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Epidemiology of DSM-5 bipolar I disorder: Results from the National Epidemiologic Survey on Alcohol and Related Conditions — III

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ABSTRACT

Background: The objective of this study was to present 12-month and lifetime prevalence, correlates, comorbidity, treatment and disability of DSM-5 bipolar I disorder.
Methods: Nationally representative U.S. adult sample (N = 36,309), the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions — III.
Results: Prevalences of 12-month and lifetime DSM-5 bipolar I disorder were 1.5% and 2.1% and did not differ between men (1.6% and 2.2%) and women (1.5% and 2.0%). Prevalences of bipolar I disorder were greater among Native Americans, and lower among Blacks, Hispanics and Asians/Pacific Islanders than whites. Rates were also lower among younger than older individuals, those previously married than currently married and with lower education and income relative to higher education and income. Bipolar I disorder was more strongly related to borderline and schizotypal personality disorders (adjusted odds ratios (AORS) = 2.2–4.7)), than to anxiety disorders (AORs = 1.3–2.9), and substance use disorders (AORs = 1.3–2.1) overall and among men and women. Quality of life was lower among individuals with bipolar I disorder relative to those without the disorder. Treatment rates among individuals with bipolar I disorder were low in the total sample (46%, SE = 2.63), among men (36.7%, SE = 3.82) and among women (55.8%, SE = 3.32).
Conclusions: Bipolar I disorder continues to be common disabling and highly comorbid disorder among men and women, contributing substantially to low quality of life and burden of disease in our society.

1. Introduction

Bipolar I disorder is a serious psychiatric condition characterized by the occurrence of one or more manic episodes (American Psychiatric Association, 2013) with early onset (most often in the second decade of life) and is associated with chronic course (Grant et al., 2005; Merikangas et al., 2011, 2007). Bipolar I disorder has been consistently associated with significant medical and psychiatric comorbidity (Gadermann et al., 2012; Grant et al., 2005; Roshanaei-Moghaddam and Katon, 2009; Vancampfort et al., 2013; Weber et al., 2011), premature mortality (Westman et al., 2013), high levels of functional disability (Judd et al., 2005; Rosa et al., 2010; Simon et al., 2007) and reduced quality of life (Moreno et al., 2012; Phillips and Kupfer, 2013; Rubio et al., 2014, 2013). Bipolar I disorder has also been associated with increased risk of suicide attempts and completion (Hoertel et al., 2015; Oquendo et al., 2010; Marangell et al., 2006) and high societal burden. In 2009, the economic costs of bipolar disorder were estimated to be $151 billion dollars, with the majority of those costs (79%) attributable to lost productivity (Dilsaver, 2011).

In contrast with an extensive literature on bipolar I disorder based on clinical samples (Cerimele et al., 2014), much less is known about the disorder in community samples. Several surveys worldwide have estimated the prevalence of bipolar I disorder (Angst et al., 1984; Chen et al., 1993; Faravelli et al., 1990; Grant et al., 2005; ten Have et al., 2002; Tijssen et al., 2010;

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Weissman et al., 1996), but most of those surveys were constrained by sample size, leading to unstable estimates of prevalence and correlates (particularly at the national level) or are decades old. In the U.S., the most recent national estimates of bipolar I disorder prevalence and correlates are based on data collected over 15 years ago (Grant et al., 2005; Merikangas et al., 2011). During that period there have been important social, historic and economic changes in the U.S., including wars, terrorism, and unevenly distributed recovery from the 2007 recession. Changes during that time also included important increases in the prevalences of heavy drinking (Dawson et al., 2015), substance use disorders (Grant et al., 2015a, 2015b) and suicide completion (Centers for Disease Control and Prevention, 2014), all of which are associated with bipolar I disorder. These factors could all influence the epidemiology of bipolar I disorder, for example, by further increasing national prevalence. Finally, in 2013, a new diagnostic system, the Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition-DSM-5 (American Psychiatric Association, 2013), replaced earlier editions DSM-IV (American Psychiatric Association, 1994) and DSM-III-R (American Psychiatric Association, 1987), which had been used in most epidemiologic studies over the last 20 years. While the core DSM-IV manic symptoms were retained in the DSM-5 definition of bipolar I disorders, some changes were made, e.g., the expansion of the elevated, expansive or irritable mood criterion to include persistently increased activity or energy (American Psychiatric Association, 2013). Taken together, these changes leave important unanswered questions about the prevalence of DSM-5 bipolar I disorder, its correlates psychiatric comorbidity; functional impairment and treatment utilization. Further whether those findings differ by gender is unknown.

The absence of current national information about the prevalence, correlates and comorbidity of bipolar I disorders represents a gap in our knowledge in terms of prevention, intervention, treatment need and burden of disease. Accordingly, to our knowledge, this study reports the first nationally representative findings on the prevalence, sociodemographic correlates, psychiatric comorbidity, disability, and treatment of DSM-5 bipolar I disorder from the National Institute on Alcohol Abuse and Alcoholism's 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions-III (NESARC-III) (Grant et al., 2014). Information about bipolar I disorders is presented for the total sample and separately among men and women.

2. Methods

2.1. Sample

NESARC-III's target population was the U.S. noninstitutionalized adult civilian population, including residents of selected group quarters. As detailed elsewhere (Grant et al., 2014), probability sampling was used to select respondents. Primary sampling units were counties or groups of contiguous counties, secondary sampling units (SSU) comprised groups of Census-defined blocks, and tertiary sampling units were households within SSUs. Eligible adults within sampled households were randomly selected. Hispanics, Blacks, and Asians were oversampled; in households with ≥4 eligible minority persons, two respondents were selected (n = 1661). Total sample size was 36,309. The screener- and person-level response rates were 72.0% and 84.0%, yielding a total response rate of 60.1%, comparable to most current U.S. national surveys (Centers for Disease Control and Prevention, 2013; Substance Abuse and Mental Health Services Administration, 2014). Data were adjusted for oversampling and nonresponse, then weighted to represent the US civilian population based on the 2012 American Community Survey (Bureau of the Census, 2013). Weighting adjustments compensated adequately for nonresponse as detailed elsewhere (Grant et al., 2015a). Oral informed consent was recorded and respondents received $90.00 for participation. Protocols were approved by National Institutes of Health and Westat Institutional Review Boards.

2.2. Assessments

The diagnostic interview was the NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule-5 (AUDADIS-5) (Grant et al., 2011), designed to measure DSM-5 alcohol (AUD), tobacco (TUD), drug use disorders (DUDs), and selected mood, anxiety, trauma-related, eating and personality disorders (PDs).

2.3. Bipolar I disorder

DSM-5 lifetime bipolar I disorder was defined as having at least one manic episode with or without one or more major depressive or hypomanic episodes on a lifetime basis. Among respondents with lifetime diagnoses of bipolar I disorder, respondents who had at least 1 manic, major depressive, or hypomanic episode in the year preceding the interview were classified with 12-month bipolar I disorder. Twelve-month and lifetime diagnoses of DSM-5 bipolar I disorder excluded disorders that were attributable to substance/medication (aside from sustained manic responses to antidepressants)/medical illness-related effects. Test-retest reliability of DSM-5 manic episode diagnoses and associated symptom scales were fair (kappa = 0.42; interclass correlation coefficients = 0.40) in a large general population sample (Grant et al., 2015b). Age at onset of bipolar I disorder was defined as the first age at which the requisite number of criteria for bipolar I disorder occurred. Respondents were asked if they sought help for their manic symptoms from a physician or other healthcare practitioner, received medications, been a patient in any kind of hospital overnight, or gone to an emergency room during the last 12-months and on a lifetime basis.

2.4. Other psychiatric disorders

DSM-5 substance use disorders included alcohol use disorder (AUD), tobacco use disorder (TUD), and other drug use disorder (DUDs): cannabis, sedative/tranquilizer, stimulant, cocaine, club drug, opioid, heroin, hallucinogen, solvent/inhalant and other drug use disorders. Test-retest reliabilities were moderate to substantial for AUD (kappa = 0.60–0.62), TUD (kappa = 0.50–0.87) and all other DUDs (kappa = 0.41–0.66), and higher for their dimensional counterparts (Intraclass correlation coefficient (ICC) = 0.45–0.85) (Grant et al., 2015b). Procedure validity was assessed through blind clinician re-appraisal using the semi-structured, clinician-administered Psychiatric Research Interview for Substance and Mental Disorders, DSM-5 version (PRISM-5) (Hasin et al., 2011). AUDADIS-5 and PRISM-5 concordance on AUD, TUD and other DUD diagnoses and dimensional scales was fair to substantial (kappa = 0.35–0.72; ICCs = 0.38–0.92) (Hasin et al., 2015a).

Other DSM-5 mood disorders assessed in the NESARC-III included 12-month and lifetime persistent depression, major depressive disorder, and bipolar II disorders. Anxiety disorders included panic, agoraphobia, generalized anxiety, and social anxiety disorder and specific phobia. Posttraumatic stress disorder (PTSD) was also assessed. All diagnoses excluded substance-

Table 1
Prevalence and adjusted odds ratios of 12-month and lifetime DSM-5 bipolar I disorder by sociodemographic characteristics, total sample.

Sociodemographic Characteristic	12-Month (N = 566)		Lifetime (N = 753)	
	Prevalence % (SE)[a]	AOR[b] (95% CI)	Prevalence % (SE)	AOR (95% CI)
Total	1.5 (0.09)	–	2.1 (0.10)	–
Sex				
Men	1.6 (0.13)	1.1 (0.91–1.45)	2.2 (0.16)	1.1 (0.93–1.37)
Women	1.5 (0.11)	1.0 (Reference)[c]	2.0 (0.13)	1.0 (Reference)
Race-ethnicity				
White	1.6 (0.12)	1.0 (Reference)	2.1 (0.14)	1.0 (Reference)
Black	1.5 (0.17)	**0.7** (0.54–0.96)	2.0 (0.23)	**0.7** (0.56–0.97)
Native American	3.9 (0.93)	**1.9** (1.13–3.14)	5.6 (1.05)	**2.1** (1.39–3.13)
Asian/Pacific Islander	0.7 (0.20)	**0.4** (0.21–0.73)	1.0 (0.26)	**0.4** (0.25–0.75)
Hispanic	1.6 (0.19)	**0.7** (0.48–0.95)	1.9 (0.21)	**0.7** (0.50–0.90)
Age, y				
18-29	2.3 (0.20)	**6.6** (4.05–10.75)	2.8 (0.23)	**4.0** (2.68–5.97)
30-44	1.8 (0.14)	**5.9** (3.57–9.80)	2.4 (0.19)	**3.9** (2.62–5.80)
45-64	1.5 (0.15)	**4.5** (2.77–7.32)	2.0 (0.16)	**2.9** (1.99–4.19)
≥65	0.4 (0.10)	1.0 (Reference)	0.8 (0.16)	1.0 (Reference)
Marital status				
Married/cohabiting	1.2 (0.11)	1.0 (Reference)	1.7 (0.13)	1.0 (Reference)
Widowed/separated/divorced	1.8 (0.17)	**1.5** (1.18–1.96)	2.5 (0.19)	**1.5** (1.17–1.78)
Never married	2.2 (0.19)	1.2 (0.89–1.61)	2.8 (0.21)	1.1 (0.91–1.44)
Education				
Less than high school	2.2 (0.31)	**1.6** (1.11–2.19)	2.5 (0.33)	1.3 (0.92–1.72)
High school	1.9 (0.18)	**1.3** (1.08–1.64)	2.5 (0.20)	**1.2** (1.03–1.48)
Some college or higher	1.3 (0.09)	1.0 (Reference)	1.8 (0.11)	1.0 (Reference)
Family income				
0–19,999	2.5 (0.19)	**2.3** (1.71–3.21)	3.2 (0.22)	**2.3** (1.74–3.15)
20,000–34,999	1.7 (0.19)	**1.7** (1.24–2.45)	2.3 (0.19)	**1.8** (1.31–2.34)
35,000–69,999	1.4 (0.15)	**1.5** (1.05–2.03)	2.0 (0.17)	**1.5** (1.15–2.00)
≥70,000	0.9 (0.12)	1.0 (Reference)	1.2 (0.14)	1.0 (Reference)
Urbanicity				
Urban	1.5 (0.09)	0.8 (0.60–1.05)	2.0 (0.11)	0.8 (0.63–1.06)
Rural	1.8 (0.23)	1.0 (Reference)	2.5 (0.26)	1.0 (Reference)
Region				
Northeast	1.6 (0.21)	0.9 (0.67–1.28)	2.2 (0.25)	1.0 (0.75–1.41)
Midwest	1.4 (0.16)	0.8 (0.56–1.03)	2.0 (0.19)	0.8 (0.63–1.14)
South	1.5 (0.16)	0.8 (0.56–1.06)	2.0 (0.18)	0.8 (0.60–1.13)
West	1.7 (0.16)	1.0 (Reference)	2.1 (0.23)	1.0 (Reference)

Note: Significant ($p < 0.05$) odds ratios appear in **bold font**.
[a] SE = Standard error.
[b] Adjusted odds ratios (AORs) adjusted for all other sociodemographic characteristics.
[c] Reference = Reference group specified for each sociodemographic comparison.

medication- and medical illness-induced cases. Lifetime personality disorders (PDs) included antisocial, borderline, and schizotypal. Reliability and validity of these psychiatric disorders were described in detail elsewhere (Hasin et al., 2015b).

2.5. Quality of life

Current quality of life was determined using the 12-Item Short Form Health Survey, version 2 (SF-12*v*2), a reliable and valid measure widely used in population surveys (Gandek et al., 1998). SF-12*v*2 scales included in this study were mental health, social functioning, role emotional functioning, and mental component summary (MCS). Each SF-12*v*2 norm-based score has a mean of 50, standard deviation of ±10, and a range of 0–100. Lower scores indicate lower quality of life.

2.6. Statistical analysis

Weighted percentages were computed for 12-month and lifetime DSM-5 bipolar I disorder. Adjusted odds ratios (AORs) derived from multiple logistic regression indicated associations between bipolar I disorder and each sociodemographic characteristic, controlling for all others. Logistic regressions of psychiatric comorbidity of bipolar I disorder controlled for: (1) sociodemographic characteristics only; and (2) sociodemographic characteristics and other substance use and psychiatric disorders. Anorexia nervosa, bulimia nervosa, and binge-eating disorder were too rare to assess comorbid associations with bipolar I disorder, but were used as covariates in comorbidity analyses. Relationships between 12-month bipolar I disorder to SF-12*v*2 scales were determined using multiple linear regression, controlling for sociodemographic characteristics and other psychiatric disorders. All analyses utilized SUDAAN Statistical Software For Weighting, Imputing and Analyzing Data (Research Triangle Institute, 2012) version 11.0, software that accounts for NESARC-III's complex design.

3. Results

3.1. Prevalence sociodemographic and clinical characteristics

Prevalences of 12-month and lifetime bipolar I disorder were 1.5% and 2.1% in the total sample (Table 1) and no significant differences were observed among men (1.6%, 2.2%) and women (1.5%, 2.0%). Regardless of timeframe, prevalences of bipolar I disorder

Table 2
Prevalence and adjusted odds ratios of 12-month and lifetime DSM-5 bipolar I disorder by sociodemographic characteristics among men and women.

Sociodemographic Characteristic	12-Month				Lifetime			
	Men (N = 264)		Women (N = 302)		Men (N = 350)		Women (N = 403)	
	Prevalence % (SE)[a]	AOR[b] (95% CI)	Prevalence % (SE)	AOR (95% CI)	Prevalence % (SE)	AOR (95% CI)	Prevalence % (SE)	AOR (95% CI)
Total	1.6 (0.13)	–	1.5 (0.11)	–	2.2 (0.16)	–	2.0 (0.13)	–
Race-ethnicity								
White	1.7 (0.19)	1.0 (Reference)[c]	1.4 (0.15)	1.0 (Reference)	2.3 (0.22)	1.0 (Reference)	2.0 (0.16)	1.0 (Reference)
Black	1.6 (0.26)	0.7 (0.44–1.00)	1.5 (0.24)	0.8 (0.51–1.14)	2.1 (0.32)	**0.7** (0.44–0.96)	2.0 (0.31)	0.8 (0.57–1.17)
Native American	2.6 (1.10)	1.2 (0.50–2.75)	4.8 (1.54)	**2.4** (1.14–5.06)	3.6 (1.35)	1.2 (0.56–2.70)	6.9 (1.83)	**2.8** (1.49–5.08)
Asian/Pacific Islander	0.6 (0.27)	**0.3** (0.14–0.79)	0.7 (0.25)	**0.5** (0.21–0.99)	0.9 (0.30)	**0.4** (0.18–0.76)	1.0 (0.39)	0.5 (0.24–1.06)
Hispanic	1.7 (0.25)	0.7 (0.47–1.05)	1.4 (0.24)	0.7 (0.41–1.02)	2.1 (0.27)	**0.7** (0.47–1.00)	1.7 (0.25)	**0.7** (0.45–0.96)
Age, y								
18-29	2.4 (0.31)	**8.4** (3.04–23.04)	2.2 (0.27)	**5.3** (2.77–10.10)	2.9 (0.34)	**4.4** (2.23–8.83)	2.8 (0.33)	**3.6** (2.10–6.21)
30-44	1.8 (0.21)	**6.6** (2.50–17.57)	1.8 (0.19)	**5.4** (3.00–9.56)	2.4 (0.29)	**4.2** (2.13–8.38)	2.4 (0.23)	**3.6** (2.15–5.88)
45-64	1.7 (0.23)	**5.5** (2.21–13.76)	1.3 (0.18)	**3.7** (1.96–6.90)	2.2 (0.26)	**3.5** (1.80–6.78)	1.7 (0.19)	**2.3** (1.41–3.87)
≥65	0.3 (0.16)	1.0 (Reference)	0.5 (0.12)	1.0 (Reference)	0.7 (0.22)	1.0 (Reference)	0.9 (0.20)	1.0 (Reference)
Marital status								
Married/cohabiting	1.2 (0.16)	1.0 (Reference)	1.1 (0.14)	1.0 (Reference)	1.7 (0.18)	1.0 (Reference)	1.6 (0.17)	1.0 (Reference)
Widowed/separated/divorced	2.5 (0.38)	**1.8** (1.28–2.63)	1.5 (0.17)	1.3 (0.90–1.89)	3.1 (0.39)	**1.6** (1.19–2.10)	2.1 (0.22)	1.4 (0.95–1.97)
Never married	2.1 (0.26)	1.0 (0.64–1.59)	2.3 (0.30)	1.5 (0.97–2.19)	2.7 (0.29)	1.0 (0.70–1.47)	2.9 (0.35)	1.3 (0.92–1.86)
Education								
Less than high school	2.2 (0.38)	1.4 (0.92–2.19)	2.2 (0.39)	**1.8** (1.10–2.76)	2.6 (0.42)	1.2 (0.81–1.75)	2.5 (0.40)	1.3 (0.86–2.07)
High school	2.1 (0.26)	**1.4** (1.01–1.84)	1.7 (0.25)	1.3 (0.95–1.80)	2.8 (0.29)	1.3 (0.98–1.68)	2.2 (0.26)	1.2 (0.92–1.54)
Some college or higher	1.3 (0.15)	1.0 (Reference)	1.2 (0.10)	1.0 (Reference)	1.8 (0.18)	1.0 (Reference)	1.8 (0.13)	1.0 (Reference)
Family income								
0–19,999	2.8 (0.32)	**2.3** (1.41–3.61)	2.2 (0.22)	**2.6** (1.72–3.76)	3.7 (0.37)	**2.7** (1.72–4.14)	2.8 (0.26)	**2.1** (1.41–3.02)
20,000–34,999	1.9 (0.31)	1.6 (0.98–2.65)	1.5 (0.23)	**2.0** (1.24–3.10)	2.4 (0.32)	**1.8** (1.20–2.81)	2.1 (0.24)	**1.7** (1.11–2.53)
35,000–69,999	1.3 (0.21)	1.2 (0.72–1.94)	1.5 (0.21)	**1.9** (1.26–2.81)	2.0 (0.25)	**1.5** (1.01–2.19)	2.0 (0.24)	**1.5** (1.07–2.21)
≥70,000	1.0 (0.20)	1.0 (Reference)	0.7 (0.11)	1.0 (Reference)	1.3 (0.22)	1.0 (Reference)	1.2 (0.17)	1.0 (Reference)
Urbanicity								
Urban	1.6 (0.14)	1.0 (0.67–1.49)	1.3 (0.11)	**0.6** (0.43–0.91)	2.1 (0.16)	1.0 (0.68–1.43)	1.8 (0.13)	**0.7** (0.48–0.95)
Rural	1.7 (0.32)	1.0 (Reference)	2.0 (0.31)	1.0 (Reference)	2.3 (0.38)	1.0 (Reference)	2.6 (0.36)	1.0 (Reference)
Region								
Northeast	1.5 (0.33)	0.8 (0.53–1.32)	1.6 (0.30)	1.0 (0.63–1.63)	2.4 (0.45)	1.2 (0.76–1.77)	2.1 (0.32)	0.9 (0.60–1.43)
Midwest	1.5 (0.27)	0.7 (0.47–1.15)	1.4 (0.21)	0.8 (0.50–1.23)	2.2 (0.31)	0.9 (0.65–1.37)	1.9 (0.22)	0.8 (0.51–1.14)
South	1.7 (0.27)	0.8 (0.55–1.22)	1.3 (0.16)	0.7 (0.47–1.07)	2.2 (0.29)	0.9 (0.65–1.35)	1.8 (0.18)	0.7 (0.49–1.06)
West	1.8 (0.17)	1.0 (Reference)	1.6 (0.23)	1.0 (Reference)	2.1 (0.21)	1.0 (Reference)	2.2 (0.32)	1.0 (Reference)

Note: Significant ($p < 0.05$) odds ratios appear in **bold font**.
[a] SE = Standard error.
[b] Adjusted odds ratios (AORs) adjusted for all other sociodemographic characteristics.
[c] Reference = Reference group specified for each sociodemographic comparison.

were greater among Native Americans and lower among Blacks, Hispanics, and Asian/Pacific Islanders relative to Whites. Rates of 12-month and lifetime bipolar I disorder decreased with age, and were greater among previously married individuals and those with lower education and income.

Prevalences of 12-month and lifetime bipolar I disorder among men and women mirrored those for the total sample with the following exceptions (Table 2). Among men, rates of 12-month bipolar I disorder were lower only among Asian/Pacific Islanders and higher only among respondents with < $20,000.00 annual incomes and those with a high school education. Among women, prevalences of bipolar I disorder were lower only among Asians/Pacific Islanders (12-month) and Hispanics (lifetime). There were no differences in the prevalences of bipolar I disorder by marital status among women regardless of timeframe, and 12-month rates of bipolar I disorder were greater among those with less than high school education. Interestingly, prevalences of 12-month and lifetime bipolar I disorder were lower in urban than rural areas among women.

In the total sample, age at onset of bipolar I disorder was 22.3 years and slightly younger for women (21.5 years) than men (23.0 years). Age at first treatment for bipolar I disorder was 26.3 years in the total sample, 25.2 among women, and 27.5 years among men. Twelve-month and lifetime treatment rates were 46.0% and 72.4% in the total sample, 36.7% and 65.0% for men and 55.8% and 79.9% for women.

3.2. Comorbidity

Controlling only for sociodemographic characteristics, 12-month and lifetime bipolar I disorder were positively and significantly related to all substance use and other psychiatric disorders assessed in the NESARC-III. Especially strong associations were observed between 12-month and lifetime bipolar I disorder and panic disorder (AORs) > 5.6)) and borderline and schizotypal PDs (AORs = 11.6–18.8), regardless of gender (Tables 3 and 4).

When additional control was introduced for other psychiatric disorders, these 12-month and lifetime associations were generally diminished, with odds ratios between bipolar I disorder and AUD (12-month), and social phobia no longer significant in the total sample. For men, associations between bipolar I disorder and AUD (12-month), DUD (12-month) and generalized anxiety disorder, social anxiety disorder and specific phobia (12-month and lifetime) were no longer significant. Similarly, among women, associations between bipolar I disorder and DUD (12-month), TUD (lifetime), agoraphobia (12-month) and generalized anxiety disorder, and social and specific phobias were no longer significant. Regardless of gender or timeframe, bipolar I disorder remained significantly

Table 3
Adjusted Odds ratios of 12-Month and Lifetime DSM-5 Bipolar I Disorder and Other Psychiatric Disorders, Total Sample.

Comorbid disorder	12-Month		Lifetime	
	AOR[a] (95% CI)[b]	AOR (95% CI)[c]	AOR[a] (95% CI)[b]	AOR (95% CI)[c]
Any substance use disorder	**4.4** (3.52–5.59)	**2.0** (1.56–2.56)	**5.8** (4.51–7.47)	**2.3** (1.77–3.03)
Alcohol use disorder	**3.0** (2.43–3.71)	1.2 (0.94–1.58)	**5.0** (4.08–6.02)	**1.7** (1.37–2.17)
Any drug use disorder	**5.5** (4.20–7.31)	**1.4** (1.02–1.98)	**5.3** (4.42–6.29)	**1.3** (1.08–1.66)
Tobacco use disorder	**4.1** (3.20–5.14)	**1.8** (1.38–2.34)	**4.0** (3.28–4.76)	**1.4** (1.13–1.74)
Any anxiety disorder	**7.5** (5.83–9.52)	**1.9** (1.41–2.47)	**7.0** (5.76–8.53)	**2.0** (1.55–2.54)
Panic	**11.3** (8.76–14.58)	**2.7** (2.01–3.62)	**7.8** (6.34–9.60)	**2.2** (1.73–2.77)
Agoraphobia	**9.1** (6.36–12.93)	**1.7** (1.08–2.62)	**8.0** (5.91–10.89)	**1.8** (1.23–2.61)
Social anxiety disorder	**6.3** (4.47–8.98)	1.3 (0.91–1.83)	**5.8** (4.29–7.72)	1.3 (0.96–1.81)
Specific phobia	**4.3** (3.30–5.47)	**1.4** (1.06–1.81)	**4.0** (3.16–5.08)	**1.3** (1.03–1.71)
Generalized anxiety disorder	**7.8** (6.29–9.72)	**1.3** (1.02–1.74)	**6.4** (5.25–7.85)	**1.4** (1.02–1.77)
Posttraumatic stress disorder	**9.6** (7.78–11.72)	**2.1** (1.65–2.71)	**8.8** (7.19–10.85)	**2.2** (1.73–2.90)
Any personality disorder[d]	**19.9** (15.47–25.61)	**8.4** (6.01–11.59)	**14.8** (12.22–18.03)	**5.7** (4.55–7.23)
Schizotypal	**13.6** (10.52–17.57)	**2.6** (1.87–3.57)	**11.7** (9.51–14.38)	**2.4** (1.87–3.13)
Borderline	**17.9** (14.09–22.64)	**4.4** (3.18–6.00)	**14.2** (11.79–17.10)	**3.6** (2.80–4.53)
Antisocial	**7.3** (5.45–9.89)	**1.9** (1.34–2.54)	**6.5** (4.86–8.66)	**1.7** (1.24–2.22)

Note: Significant ($p < 0.05$) odds ratios appear in **bold font**.
[a] Adjusted odds ratios adjusted for sex, age, race-ethnicity, marital status, education, household income, urbanicity and region.
[b] 95% CI = 95% confidence interval.
[c] Odds ratios adjusted for sex, age, race-ethnicity, marital status, education, household income, urbanicity, region and other psychiatric disorders.
[d] Personality disorders assessed on a lifetime basis.

associated with panic disorder (AORs = 1.4–4.0), posttraumatic stress disorder (AORs = 1.8–2.9), and borderline (AORs = 3.2–4.7), schizotypal (AORs = 2.2–2.7) and antisocial (AORs = 1.7–2.0) personality disorders.

3.3. Quality of life

In the total sample, all quality of life scores, except the mental health score, were lower among those respondents with bipolar I disorder than those without bipolar I disorder (Table 5). Women with bipolar I disorder had significantly lower quality of life than women without the disorder as assessed by each disability score. By contrast, men with bipolar I disorder differed little with respect to disability compared to those men without the disorder, except for role emotional functioning.

4. Discussion

To our knowledge, the NESARC-III is the first representative national survey to provide information on the prevalence and correlates of DSM-5 bipolar I disorder in the U.S. population. The lifetime prevalence of bipolar I disorders was 2.1%, representing about 4,884,000 million adult Americans and the 12-month prevalence was 1.5%, representing about 3,679,000 million adults Americans. Lifetime and 12-month prevalences of bipolar I disorder were similar among men and women and were associated with substantial decreases in quality of life, especially among women.

The 12-month prevalences of bipolar I disorder in NESARC-III are slightly below the estimates of the 2001–2002 NESARC (2.2%) (Grant et al., 2005), above those of the 2001 National Comorbidity Survey Replication (0.6%) (Merikangas et al., 2011) and falling with the range of estimates reported in recent reviews and meta-analyses (0.1%–5.0%) (Clemente et al., 2015; Dell'Aglio et al., 2013). Taken together, these results suggest that the prevalence of bipolar I disorder has remained broadly stable over time in the United States population. The reason for stability in the rates of bipolar I disorder may be due to the low treatment rate shown in this study and the importance of genetics in the etiology of bipolar I disorder (Craddock and Sklar, 2013). Nevertheless, environmental factors (e.g., adverse childhood events) also influence the risk of bipolar I disorder (Brietzke et al., 2012; Goldstein, 2012; Sala et al., 2014). Interventions to decrease the effect of these risk factors, as well as targeting high-risk groups should contribute to lowering the prevalence of bipolar I disorder in the community (Geddes and Miklowitz, 2013; Vallarino et al., 2015).

Consistent with prior research (Grant et al., 2005; Merikangas et al., 2007, 2011; Clemente et al., 2015; Dell'Aglio et al., 2013), we found that the ratio of 12-month to lifetime prevalence was 71%, indicating a high degree of persistence of the disorder, supporting recommendations to consider bipolar disorder a chronic disease (Kessler et al., 2007). Despite this chronicity, less than half of the individuals with 12-month bipolar I disorder had sought treatment in the year preceding the interview. Insurance or other financial barriers, side effects of medication, lack of insight on the part of some patients, and inadequate screening for the disorder may all contribute to the low treatment rates for current bipolar I disorder observed in this study (Carvalho et al., 2015; Keck et al., 2006). Recent studies (Hawke et al., 2013; Latalova et al., 2013) have also highlighted the role of stigma as a barrier to care among individuals with bipolar I disorder as well as their caregivers. Although recent health care reforms may facilitate access to care (Barry and Huskamp, 2011), more extensive research on treatment barriers in bipolar I disorder and efforts to destigmatize the disorder among affected individuals and their caretakers is warranted.

Sociodemographic correlates of bipolar I disorder among men and women in NESARC-III were similar to those previously documented for total samples of the U.S. population (Grant et al., 2005; Kessler et al., 2007; Merikangas et al., 2011). Greater prevalence among younger men and women may reflect the early age of onset of the disorder or premature death due medical complications among as individuals with bipolar I disorder (Crump et al., 2013; Goldstein et al., 2015) or by suicide (Schaffer et al., 2015). Lower socioeconomic status may be both a risk factor for and a consequence of bipolar I disorder. The increased prevalence of bipolar I disorder among Native Americans is consistent with prior research and with the broader pattern of increased mental and physical morbidity in this group (Gone and Trimble, 2012). Lower prevalences of bipolar I disorder among Asians/Pacific Islanders, Blacks and Hispanics are also broadly consistent with prior reports (Alegria et al., 2006; Blanco et al., 2013; Gibbs et al., 2013; Xu et al., 2011) that have highlighted the role of cultural factors and differential response patterns on the rates of bipolar I disorder among

Table 4
Adjusted Odds ratios of 12-Month and Lifetime DSM-5 Bipolar I Disorder and Other Psychiatric Disorders Among Men and Women.

Comorbid disorder	12-Month				Lifetime			
	Men		Women		Men		Women	
	AOR[a] (95% CI)[b]	AOR (95% CI)[c]	AOR[a] (95% CI)[b]	AOR (95% CI)[c]	AOR[a] (95% CI)[b]	AOR (95% CI)[c]	AOR[a] (95% CI)[b]	AOR (95% CI)[c]
Any substance use disorder	**4.3** (3.17–5.81)	**2.0** (1.42–2.78)	**4.5** (3.40–6.07)	**2.0** (1.45–2.78)	**8.8** (5.43–14.33)	**3.7** (2.28–6.14)	**4.6** (3.37–6.24)	**1.8** (1.27–2.44)
Alcohol use disorder	**2.3** (1.71–3.17)	0.9 (0.64–1.32)	**4.0** (2.99–5.37)	**1.7** (1.17–2.42)	**5.2** (3.77–7.16)	**1.9** (1.29–2.63)	**4.8** (3.72–6.25)	**1.7** (1.20–2.28)
Any drug use disorder	**5.2** (3.50–7.66)	1.5 (0.94–2.31)	**6.1** (4.15–9.04)	1.4 (0.81–2.25)	**4.6** (3.55–5.90)	1.1 (0.80–1.46)	**6.2** (4.87–7.96)	**1.7** (1.26–2.35)
Tobacco use disorder	**4.2** (3.11–5.78)	**2.1** (1.45–3.09)	**3.9** (2.77–5.38)	**1.6** (1.05–2.33)	**5.1** (3.81–6.84)	**2.0** (1.41–2.84)	**3.2** (2.44–4.16)	1.0 (0.74–1.45)
Any anxiety disorder	**8.4** (5.69–12.32)	**2.0** (1.32–3.06)	**6.7** (4.83–9.28)	**1.7** (1.09–2.52)	**7.2** (5.34–9.73)	**2.0** (1.39–2.73)	**6.8** (5.13–9.08)	**2.0** (1.39–2.83)
Panic	**16.1** (9.97–26.11)	**4.0** (2.20–7.23)	**9.0** (6.35–12.66)	**2.0** (1.39–3.01)	**12.0** (8.33–17.20)	**3.6** (2.32–5.67)	**5.6** (4.12–7.59)	**1.4** (1.03–2.03)
Agoraphobia	**12.9** (7.28–22.91)	**2.1** (1.12–4.10)	**7.4** (4.65–11.68)	1.4 (0.80–2.49)	**9.5** (5.72–15.92)	**1.8** (1.01–3.02)	**7.3** (4.93–10.66)	**1.8** (1.12–2.92)
Social anxiety disorder	**8.2** (5.25–12.79)	1.4 (0.86–2.30)	**5.2** (3.16–8.53)	1.1 (0.69–1.84)	**6.7** (4.59–9.71)	1.3 (0.86–2.01)	**5.2** (3.50–7.67)	1.3 (0.85–1.98)
Specific phobia	**5.7** (3.81–8.57)	1.5 (0.90–2.34)	**3.4** (2.55–4.54)	1.2 (0.94–1.61)	**5.1** (3.44–7.44)	1.3 (0.84–2.09)	**3.4** (2.59–4.39)	1.2 (0.95–1.60)
Generalized anxiety disorder	**8.7** (5.95–12.65)	1.3 (0.85–1.91)	**7.3** (5.17–10.42)	1.3 (0.83–2.11)	**6.9** (5.01–9.53)	1.3 (0.92–1.96)	**6.1** (4.49–8.15)	1.3 (0.86–1.98)
Posttraumatic stress disorder	**11.5** (8.39–15.67)	**2.4** (1.66–3.55)	**8.7** (6.65–11.26)	**1.9** (1.36–2.50)	**11.5** (8.42–15.69)	**2.9** (2.11–4.03)	**7.3** (5.60–9.50)	**1.8** (1.28–2.46)
Any personality disorder[d]	**20.2** (13.28–30.85)	**8.6** (5.45–13.54)	**19.8** (13.90–28.34)	**8.1** (4.80–13.59)	**15.2** (11.08–20.74)	**5.7** (4.17–7.78)	**14.8** (11.16–19.53)	**5.7** (4.00–8.04)
Schizotypal	**14.9** (10.36–21.53)	**2.7** (1.74–4.21)	**12.4** (8.80–17.39)	**2.4** (1.53–3.61)	**11.8** (8.83–15.76)	**2.2** (1.58–3.01)	**11.6** (8.71–15.50)	**2.6** (1.77–3.75)
Borderline	**18.8** (12.38–28.43)	**4.3** (2.72–6.80)	**17.5** (12.49–24.46)	**4.7** (2.81–7.88)	**15.7** (11.39–21.56)	**4.0** (2.75–5.79)	**13.1** (10.08–17.08)	**3.2** (2.24–4.58)
Antisocial	**7.1** (5.08–9.97)	**2.0** (1.38–2.95)	**7.7** (5.03–11.78)	**1.7** (1.06–2.66)	**5.9** (4.26–8.11)	**1.7** (1.19–2.30)	**7.6** (5.05–11.38)	**1.8** (1.13–2.70)

Note: Significant ($p < 0.05$) odds ratios appear in **bold font**.
[a] Adjusted odds ratios adjusted for sex, age, race-ethnicity, marital status, education, household income, urbanicity and region.
[b] 95% CI = 95% confidence interval.
[c] Adjusted odds ratios adjusted for sex, age, race-ethnicity, marital status, education, household income, urbanicity, region and other psychiatric disorders.
[d] Personality disorders assessed on a lifetime basis.

these minorities.

Similar to earlier findings (Xiong Lai et al., 2015), bipolar I disorder was consistently associated with panic disorder, agoraphobia, posttraumatic stress disorder, and borderline, schizotypal and antisocial PDs. With few exceptions, bipolar I disorder was also associated with AUD and TUD and DUD (lifetime) among women. Bipolar I disorder has frequently been linked with borderline PD in the clinical literature (Fan and Hassell, 2008; Garno et al., 2005; Paris et al., 2007) and high rates of comorbidity between the disorders have been observed in general population surveys (Bassett, 2012; Grant et al., 2008; McDermid et al., 2015). Although the underlying nature of the relationship remains unclear, similarities in phenomenology (i.e., misdiagnosing the emotional extremes of borderline PD as bipolar I disorder), the influence of borderline personality features on vulnerability to bipolar I disorder and the impact of early childhood adversity in the development of both bipolar I and borderline PD have been implicated (Bassett, 2012; Grant et al., 2008; McDermid et al., 2015; Ruggero et al., 2010; Zimmerman et al., 2008). Associations between bipolar I disorder and anxiety and substance use disorders were modest, but their comorbidity has recently been linked to greater likelihoods of suicide attempts and deaths attributable to suicide (da Silva Costa et al., 2015; Di Florio et al., 2014; Oquendo et al., 2010; Yoon et al., 2011). A recent task force has highlighted the need to systematically screen for comorbidity among individuals with bipolar I disorder and calls for additional treatment studies of patients with bipolar I disorder and other comorbidities to inform clinical practice (Beaulieu et al., 2012; Rosenbluth et al., 2012).

This study should be understood in the context of several limitations. Clinical information was based on self-report, with lifetime estimates subject to recall bias. However, reliability and validity of NESARC-III measures have been well documented in the literature (Grant et al., 2015b; Hasin et al., 2015a,b; 2011). The current study did not also address differences between bipolar I and bipolar II disorders with respect to prevalence and sociodemographic and clinical correlates. Consistent with other epidemiologic surveys, the NESARC did not use a clinician-administered interview, but relied on the AUDADIS-5, a fully structured interview. However, the strong associations with external clinical correlates of quality of life, age at onset and treatment observed in this study supports the validity of the AUDADIS-5 assessment of bipolar I disorder.

In conclusion, this is the first study to provide information on the prevalence of DSM-5 bipolar I disorder in the U.S. Our data suggest that the prevalence of bipolar I disorder has not substantively changed over the last decade. Bipolar I disorder continues to be a common disorder among men and women and contributes substantially to low quality of life and the burden of disease in our society. Its association with most common psychiatric disorders may hold clues to better understand its etiology, but further interferes with the individuals' level of functioning and their treatment response (Bassett, 2012) and increases the likelihood of suicide attempts and deaths (da Silva Costa et al., 2015; Di Florio et al., 2014; Oquendo et al., 2010; Yoon et al., 2011). Comprehensive evaluation of patients with bipolar I disorder should include assessment of a broad array of psychiatric comorbidities. Efforts to destigmatize bipolar I disorder also can importantly help reduce the current treatment gap that characterizes bipolar I disorder (Hawke et al., 2013; Latalova et al., 2013). Despite the existence of efficacious treatment, continuity of care is more the exception than the rule (Ketter, 2015, 2010). There is a need to develop new treatment approaches that are more accessible and acceptable to patients to decrease the burden of bipolar I disorder for the individual and society.

Table 5
Mean norm-based quality of life scores by 12-month DMS-5 bipolar I disorder among men and women.

Bipolar I Disorder	Mental Health	Social Functioning	Role Emotional Functioning	Mental Component Summary
Total				
Yes	41.9 (0.63)	40.7 (0.72)[a]	38.6 (0.66)[a]	40.3 (0.61)[a]
No	51.9 (0.08)	50.8 (0.09)	48.6 (0.12)	51.0 (0.08)
Men				
Yes	44.5 (0.92)	43.9 (1.14)	40.8 (1.05)[a]	43.5 (0.92)
No	53.0 (0.11)	51.5 (0.12)	49.4 (0.15)	52.0 (0.11)
Women				
Yes	39.1 (0.74)[a]	37.4 (0.95)[a]	36.4 (0.77)[a]	37.0 (0.73)[a]
No	50.9 (0.11)	50.1 (0.11)	47.8 (0.13)	50.1 (0.10)

[a] Significantly different ($p < .05$) from the scores for individuals with no bipolar I disorder, after adjusting for sociodemographic characteristics and other 12-month psychiatric disorders.

Disclaimer

The views and opinions expressed in this report are those of the authors and should not be construed to represent the views of any of the sponsoring organizations or agencies or the US government.

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Drafting of the manuscript: Blanco, Compton, Grant.
Critical revision of the manuscript for important intellectual content: All authors.
Obtained funding: Grant, Blanco, Compton.
Statistical analysis: Saha, Ruan, Huang, Grant.
Administrative, technical, or material support: All authors.
Study supervision: Grant, Compton, Blanco.

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Conflict of interest

Compton reports ownership of stock in General Electric Co., 3M Co., and Pfizer Inc., unrelated to the submitted work. No conflicts of interest declared by any other author.

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