Violent Behavior and DSM-IV Psychiatric Disorders: Results From the National Epidemiologic Survey on Alcohol and Related Conditions

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Objective: To present nationally representative data on the lifetime prevalence and population estimates of violent behavior among individuals with DSM-IV psychiatric disorders.

Method: The data were derived from the National Epidemiologic Survey on Alcohol and Related Conditions. Prevalences, population estimates, and associations of violent behavior occurring among individuals with pure, comorbid, and specific DSM-IV psychiatric disorders were examined.

Results: After controlling for sociodemographic characteristics and other comorbidity, it was found that the odds of violent behavior were significantly increased ($p < .05$) among individuals with substance use disorders; pathological gambling; major depressive disorder; bipolar disorders; panic disorder without agoraphobia; specific phobia; and paranoid, schizoid, histrionic, and obsessive-compulsive personality disorders. Percentages of violent behavior among individuals with each comorbid disorder were, with few exceptions, significantly greater ($p < .05$–$p < .001$) than the corresponding percentages among those presenting with the pure form of each disorder. Alcohol and drug use disorders were the most significant contributors to the public health burden of violent behavior.

Conclusion: The majority of individuals with psychiatric disorders do not engage in violent behavior, and public perception associated with stereotypic violence among individuals with psychiatric disorders appears unwarranted. Elevated risks and burden of violent behavior were not equally shared across the spectrum of psychiatric disorders, with particular disorders, especially substance use disorders, contributing disproportionately to the burden. Future research should examine the circumstances under which violence among individuals with psychiatric disorders occurs with a view toward improving clinical prediction and developing more effective prevention strategies.

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The nature of the association between psychiatric disorders and violent behavior is still unresolved. To date, the majority of research addressing this linkage has examined the prevalence of violent behavior among psychiatric patients[1] or the prevalence of psychiatric disorders among jail and prison inmates.[2] Although studies among patients and inmates have contributed much to our knowledge about the relationship between psychiatric disorders and violent behavior, these samples suffer from a broad range of selection biases, precluding generalization to the general population of individuals with these disorders.

Although resolution of these issues can only be significantly advanced by studying probability samples that are unselected for treatment and violent behavior status in general populations, very few epidemiologic studies[3–7] have directly examined the association between psychiatric disorders and violent behavior. Taken together, these studies have shown an increased risk of violent behavior

among individuals with alcohol and drug use disorders and antisocial personality disorder. Affective and anxiety disorders were not clearly associated with an elevated risk of violent behavior in 3 of these studies,[3,6,7] but in the remaining 2,[4,5] increased risks of violent behavior were found among these individuals. Results were also mixed for psychotic disorders, including schizophrenia, with only 3 of the 5 studies demonstrating increased risk of violent behavior among these individuals. Similar to the results of treatment studies,[8,9] comorbidity with substance use disorders was consistently shown to increase the risk of violence substantially among individuals with other psychiatric disorders.

Although prior epidemiologic surveys have contributed to our knowledge of the linkage between violent behavior and psychiatric disorders in the general population, this work has several limitations that may account for some of the disparate findings arising from them. Foremost, the relatively small sample sizes of these studies precluded analyses of specific mood and anxiety disorders. In 4 of these studies,[3,4,6,7] diagnoses needed to be aggregated into categories of any mood or any anxiety disorder when controlling for socioeconomic status and other comorbid disorders, while 1 study[5] did not control for either. With the exception of the study by Arseneault and colleagues,[3] which required individuals to report 2 of 7 violent behaviors in order to be classified as violent, the remaining studies either used thresholds of at least 1 of 2 to 5 violent behaviors or based their analyses on responses to a single question on violence. This prior work has also been exclusively concerned with comorbidity between substance use disorders and other psychiatric disorders, ignoring other forms of comorbidity among Axis I disorders. Further, only 1 prior study[5] examined the population burden of violent behavior attributable to types of psychiatric disorder by considering the base rates of disorder in the general population. However, that study used a hypothetical population rather than population estimates derived from the survey data and failed to present corresponding estimates for the control group of individuals with no psychiatric disorder. As a result, the public health burden attributable to individuals with psychiatric disorders could not be compared with the corresponding burden attributable to those without psychiatric disorders. Lastly, no prior epidemiologic study has examined violent behavior among individuals with personality disorders other than antisocial personality disorder or used the most current psychiatric nomenclature, the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition (DSM-IV),[10] to classify psychiatric disorders.

Accordingly, the present study was designed to address the limitations of prior epidemiologic studies by examining the relationship between violent behavior occurring before and since age 15 years and specific lifetime DSM-IV substance use, mood, anxiety, and personality disorders and pathological gambling in a large, nationally representative survey of the U.S. population: the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).[11,12] The sample size of the NESARC (43,093) was large enough to allow examination of violent behavior and specific psychiatric disorders and at the same time control for sociodemographic factors and comorbidity. This study also presents information on differences in rates of violent behavior among individuals with pure and comorbid disorders, thereby extending previous research that was limited to the assessment of violence among individuals comorbid for substance use disorders and other psychiatric disorders. Most significantly, this study determines, for the first time, the magnitude of the public health burden of violence associated with psychiatric disorders in the United States by explicitly accounting for the base rates of psychiatric disorders in the general population.

METHOD

The NESARC Sample

The 2001–2002 NESARC is a representative sample of the U.S. population, as described in detail elsewhere.[11,12] The target population included those 18 years and older, residing in households and selected group quarters. Face-to-face interviews were conducted with 43,093 respondents. The survey response rate was 81%. Blacks, Hispanics, and young adults (aged 18–24 years) were oversampled, with data adjusted for oversampling and nonresponse. The weighted data were then adjusted to represent the U.S. civilian population based on the 2000 Census.

DSM-IV Psychiatric Disorders

The diagnostic interview used in the NESARC was the National Institute on Alcohol Abuse and Alcoholism's *Alcohol Use Disorder and Associated Disabilities Interview Schedule: DSM-IV Version* (AUDADIS-IV).[13] This structured interview, designed for lay interviewers, was developed to advance measurement of substance use and mental disorders in large-scale surveys.

AUDADIS-IV questions operationalize DSM-IV criteria for alcohol and drug specific abuse and dependence for 10 drug classes (aggregated in this report). Consistent with DSM-IV, lifetime diagnoses of alcohol abuse required at least 1 of the 4 criteria for abuse in either the 12-month period preceding the interview or any time previous to that 12-month period. Alcohol dependence diagnoses required at least 3 of the 7 DSM-IV criteria for dependence during the past year or within a previous 1-year period. Drug use disorder[14–16] and nicotine dependence diagnoses[17] used the same algorithms. Lifetime diagnoses of pathological gambling are described in detail elsewhere[18] and required the respondent to meet at least

5 of the 10 diagnostic criteria in any one 12-month period preceding the interview.

Mood disorders included DSM-IV "primary" major depressive disorder (MDD), bipolar I, bipolar II, and dysthymia. Anxiety disorders included DSM-IV "primary" panic disorder with and without agoraphobia, social and specific phobias, and generalized anxiety disorder. AUDADIS-IV methods to diagnose these disorders are described in detail elsewhere.[11,14,19–23] In DSM-IV, primary excludes substance-induced disorders and those due to medical conditions: AUDADIS-IV improvements over previous measures in making the primary/substance-induced distinction for mood and anxiety disorders are presented elsewhere,[11,14,19,22–25] including the fact that specific AUDADIS questions about the chronological relationship between intoxication or withdrawal and the full psychiatric syndrome implement DSM-IV criteria differentiating primary from substance-induced disorders. MDD diagnoses also ruled out bereavement. Personality disorders, assessed on a lifetime basis, included DSM-IV avoidant, dependent, obsessive-compulsive, paranoid, schizoid, and histrionic personality disorders. Antisocial personality disorder was also assessed in the NESARC but not included in the present analysis since by definition it includes violent behaviors as diagnostic criteria. DSM-IV personality disorder diagnoses require long-term patterns of social/occupational impairment; AUDADIS-IV personality disorder diagnoses were made accordingly.[14,22,23] Like other large epidemiologic surveys of the general population, psychotic disorders were not assessed in the NESARC because of the unreliability of these diagnoses using fully-structured diagnostic interviews.[5,7]

The reliability of the AUDADIS-IV substance use disorders, nicotine dependence, and pathological gambling diagnoses is documented in clinical and general population samples, with test-retest reliability ranging from good to excellent ($\kappa = 0.70–0.84$).[17,18,26–29] Convergent, discriminant, and construct validity of AUDADIS-IV alcohol use disorder criteria and diagnoses were good to excellent,[30–34] including in the World Health Organization/National Institutes of Health International Study on Reliability and Validity,[35–40] where clinical reappraisals documented good validity of selected disorder diagnoses ($\kappa = 0.60–0.76$).[35,39,41] Test-retest reliability for AUDADIS-IV mood, anxiety and personality disorder diagnoses in general population and clinical settings was fair to good ($\kappa = 0.40–0.62$).[27–29] Test-retest reliabilities of AUDADIS-IV personality disorders (not measured in prior surveys) compare favorably with those in patient samples using semistructured personality interviews.[42] Convergent validity was good to excellent for all affective and anxiety diagnoses, and selected diagnoses showed good agreement ($\kappa = 0.64–0.68$) with psychiatrist reappraisals.[17,19,27,29,41]

Violent Behavior

Information on violent behavior was collected for 2 time periods: before age 15 and since age 15 years. Similar to other studies,[3,6] respondents were classified as positive for violent behavior if they reported at least 2 of 7 of the following violent behaviors: (1) forcing someone to have sex with them against his or her will; (2) getting into a lot of fights; (3) getting into fights that came to swapping blows with someone like a husband, wife, girlfriend, or boyfriend; (4) using a weapon such as a stick, knife, or gun in a fight; (5) hitting someone so hard that he or she was injured or had to see a doctor; (6) physically hurting another person in any other way on purpose; or (7) robbing or mugging someone (e.g., snatching a purse).

Statistical Analyses

Weighted frequencies and cross-tabulations were computed to derive the prevalences of violent behavior before and since age 15 years among respondents with lifetime substance use, mood, anxiety, and personality disorders. A series of multivariate logistic regression analyses was used to examine the associations between violent behavior and each psychiatric disorder controlling for age; sex; race-ethnicity; all comorbid substance use, mood, anxiety, and personality disorders; and pathological gambling. Chi-square statistics were used to examine differences in the rates of violent behavior between respondents classified with each pure and comorbid psychiatric disorder. For example, pure MDD respondents did not have a lifetime diagnosis of any other DSM-IV disorder assessed in the NESARC, whereas those diagnosed with comorbid MDD had at least 1 other DSM-IV disorder on a lifetime basis. The magnitude of the public health burden of violent behavior was determined by deriving population estimates of violent behavior for each pure and comorbid disorder that accounted for their base rates in the general population. Similar analyses were conducted to examine the cumulative burden attributable to specific diagnostic groups. These analyses were both unstandardized and standardized (i.e., controlling for sex, age, and race-ethnicity). These analyses were only conducted for violent behavior since age 15 years, since the population estimates for violent behavior before age 15 would have been distorted for some psychiatric disorders with earlier onsets than others, especially substance use disorders. All analyses were conducted with SUDAAN,[43] a software program that makes adjustments for survey design effects.

RESULTS

Prevalence of Violent Behavior Among Respondents With Specific Psychiatric Disorders

The prevalences of violent behavior before and since age 15 years were 0.21% and 0.66% among individuals classified with no lifetime psychiatric disorder. The

Table 1. Prevalence and Adjusted[a] Odds Ratios of Violent Behavior Before and Since Age 15 Years and Lifetime DSM-IV Substance Use, Mood, Anxiety, and Personality Disorders

		Violent Behavior Before Age 15[b]		Violent Behavior Since Age 15[b]	
Disorder	N	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)
Substance use disorder	15,238	3.03 (0.18)	**4.26** (3.26 to 5.57)	10.43 (0.34)	**6.09** (5.16 to 7.18)
Alcohol abuse	7,062	2.24 (0.21)	**2.22** (1.67 to 2.95)	7.73 (0.38)	**2.65** (2.23 to 3.15)
Alcohol dependence	4,781	4.91 (0.37)	**2.31** (1.78 to 2.99)	16.62 (0.71)	**3.05** (2.49 to 3.73)
Drug abuse	3,023	4.85 (0.47)	**2.06** (1.56 to 2.70)	16.18 (0.81)	**2.17** (1.84 to 2.58)
Drug dependence	1,045	10.53 (1.00)	**2.50** (1.78 to 3.52)	31.60 (1.91)	**2.77** (2.19 to 3.50)
Nicotine dependence	6,937	4.06 (0.29)	**1.86** (1.45 to 2.38)	13.64 (0.56)	**2.03** (1.74 to 2.37)
Pathological gambling	192	7.25 (2.00)	1.53 (0.82 to 2.86)	28.06 (3.86)	**2.54** (1.64 to 3.93)
Mood disorder	7,929	3.48 (0.25)	**1.88** (1.47 to 2.41)	11.74 (0.48)	**2.24** (1.96 to 2.56)
Major depressive disorder	5,695	2.16 (0.23)	1.28 (0.92 to 1.79)	8.31 (0.48)	**1.73** (1.47 to 2.05)
Dysthymia	1,427	3.24 (0.63)	1.66 (1.00 to 2.75)	10.02 (0.99)	1.30 (1.00 to 1.69)
Bipolar I	1,411	7.86 (0.83)	**2.67** (1.94 to 3.66)	25.34 (1.57)	**3.72** (2.94 to 4.70)
Bipolar II	494	5.88 (1.31)	**2.18** (1.26 to 3.79)	13.58 (1.64)	**1.77** (1.26 to 2.49)
Anxiety disorder	7,233	2.97 (0.22)	**1.29** (1.02 to 1.62)	9.75 (0.48)	**1.29** (1.12 to 1.50)
Panic disorder with agoraphobia	463	4.04 (1.00)	0.90 (0.50 to 1.64)	14.47 (2.31)	1.02 (0.65 to 1.58)
Panic disorder without agoraphobia	1,653	3.72 (0.55)	1.46 (0.98 to 2.18)	13.18 (0.97)	**1.66** (1.33 to 2.07)
Social phobia	1,983	3.25 (0.47)	0.83 (0.58 to 1.19)	11.22 (0.94)	0.91 (0.73 to 1.13)
Specific phobia	4,030	3.04 (0.33)	1.31 (0.95 to 1.79)	10.12 (0.65)	**1.34** (1.13 to 1.58)
Generalized anxiety	1,757	4.09 (0.56)	1.28 (0.90 to 1.81)	13.04 (1.01)	1.16 (0.91 to 1.48)
Personality disorder	5,535	5.13 (0.35)	**3.07** (2.40 to 3.93)	15.02 (0.64)	**2.64** (2.27 to 3.06)
Paranoid	2,105	7.64 (0.71)	**1.95** (1.39 to 2.73)	23.26 (1.38)	**2.53** (1.97 to 3.24)
Schizoid	1,425	6.94 (0.86)	**1.52** (1.02 to 2.28)	18.53 (1.37)	**1.32** (1.03 to 1.69)
Histrionic	808	9.54 (1.17)	**1.81** (1.23 to 2.65)	24.67 (1.82)	**1.54** (1.19 to 2.00)
Avoidant	995	5.28 (0.80)	0.98 (0.65 to 1.50)	15.02 (1.43)	0.78 (0.58 to 1.06)
Dependent	208	7.01 (2.09)	0.78 (0.35 to 1.73)	23.34 (3.59)	1.14 (0.69 to 1.86)
Obsessive-compulsive	3,261	4.67 (0.46)	**1.53** (1.12 to 2.10)	14.36 (0.78)	**1.55** (1.30 to 1.85)
Any DSM-IV disorder	22,010	2.52 (0.13)	**11.04** (7.60 to 16.04)	8.36 (0.27)	**12.39** (10.07 to 15.26)

[a]Adjusted for sex, age, and race-ethnicity and relevant comorbid substance use, mood, anxiety, and personality disorders.
[b]Bold numbers indicate p value < .05.

prevalences of violent behavior before age 15 ranged from 2.16% for MDD to 10.53% for drug dependence (Table 1) and were much lower than the rates of violent behavior since age 15 (7.73%–31.60%). Rates of violent behavior before age 15 were clearly greater among respondents with drug dependence than any other substance use disorder (2.24%–4.91%). Rates of violent behavior before age 15 were also greater for bipolar I disorder (7.86%) relative to other mood disorders (2.16%–5.88%) and greater for generalized anxiety disorder (4.09%) than other anxiety disorders (3.04%–4.04%). With respect to personality disorders, rates were greatest for respondents with histrionic (9.54%) and paranoid (7.64%) personality disorders. Prevalences of violent behavior since age 15 among individuals with lifetime DSM-IV psychiatric disorders were much greater (7.73%–31.60%) and closely paralleled the pattern of results observed for violent behavior before age 15 for specific psychiatric disorders.

After controlling for sociodemographic factors and comorbid disorders, it was found that the odds of violent behavior before and since age 15 years were significantly greater among respondents with any DSM-IV disorder relative to those without any DSM-IV disorder (ORs = 11.04, 12.39) and among respondents with specific lifetime substance use disorders (ORs = 1.86–3.05) and those with paranoid, schizoid, histrionic, and obsessive-compulsive personality disorders (ORs = 1.32–2.53). The odds of violent behavior before and since age 15 were also significantly greater among respondents with bipolar I and II disorders (ORs = 1.77–3.72), whereas the odds of violent behavior since the age of 15 were significantly greater among respondents with MDD (OR = 1.73), pathological gambling (OR = 2.54), panic disorder without agoraphobia (OR = 1.66), and specific phobia (OR = 1.34).

Prevalence of Violent Behavior Among Respondents With Pure and Comorbid Disorders

The prevalences of violent behavior before age 15 years among individuals with each pure disorder were generally very low (0.00%–3.11%) except for bipolar II disorder (8.58%), with prevalences of 0.00% reported for many psychiatric disorders (Table 2). Rates of violent behavior since age 15 among respondents with pure disorder were somewhat greater, ranging from 0.00% to 11.32%.

By contrast, prevalences of violent behavior before and since age 15 were much greater among respondents classified with a comorbid disorder. With respect to violent behavior before and since age 15, prevalences were greater for drug dependence (10.70%, 31.92%) than other substance use disorders and greater for bipolar I disorder (8.58%, 27.58%) than other mood disorders. Before age 15, the prevalence of violent behavior was greater for

Table 2. Prevalence of Violent Behavior Before and Since Age 15 Years Among Individuals With Lifetime Pure and Comorbid DSM-IV Substance Use, Mood, Anxiety, and Personality Disorders

	Before Age 15						Since Age 15			
	Pure Disorder		Comorbid Disorder				Pure Disorder	Comorbid Disorder		
Disorder	N	% (SE)	N	% (SE)	χ^2	p	% (SE)	% (SE)	χ^2	p
Substance use disorder										
Alcohol abuse	3,039	0.68 (0.16)	4,023	3.43 (0.35)	38.57	< .001	2.98 (0.34)	11.39 (0.59)	84.71	< .001
Alcohol dependence	949	1.92 (0.52)	3,832	5.65 (0.44)	23.19	< .001	7.22 (1.06)	18.95 (0.82)	52.84	< .001
Drug abuse	293	1.84 (0.81)	2,730	5.14 (0.51)	10.09	.002	8.24 (2.22)	16.93 (0.87)	10.97	.002
Drug dependence	18	0.00 (0.00)	1,027	10.70 (1.01)	12.29	< .001	11.32 (9.08)	31.92 (1.93)	3.80	.056
Nicotine dependence	1,348	0.88 (0.22)	5,589	4.78 (0.36)	57.33	< .001	2.55 (0.49)	16.15 (0.67)	103.84	< .001
Mood disorder										
Major depressive disorder	1,318	0.74 (0.26)	4,377	2.55 (0.29)	19.29	< .001	1.88 (0.49)	10.07 (0.59)	76.44	< .001
Dysthymia	115	0.00 (0.00)	1,312	3.48 (0.67)	15.45	< .001	1.58 (1.13)	10.64 (1.04)	17.39	< .001
Bipolar I	124	0.53 (0.53)	1,287	8.58 (0.90)	28.87	< .001	2.52 (1.39)	27.58 (1.67)	40.45	< .001
Bipolar II	68	8.58 (5.75)	426	5.50 (1.28)	0.26	.610	5.12 (3.85)	14.76 (1.87)	4.26	.043
Anxiety disorder										
Panic disorder with agoraphobia	12	0.00 (0.00)	451	4.15 (1.03)	6.05	.017	3.39 (3.44)	14.75 (2.38)	3.61	.062
Panic disorder without agoraphobia	265	0.84 (0.81)	1,388	4.26 (0.66)	9.98	.002	1.88 (1.07)	15.29 (1.13)	46.58	.003
Social phobia	196	0.32 (0.32)	1,787	3.59 (0.52)	20.52	< .001	0.15 (0.11)	12.53 (1.02)	63.01	< .001
Specific phobia	939	0.59 (0.31)	3,091	3.67 (0.42)	26.08	< .001	0.88 (0.32)	12.49 (0.81)	82.67	< .001
Generalized anxiety	106	0.00 (0.00)	1,651	4.32 (0.59)	29.81	< .001	4.71 (4.00)	13.51 (1.03)	4.78	.032
Personality disorder										
Paranoid	156	0.85 (0.63)	1,949	8.09 (0.75)	25.30	< .001	2.36 (1.16)	24.62 (1.43)	39.85	< .001
Schizoid	112	0.10 (0.09)	1,313	7.44 (0.91)	26.66	< .001	0.10 (0.09)	19.87 (1.44)	39.01	< .001
Histrionic	31	3.11 (3.09)	777	9.76 (1.19)	3.41	.069	3.89 (3.20)	25.36 (1.89)	10.72	.002
Avoidant	36	0.00 (0.00)	959	5.45 (0.83)	15.70	< .001	0.00 (0.00)	15.52 (1.47)	22.59	< .001
Dependent	9	0.00 (0.00)	199	7.30 (2.18)	3.93	.052	0.00 (0.00)	24.32 (3.77)	4.51	.038
Obsessive-compulsive	499	0.65 (0.38)	2,762	5.38 (0.51)	45.02	< .001	2.53 (0.90)	16.45 (0.88)	60.38	< .001
Any DSM-IV disorder	9,709	0.92 (0.11)	12,301	3.75 (0.22)	77.82	< .001	3.15 (0.21)	12.35 (0.40)	140.11	< .001

generalized anxiety disorder (4.32%) than for other anxiety disorders (3.59%–4.26%). Since age 15, however, violent behavior was more prevalent for panic disorder without agoraphobia (15.29%) than for other anxiety disorders (12.49%–14.75%). Rates of violent behavior before and since age 15 were also greatest for paranoid (8.09%, 24.62%) and histrionic (9.76%, 25.36%) personality disorders relative to other personality disorders.

When rates of violent behavior were compared between pure and comorbid cases of each psychiatric disorder, respondents with each comorbid disorder were, with few exceptions, significantly more likely ($p < .05$) to engage in violent behavior both before and since age 15.

Population Estimates of Violent Behavior Since Age 15 Years Among Respondents With Pure and Comorbid Disorders

Table 3 shows the prevalences and U.S. population estimates of each pure and comorbid disorder and violent behavior since age 15. Note that the population estimates of violent behavior associated with the aggregate disorder rows for pure disorder may not be the sum of all specific pure disorder estimates in that category, because the aggregate figures allow for comorbidity among specific disorders within each aggregate category. For example, the population estimate of 2,606,812 for the aggregate category of any pure substance use disorder includes respondents with 1 or more substance use disorders, but with no other DSM-IV disorder. However, the sum of all population estimates within each aggregate category can be interpreted as the public health burden of violence attributable to any pure specific disorder of that type. Therefore, respondents with any pure substance use disorder (N = 1,150,363) contributed most to the burden of violent behavior, followed by those with any pure mood disorder (N = 149,156), with any pure personality disorder (N = 80,815) and any pure anxiety disorder (N = 84,521) having less impact and pathological gambling having no impact. Pure alcohol abuse (N = 479,067), MDD (N = 111,775), specific phobia (N = 35,006), and obsessive-compulsive personality disorder (N = 62,289) had the greatest population estimates of violent behavior relative to other pure substance use, mood, anxiety, and personality disorders, reflecting both the high prevalences of these disorders as well as the high rates of violent behavior among individuals with these disorders.

Unlike population estimates associated with pure disorder, estimates of violent behavior for aggregated and specific comorbid disorders cannot be used to derive exact burden estimates because individuals can and indeed must be counted in more than 1 of these disorder categories. Overall, however, the burden of violence among

Table 3. Prevalence and Population Estimates of Violent Behavior Since Age 15 Years Among Individuals With Specific Lifetime Pure and Comorbid Psychiatric Disorders[a]

	Pure Disorder				Comorbid Disorder			
Disorder	Prevalence of Disorder in General Population (1) %	Population Estimate of Disorder in General Population (2) N	Prevalence of Violent Behavior (3) %	Population Estimate of Violent Behavior (2) × (3) N	Prevalence of Disorder in General Population (1) %	Population Estimate of Disorder in General Population (2) N	Prevalence of Violent Behavior (3) %	Population Estimate of Violent Behavior (2) × (3) N
Substance use disorder[b]	21.09	43,841,180	5.95	2,606,812	17.30	35,965,835	15.90	5,718,200
Alcohol abuse	7.74	16,083,422	2.98	479,067	10.06	20,915,804	11.39	2,382,204
Alcohol dependence	2.48	5,163,150	7.22	372,679	10.00	20,790,459	18.95	3,940,210
Drug abuse	0.67	1,398,895	8.24	115,261	7.07	14,690,459	16.93	2,487,677
Drug dependence	0.04	83,531	11.32	9,453	2.55	5,295,791	31.92	1,690,434
Nicotine dependence	3.27	6,806,938	2.55	173,903	14.44	30,023,365	16.15	4,850,249
Pathological gambling	0.01	21,669	0.00	0	0.41	848,460	28.78	244,152
Mood disorder[c]	3.93	8,164,893	2.17	176,810	14.41	29,946,635	14.36	4,299,095
Major depressive disorder	2.86	5,937,517	1.88	111,775	10.37	21,556,665	10.07	2,171,804
Dysthymia	0.22	458,437	1.58	7,250	2.99	6,207,142	10.64	660,392
Bipolar I	0.30	614,860	2.52	15,501	3.01	6,260,730	27.58	1,726,807
Bipolar II	0.14	285,539	5.12	14,630	0.98	2,037,949	14.76	300,891
Anxiety disorder[d]	3.71	7,712,943	1.10	84,521	13.44	27,933,464	12.14	3,391,690
Panic disorder with agoraphobia	0.03	55,829	3.39	1,891	1.05	2,175,538	14.75	320,910
Panic disorder without agoraphobia	0.63	1,312,241	1.88	24,622	3.37	6,999,746	15.29	1,070,538
Social phobia	0.53	1,095,154	0.15	1,647	4.44	9,231,156	12.53	1,156,847
Specific phobia	1.92	3,984,488	0.88	35,006	7.47	15,526,336	12.49	1,939,043
Generalized anxiety	0.22	453,455	4.71	21,355	3.92	8,144,306	13.51	1,100,007
Personality disorder[e]	2.23	4,639,552	3.36	155,848	10.55	21,940,005	17.49	3,837,720
Paranoid	0.27	562,991	2.36	13,312	4.14	8,613,220	24.62	2,120,920
Schizoid	0.21	440,878	0.10	438	2.91	6,057,537	19.87	1,203,830
Histrionic	0.06	122,930	3.89	4,776	1.78	3,706,157	25.36	939,877
Avoidant	0.08	156,958	0.00	0	2.28	4,738,752	15.52	735,445
Dependent	0.02	41,090	0.00	0	0.47	980,776	24.32	238,488
Obsessive-compulsive	1.18	2,459,805	2.53	62,289	6.70	13,922,172	16.45	2,289,659
Any DSM-IV disorder	23.02	47,863,050	3.15	1,507,970	30.08	62,502,683	12.35	7,719,156

[a]Population estimates of violent behavior for pure and comorbid disorders are exact figures that may not correspond to the product of columns (2) and (3) due to rounding of prevalence of violent behavior reported in column (3). The sum of the population estimates for the individual pure disorders may not equal the population estimate for the corresponding pure disorder category because the mean weight factors used to derive the weighted population estimates vary across disorders.
[b]The aggregated pure substance use disorder includes respondents with 1 or more substance use disorder but with no other DSM-IV disorder.
[c]The aggregated pure mood disorder includes respondents with 1 or more mood disorder but with no other DSM-IV disorder.
[d]The aggregated pure anxiety disorder includes respondents with 1 or more anxiety disorder but with no other DSM-IV disorder.
[e]The aggregated pure personality disorder includes respondents with 1 or more personality disorder but with no other DSM-IV disorder.

individuals with comorbid disorders (N = 7,719,156) is significantly greater ($p < .001$) than the burden associated with pure disorders (N = 1,507,970).

Percentages and Population Estimates of Violent Behavior Since Age 15 Years Accounted for by Respondents Within Aggregate Disorder Groups

One way to determine the relative contribution to violent behavior since age 15 of various diagnostic groups given the extensive comorbidity observed in this general population sample is to examine cumulative burden associated with increasingly comprehensive aggregate disorder groups. As can be seen in Table 4, respondents with anxiety disorders, but no other disorder, contribute very little (0.86%) to the burden of violent behavior in the United States, but that burden increases to 3.72% when the contribution of respondents with either mood or anxiety, but no other disorder, is considered, and to 9.08% when the contribution of those with any mood, anxiety, or personality disorder (but no other disorder) is considered. The burden associated with individuals with any anxiety, mood, or personality disorder; nicotine dependence; or pathological gambling further increases to 15.13%, but the greatest increase occurs when the burden among respondents with alcohol and drug use disorders is added: an increase from 15.13% to 93.49%. Further, the burden of violent behavior attributable to respondents without any lifetime DSM-IV disorder is 6.51% relative to the burden associated with respondents with any DSM-IV disorder (93.49%). Table 4 also shows that the corresponding standardized percentages for the cumulative burden associated with increasingly comprehensive aggregate disorder groups differed little from the unstandardized estimates.

Table 4. Prevalences and Population Estimates of Violent Behavior Since Age 15 Years and Lifetime Psychiatric Disorders and Percentage of Violent Behaviors Accounted for by Each Diagnostic Group[a]

Disorder	Prevalence of Disorder in General Population (1) %	Estimate of Disorder in General Population (2) N	Prevalence of Violent Behavior (3) %	Population Estimate of Violent Behavior (2) × (3) N	Unstandardized Percent of Violent Individuals Accounted for by Disorder Group	Standardized[b] Percent of Violent Individuals Accounted for by Disorder Group
Only anxiety disorder	3.71	7,712,943	1.10	84,521	0.86	1.33
Only anxiety or mood disorder	9.33	19,398,187	1.89	367,226	3.72	5.27
Only anxiety, mood, or personality disorder	14.63	30,414,386	2.95	896,340	9.08	10.81
Only anxiety, mood, or personality disorder; nicotine dependence; or pathological gambling	20.75	43,131,756	3.46	1,492,957	15.13	17.20
Any DSM-IV disorder, including anxiety, mood, or personality disorder; nicotine dependence; pathological gambling; or alcohol or drug use disorder	53.1	110,365,733	8.36	9,227,126	93.49	93.07
No DSM-IV disorder	46.9	97,514,105	0.66	641,718	6.51	6.93

[a]Population estimates of violent behavior are exact figures that may not correspond to the product of columns (2) and (3) due to rounding of prevalence of violent behavior reported in column (3).
[b]Percentages standardized by sex, age, and race-ethnicity.

DISCUSSION

Consistent with the results of prior epidemiologic research,[3–7] violent behavior before and since age 15 years was significantly increased among individuals with alcohol and drug use disorders. Bipolar I and II disorders were associated with increased risks of violent behavior both before and since age 15, and MDD was associated with an increased risk of violent behavior since age 15. These new findings reflect the fact that the NESARC was the first epidemiologic study to differentiate between MDD and bipolar disorders, while at the same time controlling for sociodemographic characteristics and comorbidity. In contrast to previous studies,[3,6,7] which examined aggregate measures of any anxiety disorder, this study also found increased risks of violent behavior since age 15 among individuals with panic disorder without agoraphobia and with specific phobia.

Information on the associations of personality disorders other than antisocial personality disorder, nicotine dependence, and pathological gambling with violent behavior has not previously been available. This study found increased odds of violent behavior both before and since age 15 among individuals with paranoid, schizoid, histrionic, and obsessive-compulsive personality disorders, as well as nicotine dependence, with increased odds observed among individuals with pathological gambling for violent behavior since age 15. Within the context of these findings, it is important to note that the clear majority of individuals with psychiatric disorders do not engage in violent behavior, a finding that we will elaborate upon later.

Earlier studies[5,7,44,45] have suggested that the observed associations between psychiatric disorders and violent behavior could be explained in terms of underlying sociodemographic factors, but this study, which controlled for sex, age, and race-ethnicity, has not supported that view. Psychiatric disorder appears to be an independent correlate of violent behavior, albeit a modest one (ORs = 1.29–3.72), for individual disorders. It was not surprising that individuals with substance use disorders, who have earlier ages at onset than individuals with other Axis I disorders,[16,17] were more likely to engage in violent behavior both before and since age 15 than those without substance use disorders. The violent behavior of these individuals is most likely due to the disinhibiting effects of alcohol and drugs. In addition, individuals with drug use disorders are of necessity exposed to illegal drug markets that promote violence.[46] Interestingly, pathological gambling, an impulse-control disorder closely related to substance use disorders, was also associated with an increased odds of violent behavior since age 15. Individuals with pathological gambling may also share with individuals who have substance use disorders exposure to an illegal market, in this case the illegal betting enterprise, an industry often inextricably linked to the illicit drug market. By contrast, nicotine dependence appears to contribute to the public health burden of violence largely through its comorbidity with other substance use disorders. This explanation is partially supported by the observation that relatively few individuals in the general population with pure nicotine dependence engaged in violent behavior (N = 173,903) compared to those with comorbid nicotine dependence (4,850,249).

Increased rates of violent behavior were also observed among individuals with MDD, bipolar I and II disorders, panic disorder without agoraphobia, specific phobia, and paranoid, schizoid, histrionic, and obsessive-compulsive personality disorders. Paranoid personality disorder, characterized by a pervasive distrust and suspiciousness of others, may predispose one toward violence through a number of avenues, including pathologic jealousy, the tendency to bear persistent grudges, and misinterpretation of even benign remarks or events as threatening. The tendency of individuals with paranoid personality disorder to react to even minor stimuli with anger is also seen among those with histrionic personality disorder, a predisposition that may increase the likelihood of violent behavior. The salient features of schizoid personality disorder, i.e., aloofness, lack of close friends or confidants, and emotional coldness, could contribute to violent behavior among affected individuals by virtue of their extreme detachment from ordinary feelings and emotions. As with schizoid personality disorder, individuals with obsessive-compulsive personality disorder can be characterized by apparent formality and social detachment, both of which can increase the probability of violent behavior.

Possible symptomatology and related motivations underlying the relationships of mood and anxiety disorders with violent behavior are less clear. MDD and bipolar disorders characterized predominantly by irritability or hyperirritability may contribute to the occurrence of violent behaviors among individuals with these presentations. Panic attacks associated with panic disorder without agoraphobia and often accompanying specific phobia may lead to weakening of self-control mechanisms, increasing the likelihood of violent behavior among affected individuals, similar to the override of personal controls shown to predispose toward violence among psychotic individuals experiencing certain types of hallucinations and delusions.[47–49] Future attempts to specify which symptoms of specific psychopathology are associated with violent behavior, together with tests of theory-driven explanations about the mechanisms that produce such associations, are sorely needed. Future research examining patterns of violence should recognize that violence among individuals with psychiatric disorders cannot be explained solely in terms of the clinical features of the disorders. The impact of symptomatology on violent behavior can only be adequately understood in the context of social relationships, that is, the ways in which symptomatology affects relationships by impairing individuals' abilities to relate meaningfully to others, gain critical social support, and resolve conflicts.[50]

Although the present findings provide information on which specific psychiatric disorders are associated with rates of violent behavior in excess of the control group without any lifetime DSM-IV disorder, the data do not address the magnitude of the problem because they ignore the base rates or prevalences of specific psychiatric disorders in the general population. When base rates and associated population estimates of violent behavior since age 15 were estimated for each pure disorder, the number of individuals who engaged in violent behavior with pure substance use disorders (N = 1,150,363), especially alcohol abuse (N = 479,067), was clearly greater than the combined number of individuals who engaged in violent behavior with pure mood (N = 149,156), anxiety (N = 84,521), and personality disorders (N = 80,815).

Although previous research has established that comorbidity with substance use disorders increases the risk of violent behavior among individuals with other psychiatric disorders,[3–7,47] this study was the first to show that comorbidity between and within Axis I and II disorders also significantly increases the likelihood of violent behavior regardless of which specific psychiatric disorder was examined. Indeed, the public burden of violence since age 15 was 1,507,970 among individuals with specific lifetime pure psychiatric disorders, whereas the corresponding burden among those with comorbid disorders was 7,719,156. The increased disability and impairment in social and occupational functioning among comorbid individuals, well documented in both the clinical and the epidemiologic literatures,[16] may predispose toward violence in these individuals. Future research examining associations between disability and violent behavior among individuals with pure and comorbid psychiatric disorders appears warranted.

When interpreting the results of this study, it is important to keep in mind, as previously mentioned, that only a minority of individuals with psychiatric disorders (i.e., 9,227,126 of 110,365,733) engage in violent behavior, a result that does not validate the public image of all individuals with psychiatric disorders as potentially violent. The public health burden of violent behavior, however, is clearly greater among individuals with psychiatric disorders (N = 9,227,126) than among individuals with no psychiatric disorders (N = 641,718) in the general population when expressed in terms of U.S. population estimates. In marked contrast to findings of previous research,[3–7,51] psychiatric disorders were found in this study to be associated with violent behavior in the general population. Prior research focused exclusively on the modest to moderate increases in rates of violent behavior among individuals with psychiatric disorders, which this study also found, while ignoring the burden of violent behavior attributable to individuals with psychiatric disorders by not analyzing base rates and population estimates. Previous research[5,51] also failed to present the burden of violent behavior attributable to those without psychiatric disorders and to compare these estimates with those associated with any psychiatric disorder. Further, conclusions from past research that only a weak association exists between psychiatric disorder and violent behavior, based on analyses showing

that demographic factors were far better predictors of violent behavior than psychiatric disorders, were also not supported by the results of this study. Significant associations remained between specific psychiatric disorders and violent behavior even after controlling for sociodemographic factors and comorbidity.

This study has increased our understanding of the relationship between psychiatric disorders and violent behavior by demonstrating that the burden of violent behavior in the general population is not equally shared across the spectrum of psychiatric disorders. Burden is limited to several particular disorders, most notably alcohol and drug use disorders and nicotine dependence, followed by personality disorders and mood disorders, with anxiety disorders and pathological gambling contributing little to the overall burden of violent behavior. In fact, individuals with alcohol and drug use disorders contribute more to the public health burden of violent behavior than all other psychiatric disorders combined. Reducing levels of anger leading to violent behavior is now seen as an important component in substance use treatment, and anger dyscontrol has been associated with relapse.[52] Although anger management modules and emotional regulation are often components of substance use treatment programs, there exist no large scale randomized controlled clinical trials of such programs.[53,54] Clearly, there is a great need to develop, implement, and evaluate anger management programs, and in particular optimize their ability to control the consequences of anger as both an affect and a set of behaviors in order to break the alcohol and drug use disorders/violent behavior cycle.

Individuals with alcohol and drug use disorders have also repeatedly been identified as high risk groups for intimate partner violence (IPV).[55–57] However, not much is currently known about the best treatments for IPV among individuals with alcohol and drug use disorders, and the efficacy of domestic violence intervention programs tailored to these individuals is unknown.[58] Comprehensively evaluating IPV among married or cohabiting individuals entering substance abuse treatment, strengthening referral linkages between these programs, and developing and evaluating interventions for IPV that can be integrated into substance abuse treatment programs can help substantially reduce the public health burden of violent behavior. Increasing prevention efforts aimed at excessive alcohol and/or drug use, especially among high risk subgroups of the population, will also be needed to parallel treatment interventions if the burden of violent behavior attributable to these disorders is to be reduced.

Similar to all previous epidemiologic work in this area, the present study was cross-sectional, whereas several questions regarding relationships between violent behavior and psychiatric disorders would best be examined in a longitudinal design. Although this study has advanced our understanding of the relationship between violent behavior and psychiatric disorders, prospective epidemiologic studies of general populations will be needed to determine the exact nature of that relationship. The Wave 2 NESARC, a 3-year follow-up of participants in this Wave 1 survey, was designed to address this limitation. Further, general population surveys may not capture all individuals who engage in violent behaviors, since these individuals are more likely to be incarcerated or homeless or otherwise less likely to live in households, the exclusive sampling frame of most general population surveys. However, the NESARC sampled from households and group quarters (e.g., shelters, halfway houses, group homes), one strategy designed to increase representation in the sample of individuals who engage in violent behavior. Based on these considerations of potential underrepresentation of individuals who engage in violent behaviors, NESARC estimates of prevalences and risks are likely to be conservative.

Stigma of mental disorders and substance use disorders and the public perceptions and anxieties associated with stereotypes of violence among individuals with these disorders appear to be largely unwarranted, as the majority of individuals with these disorders do not engage in violent behavior. However, the public health burden of violence in the general population appears to be most attributable to individuals with psychiatric disorders, with specific disorders disproportionately contributing to that burden. Clearly, the public health burden of violent behavior can be largely attributed to alcohol and drug use disorders. With regard to public health implications, campaigns to educate the public about the low prevalence of violent behavior among individuals with psychiatric disorders and those disorders most associated with violence appear warranted. With regard to clinical implications, there is a need to assess violent behavior particularly among comorbid individuals, especially those with specific psychiatric disorders most significantly related to violence in this study. Future research on the interplay of various factors affecting the relationships found in this study can refine the identification of subgroups of individuals with psychiatric disorders who are particularly prone to violent behavior. Increasing our knowledge of the circumstances under which violence among individuals with specific psychiatric disorders is likely to occur promises to improve the accuracy of prediction in clinical practice; this in turn will contribute to the development of more effective prevention strategies in the future.

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