by chi-squared tests for trend (all tests with $p < 0.001$).

The characteristics associated with lifetime alcohol use disorders are presented in Table 2. A greater proportion of individuals with alcohol abuse or dependence reported consuming five or more drinks on drinking days in the past year, had an illicit drug use disorder, and nicotine dependence compared with individuals without an AUD diagnosis. A larger percent of participants with alcohol dependence also met criteria for dysthymia, major depression, bipolar, and anxiety disorders, relative to those with alcohol abuse and those with no AUD. The presence of low educational level, family history of alcoholism, mood disorders, and non-alcohol substance use disorders increased in proportion to the exposure group severity (no alcohol use disorder to alcohol abuse to alcohol dependence; for all differences, $p < 0.001$). As expected, the level of alcohol consumption increased by exposure group severity, as confirmed by the chi-squared test for trend ($F = 541.185$; $p < 0.001$).

Alcohol use disorders and suicidality

Findings for the multivariate logistic regression models for each outcome (suicidal ideation, and suicide attempts) are presented in Tables 3A and 3B, respectively. The adjusted models accounted for sociodemographic, psychiatric, drug use disorder, and family history covariates. Alcohol dependence was associated with an increased odds for both suicidal ideation (adjusted odds ratio [AOR]=1.64; 95% confidence interval (CI)=1.25-2.14; $p = 0.001$) and suicide attempts (AOR=2.02; CI=1.43-2.85; $p < 0.001$). In addition, the associations of alcohol dependence with suicide attempts tended to be stronger than for those with suicidal ideation. Alcohol abuse was not appreciably associated with either

suicidal ideation or suicide attempts, with the exception of a significantly negative association with suicidal ideation in the multivariate model that included consumption level.

Alcohol consumption and suicidality

As diagnostic criteria for alcohol abuse and dependence may not reflect the drinking level of the participants, we also assessed the associations between alcohol consumption level and suicidal ideation and attempts. When using consumption as the main exposure in a bivariate analysis, higher consumption (5 drinks or more per drinking day) was associated with a greater odds of both suicidal ideation and suicide attempts when compared to those who consumed less than 5 drinks per drinking day (results not shown). Consumption was then included in the overall models evaluating AUD and suicidality to assess for potential mediation. In the multivariate model that included consumption level, alcohol dependence was still positively associated with both suicidal ideation (AOR=1.50; CI=1.12-2.02; $p=0.007$) and suicide attempts (AOR=1.62; CI=1.12-2.33; $p=0.011$). The attenuation of the AUD coefficients with the addition of consumption to the models is consistent with partial mediation. This was formally tested with the Sobel-Goodman Test; consumption level was found to mediate 17% of the total association between alcohol dependence and suicidal ideation ($z=2.334$; $p=0.020$) and 23% of the total association between dependence and suicidal attempts ($z=4.654$; $p<0.001$).

The role of mood disorders in the AUD/suicidality association

We next evaluated whether mood disorders modified the association between alcohol use disorders and suicidality. We did this in two ways. We tested for effect modification by including interaction terms for AUD and mood disorders in the multivariate models for SI and SA. The interaction terms did not meet criteria for statistical significance. We also examined our multivariate models stratifying by the presence of mood disorder history in order to assess whether the AUD/suicidality associations differed in any way for those with a mood disorder compared with those who had no mood disorder history (Tables 4A and 4B). The association of alcohol dependence with SI and SA remained significantly positive among those with and without mood disorders. However, the odds ratios for the associations for alcohol dependence with suicidal ideation and attempts were higher among the participants that did not have a mood disorder history. No appreciable associations were found with alcohol abuse.

Discussion

Using a population-based sample, we extended work from prior studies to examine the associations between AUD and suicidality. Consistent with our hypotheses, alcohol dependence was associated with a higher likelihood of having suicidal ideation and suicide attempts; however, alcohol abuse was either not associated with suicidality or had a negative association. These findings are consistent with prior studies that report relatively weak or negative associations of alcohol abuse with internalizing conditions such as major depression (Kessler et al., 1997; Grant et al., 2004).

Few, if any, population-based studies have examined the role of consumption level with AUD and suicidality. In our analyses, the association of dependence with suicidality remained statistically significant after consumption level was included in the multivariate model. However, the strengths of the associations were attenuated, providing evidence that heavier consumption may partially mediate the relationship found between dependence and suicidality. This would be expected as drinking alcohol is a disinhibiting factor (Claus et al., 2013; Rose & Duka, 2007), and increases the risk of impulsivity and self-injurious thoughts and behavior.

Contrary to our hypotheses, we found that the AUD/suicidality association was not modified by mood disorders. We investigated whether mood disorders modified the AUD/suicidality association by including interaction terms to the regression models. None of these interactions met criteria for statistical significance, suggesting that the effect of AUD on suicidality was not modified by the co-occurrence of a mood disorder on a multiplicative scale. When we stratified by mood disorder history, we found that alcohol dependence was positively associated with suicidality for those with and without mood disorders. However, it was interesting to note that the alcohol dependence/suicidality association tended to be stronger among participants without mood disorders, particularly for the association of alcohol dependence with suicide attempts. One possible explanation for this finding might be differences in treatment history between the groups. Evidence from surveys such as the NESARC indicate that most individuals with AUD in the general population never receive treatment for their drinking problems (Hasin et al., 2007). However, those with mood disorders are more likely to receive treatment, and clinical care may have resulted in symptom improvement, including improvement in suicidality symptoms. Burnett-Zeigler and colleagues (2012) found that among individuals with comorbid depression and substance use disorder, the presence of comorbid substance disorder appeared to increase the likelihood of receiving depression treatment. In the presence of depression which is a very strong predictor of suicidality, other risk factors such as additional AUD may become less significant. Future analyses will need to explore whether treatment for alcohol dependence or mood disorders alters the association between dependence and suicidality. In this study, we did not include treatment history in the regression analyses because there was limited information regarding the timing of treatment as it might relate to the disorders' occurrence. However, in a supplemental analysis, we compared the mood disorder and no mood disorder groups, by overall treatment history for psychiatric and/or substance use conditions. Those without mood disorders were less likely to have received any type of treatment for psychiatric or substance use conditions (1.8% vs. 6.1%; $p<0.001$), providing some evidence that the association between AUD and suicidality was stronger in the group without mood disorder history, possibly because these individuals were less likely to have received clinical intervention.

Because alcohol dependence was associated with suicidality independent of mood disorder status, these associations are not simply due to individuals with alcohol dependence being more likely to become depressed. It is possible that specific characteristics or exposures account for both conditions and were not captured in the current study. For example, poorly developed coping strategies may increase risk for both early maladaptive drinking and subsequent alcohol dependence as well as impulsive behaviors and suicidality. There is also

the possibility that the level of drinking may be associated with the escalation of suicidality, because a stronger association for alcohol dependence was found with suicide attempts than with suicidal ideation. Further investigations should examine whether alcohol involvement is associated with temporal change in suicidal ideation or attempts, and whether it increases the possibility of transitioning from suicidal ideation to the more severe stage of suicide attempts.

Several limitations of these analyses should be noted. First, although using the population-based sample reduces selection biases that might occur in a clinical context, there is the potential for reporting biases. However, if individuals underreport their alcohol consumption or criteria for AUD, this would tend to weaken the hypothesized associations in our analyses. This indicates that our findings may actually underestimate the associations between alcohol consumption, AUD and suicidality. Second, although we were able to account for a large number and range of potential confounders in our analyses, the potential for residual confounding still remains. Third, although the NESARC is one of the largest population-based surveys available with extensive assessment of mental health and substance use symptoms needed to test our hypotheses, some analyses were limited by small subgroup sizes. For example, we weren't able to assess the associations by specific mood disorder diagnosis, such as depression, bipolar disorder, and dysthymia. Fourth, as aforementioned, we did not include treatment history in the analysis because there was limited information available regarding the timing of the treatment as it might relate to the disorders' occurrence. Fifth, the sample was restricted to include current drinkers that reported having a lifetime history of at least 2-weeks of low mood, because these were the participants asked about suicidality in the survey. While this may potentially limit the generalizability, this improved the specificity of the association. Several prior analyses have been completed among individuals with specific mood disorders (Oquendo et al., 2009; Bolton et al., 2008). However, the current report evaluated the hypothesized associations among a sample that included individuals with subclinical symptoms, broadening the potential generalizability and permitting the assessment of effect modification by mood disorder status. Lastly, because these analyses utilized cross-sectional data, we cannot establish temporality.

Notwithstanding these potential limitations, the present analyses indicate that alcohol dependence and heavy drinking levels are associated with suicidal ideation and suicide attempts, independent of whether there is a mood disorder history. Mood disorders do not appear to appreciably modify the associations between alcohol dependence and suicidality, but drinking level may mediate the relationship between dependence and suicidality. Further studies are needed to evaluate these relationships with respect to treatment history, as well as to assess the associations between change in drinking behavior with the transition of suicidality. These findings may impact early identification, educational efforts and intervention among individuals with alcohol dependence and may have an important effect on reducing the incidence of suicidal ideation and the potential transition to suicide attempts.

Acknowledgements

The analyses and preparation of this project were supported by grants from the National Institute on Alcohol Abuse and Alcoholism (AA016346) and the National Institute on Drug Abuse (DA030460). The authors report no conflicts of interest. Dr. Rosa M. Crum had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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Table 1

Characteristics of study sample participants, current drinkers who reported ever having experienced a period of low mood, by *suicidality* (n=9173); NESARC, 2001-02.

Characteristics	No suicidality n=5,093 (%)	Suicidal ideation (SI) alone n=4,000 (%)	Suicidal attempts with/without SI n=716 (%)	p-value
Sex				0.006
Female	3,100 (57.5)	2,564 (61.4)	487 (65.2)	
Male	1,993 (42.5)	1,436 (38.6)	229 (34.8)	
Age (years)				<0.001
18-29	1,025 (21.2)	1,013 (26.5)	240 (36.9)	
30-39	1,130 (21.3)	989 (23.5)	186 (24.8)	
40-49	1,196 (24.1)	912 (23.5)	156 (22.4)	
50+	1,742 (33.4)	1,086 (26.6)	134 (15.9)	
Mean (SD) ^a	44.2 (16.0)	41.7 (15.1)	37.4 (13.6)	
Race/ethnicity				<0.001
Non-Hispanic white	3,431 (79.4)	2,639 (77.9)	432 (74.8)	
Non-Hispanic black	676 (7.5)	501 (7.4)	100 (8.9)	
Hispanic/Other	986 (13.1)	860 (14.8)	184 (16.3)	
Income				<0.001
\$20,000 or greater	2,981 (58.8)	2,047 (50.5)	270 (36.0)	
\$0-\$19,999	2,112 (41.3)	1,953 (49.6)	446 (64.0)	
Education level				<0.001
High school or greater	4,524 (90.2)	3,484 (88.1)	589 (83.2)	
Less than high school	569 (9.8)	516 (11.9)	127 (16.8)	
Amount of alcohol consumed on drinking days in the past year ^a				<0.001
Less than 5 drinks	4,611 (89.6)	3,421 (84.9)	569 (75.9)	
5 drinks or more	482 (10.4)	579 (15.1)	147 (24.2)	
Family history of AUD				<0.001
Absent	2,843 (58.6)	1,751 (45.1)	241 (35.0)	
Present	2,044 (41.5)	2,069 (54.9)	435 (65.0)	
Family history of depression				<0.001
Absent	2,041 (44.2)	992 (26.1)	158 (23.7)	
Present	2,506 (55.8)	2,586 (73.9)	484 (76.3)	
Mood disorder diagnosis ^b				<0.001
Major depression	1,899 (37.5)	3,029 (75.3)	584 (82.2)	<0.001
Dysthymia	286 (5.6)	873 (21.1)	261 (33.8)	<0.001
Bipolar disorder	219 (4.3)	550 (13.9)	190 (26.1)	<0.001
Anxiety disorders				<0.001
GAD	349 (7.1)	637 (16.1)	146 (20.8)	<0.001
Social phobia	327 (7.1)	592 (15.6)	127 (19.8)	<0.001
Specific phobia	698 (13.9)	846 (22.0)	189 (29.1)	<0.001
Panic	337 (6.7)	666 (16.9)	192 (29.0)	<0.001
Substance use disorders				<0.001
Alcohol abuse				<0.001
Alcohol dependence	347 (7.1)	309 (7.4)	47 (5.4)	<0.001
Illicit drug abuse ^c	200 (4.3)	356 (9.6)	103 (16.7)	<0.001
Illicit drug dependence ^d	586 (12.4)	847 (21.7)	200 (30.2)	<0.001
Nicotine dependence	80 (1.7)	183 (4.7)	61 (9.2)	<0.001
	1,142 (24.0)	1,442 (37.8)	334 (49.6)	

^c Includes lifetime history of dependence on non-alcohol substances: heroin, other opioids, cocaine, cannabis, stimulants, and/or hallucinogens.

^aSD, standard deviation; t-test, $P < 0.001$

^bIndicates the number of alcoholic drinks consumed on drinking days in the past year.

^cDiagnostic categories are not mutually exclusive.

^dIncludes lifetime history of abuse of non-alcohol substances: heroin, other opioids, cocaine, cannabis, stimulants, and/or hallucinogens.

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Table 2

Characteristics of study sample participants, current drinkers who reported ever having experienced a period of low mood, by 12-month alcohol abuse and/or dependence (n=9173); NESARC, 2001-02.

Characteristics	No alcohol use disorder n=7,954 (%)	Alcohol abuse only n=660 (%)	Alcohol dependence with/without abuse n=559 (%)	p-value
Sex				<0.001
Female	5,186 (62.3)	284 (38.7)	228 (38.0)	
Male	2,768 (37.7)	376 (61.4)	331 (62.0)	
Age (years)				<0.001
18-29	1,640 (21.5)	209 (33.6)	200 (38.6)	
30-39	1,826 (21.5)	163 (25.8)	144 (26.5)	
40-49	1,823 (23.8)	167 (24.0)	143 (25.2)	
50+	2,665 (33.2)	121 (16.7)	72 (9.7)	
Mean (SD) ^a	43.7 (15.8)	37.8 (13.5)	36.1 (12.3)	
Race/ethnicity				<0.001
Non-Hispanic white	5,297 (79.0)	463 (79.3)	358 (74.7)	
Non-Hispanic black	1,047 (7.4)	71 (7.0)	77 (9.2)	
Hispanic/Other	1,610 (13.6)	126 (13.7)	124 (16.2)	
Income				<0.001
\$20,000 or greater	4,397 (55.5)	412 (59.1)	265 (47.0)	
\$0-\$19,999	3,557 (44.5)	248 (40.9)	294 (53.0)	
Education level				<0.001
High school or greater	7,040 (89.9)	581 (87.7)	458 (83.6)	
Less than high school	914 (10.1)	79 (12.3)	101 (16.5)	
Amount of alcohol consumed on drinking days in the past year ^b				<0.001
Less than 5 drinks	7,393 (73.3)	455 (55.9)	252 (42.6)	
5 drinks or more	561 (26.7)	205 (44.1)	307 (57.4)	
Family history of AUD				<0.001
Absent	4,110 (54.2)	323 (50.6)	198 (36.6)	
Present	3,498 (45.8)	310 (49.4)	336 (63.5)	
Family history of depression				<0.001
Absent	2,679 (36.6)	218 (39.0)	161 (32.3)	
Present	4,409 (63.4)	363 (61.0)	341 (67.8)	
Mood disorder diagnosis ^c				<0.001
Major depression	4,178 (52.6)	385 (55.1)	391 (68.7)	<0.001
Dysthymia	979 (11.9)	73 (11.8)	119 (18.7)	<0.001
Bipolar disorder	580 (7.3)	73 (11.6)	119 (20.4)	<0.001
Anxiety disorders				<0.001
GAD	830 (10.7)	66 (9.2)	93 (16.9)	<0.001
Social phobia	768 (10.3)	66 (9.8)	89 (18.2)	<0.001
Specific phobia	1,310 (16.9)	107 (15.7)	133 (25.3)	<0.001
Panic	819 (10.5)	74 (9.7)	113 (20.5)	<0.001
Non-alcohol substance use disorders				<0.001
Illicit drug abuse ^d	963 (12.7)	240 (35.8)	237 (42.7)	<0.001
Illicit drug dependence ^e	182 (2.3)	26 (4.6)	56 (10.8)	<0.001
Nicotine dependence	2,009 (26.7)	276 (44.1)	316 (57.4)	<0.001

^aSD, standard deviation; t-test, $P<0.001$

^bIndicates the number of alcoholic drinks consumed on drinking days in the past year.

^cDiagnostic categories are not mutually exclusive.

^dIncludes lifetime history of abuse of non-alcohol substances: heroin, other opioids, cocaine, cannabis, stimulants, and/or hallucinogens.

^eIncludes lifetime history of dependence on non-alcohol substances: heroin, other opioids, cocaine, cannabis, stimulants, and/or hallucinogens.

Table 3A

Associations of alcohol use disorders and alcohol consumption with a history of *suicidal ideation* among current drinkers who have reported ever having experienced a period of low mood; NESARC, 2001-02.

	Suicidal ideation OR (95% CI), p-value		
	Unadjusted model	Adjusted Model ^a without consumption	Adjusted Model ^b with consumption
Alcohol Dependence ^{c,d}	2.41 (1.92-3.02), <0.001	1.64 (1.25-2.14), 0.001	1.50 (1.12-2.02), 0.007
Alcohol Abuse Only ^c	1.11 (0.92-1.33), 0.261	1.01 (0.81-1.27), 0.910	0.97 (0.77-1.21), 0.773
Drinking 5 drinks/drinking day	1.52 (1.30-1.79), <0.001	N/A	1.22 (0.99-1.51), 0.064

^a Model adjusted for age, sex, race, income, education, mood disorders, psychiatric disorders (anxiety and non-alcohol substance use disorders), and family history (of depression and/or alcohol use disorders).

^b Model adjusted for age, sex, race, income, education, mood disorders, psychiatric disorders (anxiety disorders and non-alcohol disorders), and family history (of depression and alcohol use disorders), and amount of alcohol consumed on drinking days in the past year (5 drinks per drinking day relative to <5 drinks per drinking day).

^c The reference for alcohol abuse and alcohol dependence were individuals without an alcohol use disorder.

^d Alcohol dependence with or without a history of alcohol abuse.

Table 3B

Associations of alcohol use disorders and alcohol consumption with a history of *suicidal attempt* among current drinkers who have reported ever having experienced a period of low mood; NESARC, 2001-02.

	Suicidal attempt OR (95% CI), p-value		
	Unadjusted Model	Adjusted Model ^a without consumption	Adjusted Model ^a including consumption
Alcohol Dependence ^{c,d}	3.26 (2.39-4.43), <0.001	2.02 (1.43-2.85), <0.001	1.62 (1.12-2.33), 0.011
Alcohol Abuse Only ^c	0.81 (0.56-1.18), 0.272	0.70 (0.46-1.07), 0.100	0.63 (0.41-0.96), 0.033
Drinking 5 drinks/drinking day	2.44 (1.92-3.11), <0.001	N/A	1.67 (1.24-2.26), 0.001

^a Model adjusted for age, sex, race, income, education, mood disorders, psychiatric disorders (anxiety and non-alcohol substance use disorders), and family history (of depression and/or alcohol use disorders).

^b Model adjusted for age, sex, race, income, education, mood disorders, psychiatric disorders (anxiety disorders and non-alcohol disorders), and family history (of depression and alcohol use disorders), and amount of alcohol consumed on drinking days in the past year (5 drinks per drinking day relative to <5 drinks per drinking day).

^c The reference for alcohol abuse and alcohol dependence were individuals without an alcohol use disorder.

^d Alcohol dependence with or without a history of alcohol abuse.

Table 4A

Association of alcohol use disorders with suicidality among study participants *with mood disorders*; NESARC, 2001-02 (n=5249).

	With Mood Disorders ^a					
	Suicidal ideation		Suicidal attempt		Suicidality ^b	
	OR (95% CI), p-value					
	Unadjusted	Adjusted ^c	Unadjusted	Adjusted ^c	Unadjusted	Adjusted ^c
Alcohol Dependence ^d	1.75 (1.33-2.29), <0.001	1.52 (1.14-2.02), 0.005	2.48 (1.78-3.45), <0.001	1.88 (1.32-2.66), 0.001	1.73 (1.32-2.27), <0.001	1.50 (1.13-2.00), 0.006
Alcohol Abuse Only	0.87 (0.68-1.12), 0.279	0.88 (0.67-1.15), 0.349	0.76 (0.51-1.14), 0.186	0.70 (0.44-1.10), 0.122	0.87 (0.68-1.12), 0.279	0.88 (0.68-1.15), 0.352
No Alcohol Use Disorder	1.00 (Reference)					

^a Mood disorders include a lifetime diagnosis of major depressive disorder, dysthymia or bipolar disorder.

^b Suicidality indicates having lifetime suicidal ideation or attempts.

^c Adjusted model includes age, sex, race, income, education, psychiatric disorders (anxiety disorders and non-alcohol substance use disorders), and family history (of depression and alcohol use disorders). Age was included as a continuous variable in years.

^d Alcohol dependence with or without a history of alcohol abuse.

Table 4B

Association of alcohol use disorders with suicidality among study participants *without mood disorders*; NESARC, 2001-02 (n=3924).

	Without Mood Disorders					
	Suicidal ideation		Suicidal attempt		Suicidality ^b	
	OR (95% CI), p-value					
	Unadjusted	Adjusted ^c	Unadjusted	Adjusted ^c	Unadjusted	Adjusted ^c
Alcohol Dependence ^d	2.50 (1.62-3.85), <0.001	2.05 (1.25-3.37), 0.005	4.54 (1.99-10.34), <0.001	3.39 (1.12-10.25), 0.031	2.48 (1.61-3.82), <0.001	2.03 (1.24-3.34), 0.006
Alcohol Abuse Only	1.49 (1.05-2.12), 0.025	1.34 (0.91-1.98), 0.139	0.79 (0.26-2.40), 0.673	0.76 (0.22-2.63), 0.664	1.48 (1.05-2.10), 0.028	1.33 (0.90-1.96), 0.153
No Alcohol Use Disorder	1.00 (Reference)					

^a Mood disorders include a lifetime diagnosis of major depressive disorder, dysthymia or bipolar disorder.

^b Suicidality indicates having lifetime suicidal ideation or attempts.

^c Adjusted model includes age, sex, race, income, education, psychiatric disorders (anxiety disorders and non-alcohol substance use disorders), and family history (of depression and alcohol use disorders). Age was included as a continuous variable in years.

^d Alcohol dependence with or without a history of alcohol abuse.