ORIGINAL ARTICLE

Epidemiology of Major Depressive Disorder

Results From the National Epidemiologic Survey on Alcoholism and Related Conditions

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Objective: To present nationally representative data on 12-month and lifetime prevalence, correlates, and comorbidity of *DSM-IV* major depressive disorder (MDD) among adults in the United States.

Design/Setting/Participants: Face-to-face survey of more than 43 000 adults aged 18 years and older residing in households and group quarters in the United States.

Main Outcome Measures: Prevalence and associations of MDD with sociodemographic correlates and Axis I and II disorders.

Results: The prevalence of 12-month and lifetime *DSM-IV* MDD was 5.28% (95% confidence interval, 4.98-5.57) and 13.23% (95% confidence interval, 12.64-13.81), respectively. Being female; Native American; middle-aged; widowed, separated, or divorced; and low income increased risk, and being Asian, Hispanic, or black decreased risk ($P<.05$). Women were significantly more likely to receive treatment than men. Both current and lifetime MDD were significantly associated with other specific psychiatric disorders, notably substance dependence, panic and generalized anxiety disorder, and several personality disorders.

Conclusions: This large survey suggests a higher prevalence of MDD in the US population than large-sample estimates from the 1980s and 1990s. The shift in highest lifetime risk from young to middle-aged adults is an important transformation in the distribution of MDD in the United States and specificity in risk for an age-period cohort. Associations between MDD and Axis I and II disorders were strong and significant, with variation within broad categories by specific diagnoses signaling the need for attention to the genetic and environmental reasons for such variation, as well as the implications for treatment response.

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MAJOR DEPRESSIVE DISORDER (MDD) is one of the most pressing public health problems in the United States. Depression is associated with substantial impairment,[1-3] comorbidity,[1-3] poor health,[4] and mortality.[5] Understanding the epidemiology of MDD is important in arguing for resources and identifying shortfalls in services. Also, epidemiologic information underlies hypotheses about etiology, so such information must be accurate as investigators seek to identify biological[6,7] and environmental[8,9] factors that are unique as well as shared between MDD and other disorders.

Until recently, information on the epidemiology of adult MDD in the United States came mainly from 3 sources. In the 1980s, the Epidemiologic Catchment Area (ECA) study[1,10,11] assessed mental disorders among 18 571 household residents in 5 US communities. This groundbreaking study was the first to use lay interviewers and structured interviews for specific diagnostic criteria, in this case, those of the *DSM-III*.[12] Prevalence estimates of MDD were 3.0% for a current and 5.2% for a lifetime disorder. A striking ECA finding was high comorbidity between MDD and other mental disorders.[13] The National Comorbidity Survey (NCS), conducted in 1990 through 1992, assessed psychiatric comorbidity among 5877 household residents.[2,14,15] Using a different measure,[16] the NCS produced current and lifetime prevalence of *DSM-III-R*[17] MDD of 8.6% and 14.9%, respectively.[18] In the NCS, comorbidity between MDD and other psychiatric disorders remained common.[19] In an NCS replication (NCS-R) in 2001 through 2002, MDD and additional psychiatric disorders were assessed in 5554 US adults.[3] Last 12-month and lifetime prevalence of *DSM-IV*[20] MDD was estimated at 6.6% and 16.2%, respectively.

Thus far, NCS-R comorbidity of MDD was reported only for broad categories, not specific disorders.

Worldwide, several epidemiologic surveys of MDD (as distinct from major depressive episode) have been conducted since about 1980. For *DSM-IV*, lifetime and 12-month rates of *DSM-IV* MDD in Germany were 17.1% and 10.7%.[21] For *DSM-III-R* criteria, MDD prevalence in the Netherlands,[22] Norway,[23] Italy,[24] and Hungary[25] ranged from 15.1% to 17.8% for lifetime and 5.8% to 7.3% for the last 12 months. For *DSM-III* criteria, lifetime prevalence ranged from 1.5% to 19.0% (mean, 8.8%; median, 8.9%) while 12-month MDD prevalence ranged from 0.8% to 5.8% (mean, 3.4%; median, 3.0%) across 11 countries worldwide.[26,27] These surveys indicate that MDD prevalence was higher with *DSM-IV* and *DSM-III-R* than *DSM-III* criteria, although whether due to criteria differences or true prevalence is unknown. However, although *DSM-IV* was published 10 years ago, only 2 national studies have addressed the epidemiology of MDD according to *DSM-IV* criteria.[3,21] Although the World Health Organization World Mental Health 2000 Survey[28,29] was based on *DSM-IV* criteria, rates for MDD have not yet been reported.[30]

The earlier studies all contributed valuable information, but they leave important questions unanswered about the current US epidemiology of *DSM-IV* MDD and its comorbidity with other disorders. First, given the diversity of the US population, disparities in disadvantaged groups, and the aging of the population (particularly the "baby boom"), delineating the prevalence of MDD in specific US demographic groups (ie, age and race-ethnic groups) is necessary. This requires larger samples than most previous surveys (usually ≤5000). Second, obtaining accurate information on MDD comorbidity with other specific mental disorders is important because etiology and treatment implications of specific disorders within broader categories may differ considerably. Assessing comorbidity on a disorder-specific basis also requires larger samples than in the past. Third, only 1 large national survey (Australia) assessed personality disorders (PDs) other than antisocial personality disorder.[31] Although groundbreaking on this topic, the survey collected information on PDs from the *International Classification of Diseases, 10th Revision*, and only reported the association of PDs with the broad "any affective disorder" category.[32,33] To begin building a knowledge base on the co-occurrence and implications of MDD with *DSM-IV* PDs, large-scale survey data are critical.

The National Epidemiologic Survey of Alcoholism and Related Conditions (NESARC)[34] was conducted to address these and related questions. The NESARC was large enough (n = 43 093) to indicate the prevalence of *DSM-IV* MDD in minority groups not studied previously on a national basis, as well as the comorbidity of *DSM-IV* MDD with specific, often rare conditions, including PDs.

METHODS

SAMPLE

The 2001 through 2002 NESARC is a representative sample of the United States (including Alaska and Hawaii) conducted by the National Institute on Alcohol Abuse and Alcoholism (Bethesda, Md), as described elsewhere.[34-36] The NESARC target population was the civilian, noninstitutionalized population residing in households and group quarters, aged 18 years and older. Face-to-face interviews were conducted with 43 093 respondents. The survey response rate was 81%. Blacks, Hispanics, and young adults (ages 18-24 years) were oversampled, with data adjusted for oversampling and household- and person-level nonresponse. The weighted data were then adjusted to represent the US civilian population based on the 2000 census.

DSM-IV DIAGNOSTIC INTERVIEW

The diagnostic interview used to generate diagnoses was the Alcohol Use Disorder and Associated Disabilities Interview Schedule–*DSM-IV* Version (AUDADIS-IV) from the National Institute on Alcohol Abuse and Alcoholism.[37] This structured diagnostic interview designed for lay interviewers was developed to advance measurement of substance use and mental disorders in large-scale surveys. Earlier AUDADIS-IV results on major depression are reported elsewhere.[38-41]

MAJOR DEPRESSIVE AND ANXIETY DISORDERS

A major depressive episode was diagnosed when at least 2 weeks of persistent depressed mood or anhedonia were present, accompanied by a total of at least 5 or more of the 9 *DSM-IV* symptoms of major depression during the episode. Lifetime *DSM-IV* MDD was defined as having at least 1 major depressive episode over the life course without history of manic, mixed, or hypomanic episodes (ie, excluding bipolar 1 and bipolar 2 disorders). Among respondents with lifetime MDD thus defined, respondents with at least 1 major depressive episode in the year preceding the interview were classified with 12-month MDD. Anxiety disorders similarly followed *DSM-IV* criteria. The AUDADIS-IV MDD symptom questions are similar to those of other measures, including the Schedule for Affective Disorders and Schizophrenia[42] and the Structured Clinical Interview for *DSM-III-R*.[43]

The *DSM-IV* includes a clinical significance criterion (CSC): "symptoms cause clinically significant distress or impairment in social, occupational or other important areas of functioning."[20(p1857)] This important criterion has been assessed deficiently in previous epidemiologic studies of MDD. The Diagnostic Interview Schedule (DIS)[44] used in the ECA and University of Michigan–Composite International Diagnostic Interview (UM-CIDI)[16] used in the NCS predated *DSM-IV* and did not assess the CSC at all. Reanalysis of ECA and NCS data[45] attempted to approximate the CSC with a single-item assessment of social and occupational dysfunction and treatment as a proxy for distress. For this proxy to be valid, however, services must be universally available, broadly acceptable, and known to be efficacious,[46] conditions not met in the US population. This CSC approximation precludes separate analysis of unmet treatment need. Unlike the AUDADIS-IV, the extensively revised UM-CIDI, the World Mental Health CIDI (WMH-CIDI), used in the NCS-R and 2000 World Mental Health Surveys,[28-30] skips respondents not reporting significant distress during 2 weeks of low mood or anhedonia out of the depression section without asking about symptoms frequently responsible for distress (eg, insomnia). The AUDADIS-IV corrects these problems by carefully defining the CSC according to the *DSM-IV* definition of distress (2 questions) and/or impairment (6 questions). The AUDADIS-IV asks these with reference to full syndromes after they are established, and questions are tailored to distinctive characteristics and impairments of each disorder. Although designed as a binary CSC indicator, the 8 items have good internal consistency (Cronbach $\alpha = .71$). Among the 595 NESARC respondents whose worst epi-

sode was in last 12 months, the correlation between number of depressive symptoms and the impairment scale was 0.50 ($P<.001$), indicating a strong but not redundant relationship between symptom and impairment severity.

The MDD and anxiety diagnoses in this report are *DSM-IV* primary (or independent) diagnoses. In *DSM-IV*, "primary" excludes mental disorders that are substance-induced or due to a medical condition.[20(p192)] In differentiating primary from substance-induced disorders, the DIS, UM-CIDI, and WMH-CIDI rely on respondent opinion of the cause of individual symptoms. An important AUDADIS improvement in this differentiation is use of specific questions about the chronological relationship between intoxication or withdrawal and the full depressive syndrome.[35] Specific questions about chronology improve the reliability and validity of MDD diagnoses in substance abusers.[47-49] The DIS, UM-CIDI, and WMH-CIDI also relied on respondent opinion in differentiating primary disorders from those due to a medical condition. The AUDADIS-IV offers a similar improvement: specific questions about chronology of the mental disorder and the medical condition. Diagnoses of MDD presented in this report also ruled out bereavement.

SUBSTANCE USE DISORDERS

The questions of AUDADIS-IV operationalize *DSM-IV* criteria for alcohol and drug-specific abuse and dependence for 10 drug classes (aggregated in this report).[35] Consistent with the *DSM-IV*, lifetime AUDADIS-IV diagnoses of alcohol abuse required at least 1 of the 4 criteria for abuse either in the 12-month period preceding the interview or previously. The AUDADIS-IV alcohol dependence diagnoses required at least 3 of the 7 *DSM-IV* criteria for dependence during the past year or prior. For prior diagnoses of alcohol dependence, at least 3 criteria must have occurred within a 1-year period, following *DSM-IV*. Drug abuse and dependence and nicotine dependence[50] diagnoses used the same algorithms.

The AUDADIS-IV substance use disorder diagnoses constitute substantial improvement over the DIS, UM-CIDI, and WMH-CIDI. The AUDADIS-IV dependence diagnoses are syndromal, requiring clustering of at least 3 dependence criteria in any 1 year over the lifetime. This contrasts with the DIS and UM-CIDI, which diagnose even individuals who never experienced more than 1 symptom at a time. With the AUDADIS-IV, last 12-month and lifetime prevalences clearly indicate those meeting full criteria for the diagnosis. The UM-CIDI and WHM-CIDI also did not provide alcohol or drug-specific abuse or dependence diagnoses unless problems were reported for 1 substance only.[2,51,52] The WHM-CIDI used abuse symptoms to screen for dependence; those with no abuse symptoms were skipped past dependence questions. This procedure misses about one third of current dependence cases (mainly women and minority groups),[53] underestimating rates of alcohol and drug dependence and limiting inferences about comorbidity between substance and mood disorders, including MDD.

PERSONALITY DISORDERS

The AUDADIS-IV assessments of *DSM-IV* PDs have been presented previously.[54,55] They include avoidant, dependent, obsessive-compulsive, paranoid, schizoid, and antisocial PDs. The *DSM-IV* PD diagnoses require evaluating long-term patterns of functioning. The AUDADIS-IV PD diagnoses were made accordingly. With the exception of antisocial PD, respondents were asked a series of 64 PD symptom questions about how they felt or acted most of the time, throughout their lives, regardless of the situation or whom they were with. Respondents were instructed not to include symptoms occurring only when they were depressed, manic, anxious, drinking heavily, using medicines or drugs, experiencing withdrawal symptoms, or physically ill. For each reported symptom, respondents were asked if the symptoms caused them distress and/or social and occupational dysfunction.

To receive a *DSM-IV* PD diagnosis, respondents needed to endorse the required number of *DSM-IV* symptom items for the specific PD, with at least 1 symptom causing distress or social or occupational dysfunction. Administration time was minimized by the concise explanation (repeated throughout) of the criteria common across PDs (pervasiveness, inflexibility, stability over the lifetime) and by assessing only a subset of *DSM-IV* PDs. Borderline, schizotypal, and narcissistic PDs are included in wave 2.

An AUDADIS-IV diagnosis of antisocial PD required the specified number of *DSM-IV* symptoms for conduct disorder before age 15 years and adult antisocial PD since age 15 years. Conduct symptoms before age 15 years must have caused social, academic, or occupational dysfunction, following *DSM-IV*.

In the NESARC, the AUDADIS-IV took an average of 1 hour to administer. Similar to other interviews, the interview was shorter for respondents with no psychopathology and longer for those with complex histories. As reported in detail elsewhere, test-retest reliability was good for MDD ($\kappa=0.65$-0.73) and reliability ($\kappa>0.74$) and validity were good to excellent for substance use disorders.[35,36,40,56-67] Reliability was fair to excellent for other mood and anxiety disorders ($\kappa=0.40$-0.60) and personality disorders ($\kappa=0.40$-0.67).[36] Clinical reappraisal of major depression diagnoses showed that AUDADIS-IV measures and psychiatrists' diagnoses agreed well ($\kappa=0.64$-0.68).[56] In addition, validity of 12-month and lifetime MDD diagnoses was assessed using the Mental Component, Social Functioning, Role Emotional Functioning, and Mental Health scores of the Short Form-12v2, a reliable and valid impairment measure in population surveys.[68] Linear regression analyses of NESARC data on associations between MDD and Short Form-12v2[57] scores controlling for age and substance use, anxiety, and PDs showed highly significant relationships ($P<.001$) between each disability and mental impairment score and current or lifetime MDD. With few exceptions, analyses show similar relationships between other AUDADIS-IV mood, anxiety, and personality disorders[35,50,54,55,69] and Short Form-12v2 scales.

STATISTICAL ANALYSES

Weighted means, medians, and cross-tabulations were computed. Odds ratios (ORs) indicated bivariate associations between (1) lifetime MDD and sociodemographic correlates and (2) 12-month and lifetime MDD and other psychiatric disorders, both unadjusted and adjusted for sociodemographic factors. Hazard rates, reflecting risk of MDD onset at specific ages among the population at risk at those ages, were calculated using standard life table methods.[70,71] This included 5-year age groups, a standard grouping used because each data point must reflect risk of MDD among the population at risk (ie, those who do not have the disorder). Single-year groupings are too small, even in large samples, and 10-year groupings are not informative. Standard errors and 95% confidence intervals were estimated using SUDAAN,[72] which adjusts for characteristics of complex sample surveys like the NESARC.

RESULTS

PREVALENCE AND SOCIODEMOGRAPHIC CORRELATES

Lifetime and 12-month estimates of *DSM-IV* MDD were 13.23% (95% confidence interval, 12.64-13.81) and 5.28%

Table 1. Prevalence of 12-Month and Lifetime *DSM-IV* Major Depressive Disorder by Sociodemographic Characteristics

Sociodemographic Characteristic	12-Month MDD, % (SE)	Lifetime MDD, % (SE)
Total	5.28 (0.15)	13.23 (0.3)
Sex		
Male	3.56 (0.17)	9.01 (0.27)
Female	6.87 (0.24)	17.10 (0.44)
Race/ethnicity		
White	5.53 (0.17)	14.58 (0.29)
Black	4.52 (0.32)	8.93 (0.48)
Native American	8.89 (1.23)	19.17 (1.75)
Asian or Pacific Islander	4.12 (0.72)	8.77 (0.98)
Hispanic	4.27 (0.44)	9.64 (0.57)
Age, y		
18-29	6.39 (0.35)	12.02 (0.49)
30-44	5.52 (0.26)	14.03 (0.46)
45-64	5.62 (0.28)	15.91 (0.50)
≥65	2.69 (0.22)	8.19 (0.38)
Marital status		
Married or living with someone as if married	4.19 (0.17)	12.07 (0.35)
Widowed, separated, or divorced	7.89 (0.37)	18.80 (0.54)
Never married	6.31 (0.33)	11.99 (0.43)
Education		
Less than high school	5.66 (0.36)	11.32 (0.53)
High school	5.01 (0.24)	12.13 (0.41)
Some college or higher	5.32 (0.19)	14.35 (0.37)
Personal income, $		
0-19 999	6.46 (0.25)	14.02 (0.42)
20 000-34 999	4.78 (0.28)	13.18 (0.54)
35 000-69 999	3.94 (0.24)	12.29 (0.47)
≥70 000	3.42 (0.41)	11.26 (0.72)
Urbanicity		
Urban	5.19 (0.17)	12.99 (0.35)
Rural	5.65 (0.31)	14.19 (0.46)
Region		
Northeast	5.12 (0.29)	12.33 (0.63)
Midwest	5.48 (0.38)	14.08 (0.64)
South	5.31 (0.24)	12.51 (0.43)
West	5.17 (0.33)	14.28 (0.85)

Abbreviation: MDD, major depressive disorder.

Table 2. Odds Ratios of *DSM-IV* Lifetime Major Depressive Disorder and Sociodemographic Characteristics

Sociodemographic Characteristic	Major Depressive Disorder, Odds Ratio (Confidence Interval)
Sex	
Male	1.0
Female	2.0 (1.8-2.4)
Race/ethnicity	
White	1.0
Black	0.7 (0.6-0.8)
Native American	1.5 (1.1-2.1)
Asian or Pacific Islander	0.6 (0.4-0.9)
Hispanic	0.6 (0.5-0.8)
Age, y	
18-29	1.5 (1.3-1.8)
30-44	1.8 (1.6-2.0)
45-64	2.1 (1.9-2.4)
≥65	1.0
Marital status	
Married or living with someone as if married	1.0
Widowed, separated, or divorced	2.2 (1.9-2.6)
Never married	1.0 (0.8-1.1)
Education	
Less than high school	1.1 (0.9-1.3)
High school	1.0 (0.8-1.1)
Some college or higher	1.0
Personal income, $	
0-19 999	1.7 (1.2-2.6)
20 000-34 999	1.4 (0.9-2.1)
35 000-69 999	1.2 (0.8-1.7)
≥70 000	1.0
Urbanicity	
Urban	1.0
Rural	0.9 (0.8-1.1)
Region	
Northeast	1.0 (0.8-1.2)
Midwest	1.0 (0.8-1.3)
South	0.8 (0.6-1.0)
West	1.0

(95% confidence interval, 4.98-5.57), respectively (**Table 1**). (Bipolar disorders exclude MDD, so NESARC rates are presented as well: bipolar 1 lifetime and 12-month prevalences were 3.3% and 2.0%, and bipolar 2 lifetime and 12-month rates were 1.1% and 0.8%.) For both periods, higher rates of MDD were found among women; Native Americans; respondents who were middle-aged or widowed, separated, or divorced; and those with lower income levels.

When the lifetime risk of MDD was examined across sociodemographic population subgroups (**Table 2**), women showed a significantly higher risk (OR, 2.0). Among race-ethnic groups, the odds of MDD were significantly higher among Native Americans (OR, 1.5) and significantly lower among Asians (OR, 0.6), Hispanics (OR, 0.6), and blacks (OR, 0.7) compared with whites. Compared with the oldest age group, MDD risk was significantly greater for other groups, with strongest risk among those 45 to 64 years old. Risk of MDD was significantly greater among widowed, separated, or divorced respondents (OR, 2.2) than among those married or cohabiting. For each successively lower category of income, risk of MDD weakly increased, although only the lowest category (<$19 999/y) differed significantly from the highest category (OR, 1.7). Risk of MDD did not differ by education, region, or urbanicity.

ONSET, COURSE, AND TREATMENT

Mean age at onset of MDD was 30.4 years (**Table 3**). The hazard for onset of MDD (**Figure**) increased sharply between ages 12 and 16 years and continued to increase, albeit more gradually, up to the early 40s, when it began to decline. Among respondents with lifetime MDD, a mean of 4.7 episodes was reported, with median duration of 24.3 weeks for the longest (or only) episode. Approximately 60% of those with MDD reported treatment specifically for the disorder; women were more likely to be treated than men. Approximately 9.6% reported a hospitalization. Mean age at first treatment, 33.5 years, indicated a 3-year lag between onset and first treatment. Nearly half wanted to die, over a third thought of

Table 3. Age at Onset, Course, and Treatment for *DSM-IV* Major Depressive Disorder

Characteristic	Men (n = 832)	Women (n = 579)	Total (N = 1411)
Age at onset, mean (SE), y	30.5 (0.45)	30.4 (0.26)	30.4 (0.24)
Lifetime episodes, mean (SE), No.	4.6 (0.38)	4.8 (0.28)	4.7 (0.22)
Duration of longest or only lifetime episode, median (SE), wk	21.3 (2.85)	22.9 (0.39)	24.3 (0.24)
Treated, % (SE)*	50.5 (1.51)	65.5 (0.97)	60.6 (0.82)†
Hospitalized, % (SE)	9.3 (0.85)	9.8 (0.57)	9.6 (0.47)
Age at first treatment, mean (SE), y	33.7 (0.64)	33.5 (0.34)	33.5 (0.32)
Attempted suicide, % (SE)	7.9 (0.73)	9.3 (0.52)	8.8 (0.42)
Thought a lot about suicide, % (SE)	38.2 (1.45)	35.5 (0.94)	36.4 (0.83)
Felt that they wanted to die, % (SE)	43.3 (1.41)	46.6 (0.96)	45.5 (0.78)
Thought a lot about their own death, % (SE)	33.9 (1.29)	31.5 (0.92)	32.3 (0.77)

*Treatment included (1) visiting a counselor, therapist, doctor, psychologist, or other health professional; (2) being hospitalized for at least 1 night; (3) visiting an emergency department; or (4) being prescribed medication for an episode of major depressive disorder.
†$P<.001$.

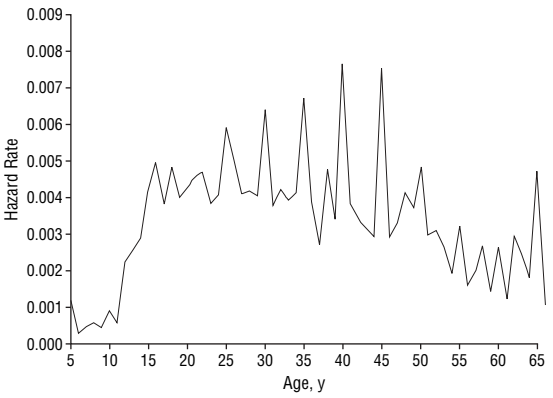

Figure. Hazard rates for age at onset of major depressive disorder.

suicide, and 8.8% reported a suicide attempt.

PREVALENCE OF *DSM-IV* AXIS I AND II DISORDERS AMONG RESPONDENTS WITH MDD

Table 4 shows the prevalence of other disorders among those with MDD by time frame. Among those with MDD in the prior 12 months, 14.1% had an alcohol use disorder, 4.6% had a drug use disorder, and 26.0% had nicotine dependence. Furthermore, 36.1% had at least 1 anxiety disorder, with specific prevalences ranging from 2.5% to 17.5%. The prevalence of any PD was also high (37.9%) and quite variable from PD to PD.

Among those with lifetime MDD, 40.3% had an alcohol use disorder, 17.2% had a drug use disorder, and 30.0% had nicotine dependence. Slightly over 40% had an anxiety disorder and slightly over 30% had a PD. Considerable variability also occurred in the lifetime prevalence of specific disorders within broad diagnostic categories (eg, anxiety, personality).

ASSOCIATION BETWEEN *DSM-IV* MDD AND OTHER PSYCHIATRIC DISORDERS

The 12-month and lifetime associations between MDD and other psychiatric disorders are shown in **Table 5**, including unadjusted ORs and ORs adjusted for sociodemographic factors. Major depressive disorder was significantly associated at varying levels with all other disorders. Odds ratios were generally greater for 12-month disorders than for lifetime disorders. Even after adjustment for important covariates, associations generally remained strong and statistically significant. We focus on adjusted results.

Major depressive disorder was more strongly related to dependence than abuse for alcohol and drug disorders, with strongest associations for drug dependence. Associations were similar for 12-month and lifetime disorders except for drug dependence, where the associa-

Table 4. Twelve-Month and Lifetime Prevalence of *DSM-IV* Psychiatric Disorders Among Respondents With 12-Month and Lifetime Major Depressive Disorder

Comorbid Disorder	Major Depressive Disorder, % (SE)	
	12-Month	Lifetime
Any alcohol use disorder	14.1 (0.86)	40.3 (0.89)
Alcohol abuse	5.9 (0.56)	19.4 (0.70)
Alcohol dependence	8.2 (0.78)	21.0 (0.78)
Any drug use disorder	4.6 (0.50)	17.2 (0.64)
Any drug abuse	2.2 (0.34)	11.8 (0.56)
Any drug dependence	2.4 (0.38)	5.5 (0.38)
Nicotine dependence	26.0 (1.11)	30.0 (0.81)
Any anxiety disorder	36.1 (1.27)	41.4 (0.92)
Panic disorder with agoraphobia	2.5 (0.41)	3.1 (0.30)
Panic disorder without agoraphobia	7.9 (0.75)	10.8 (0.55)
Social phobia	10.4 (0.84)	12.8 (0.58)
Specific phobia	17.5 (1.05)	20.4 (0.74)
Generalized anxiety	13.5 (0.87)	15.0 (0.62)
Any personality disorder	37.9 (1.30)	30.8 (0.76)
Avoidant	9.6 (0.77)	6.5 (0.39)
Dependent	2.2 (0.36)	1.2 (0.18)
Obsessive-compulsive	18.3 (1.12)	16.4 (0.69)
Paranoid	15.1 (0.95)	10.0 (0.48)
Schizoid	10.2 (0.82)	7.4 (0.46)
Histrionic	5.3 (0.65)	3.6 (0.38)
Antisocial	8.1 (0.69)	6.3 (0.40)

Table 5. Odds Ratios of 12-Month and Lifetime *DSM-IV* Major Depressive Disorder and Other Psychiatric Disorders

	12-Month		Lifetime	
Psychiatric Disorder	Unadjusted Odds Ratio (95% Confidence Interval)*	Adjusted Odds Ratio (95% Confidence Interval)†	Unadjusted Odds Ratio (95% Confidence Interval)	Adjusted Odds Ratio (95% Confidence Interval)
Any alcohol use disorder	1.8 (1.6-2.2)	1.8 (1.5-2.2)	1.7 (1.5-1.8)	1.9 (1.7-2.0)
Alcohol abuse	1.3 (1.1-1.6)	1.3 (1.1-1.7)	1.1 (1.2-1.3)	1.2 (1.1-1.3)
Alcohol dependence	2.4 (1.9-3.0)	2.1 (1.7-2.7)	2.1 (1.9-2.3)	1.9 (1.7-2.1)
Any drug use disorder	2.6 (2.0-3.2)	2.2 (1.7-2.9)	2.0 (1.9-2.2)	2.0 (1.9-2.3)
Any drug abuse	1.7 (1.2-2.4)	1.4 (0.9-2.1)	1.7 (1.6-1.9)	1.7 (1.5-1.9)
Any drug dependence	4.7 (3.2-6.8)	3.7 (2.5-5.7)	2.6 (2.2-3.1)	2.5 (2.1-3.1)
Nicotine dependence	2.6 (2.3-2.9)	2.2 (2.0-2.5)	2.3 (2.1-2.5)	2.1 (2.0-2.3)
Any anxiety disorder	5.3 (4.7-6.0)	4.4 (3.9-5.0)	4.5 (4.2-4.9)	3.9 (3.6-4.2)
Panic with agoraphobia	5.6 (3.9-8.1)	4.0 (2.7-6.0)	4.1 (3.2-5.3)	3.3 (2.5-4.2)
Panic without agoraphobia	7.1 (5.5-9.0)	5.4 (4.2-7.0)	3.9 (3.4-4.5)	3.2 (2.7-3.7)
Social phobia	4.9 (4.0-6.0)	4.1 (3.4-5.1)	3.8 (3.3-4.3)	3.4 (3.0-3.9)
Specific phobia	3.0 (2.6-3.5)	2.5 (2.1-3.0)	3.1 (2.8-3.4)	2.6 (2.4-2.9)
Generalized anxiety	10.9 (9.0-13.1)	8.6 (7.1-10.5)	6.9 (6.1-7.9)	5.7 (5.0-6.5)
Any personality disorder‡	4.0 (3.5-4.4)	3.6 (3.2-4.1)	3.1 (2.9-3.4)	3.0 (2.8-3.3)
Avoidant	5.4 (4.4-6.5)	4.2 (3.4-5.2)	4.0 (3.4-4.7)	3.5 (3.0-4.2)
Dependent	5.6 (3.8-8.3)	4.0 (2.6-6.1)	3.2 (2.2-4.5)	2.6 (1.8-3.9)
Obsessive-compulsive	2.8 (2.5-3.3)	2.7 (3.0-3.2)	2.8 (2.5-3.1)	2.7 (2.4-3.0)
Paranoid	4.5 (3.8-5.2)	3.7 (3.1-4.4)	3.0 (2.6-3.4)	2.9 (2.5-3.3)
Schizoid	4.0 (3.3-4.9)	3.7 (3.0-4.5)	3.2 (2.7-3.7)	3.2 (2.8-3.8)
Histrionic	3.4 (2.6-4.4)	2.8 (2.1-3.7)	2.3 (1.8-3.0)	2.3 (1.8-3.0)
Antisocial	2.5 (2.0-3.1)	2.5 (2.0-3.1)	2.0 (1.7-2.4)	2.3 (1.9-2.7)

*Unadjusted bivariate odds ratios.
†Odds ratios adjusted for age, sex, race/ethnicity, marital status, education, income, region, and urbanicity.
‡Personality disorders assessed only on a lifetime basis.

tion was stronger in the last 12 months (OR, 3.7) than for lifetime (OR, 2.5).

Anxiety disorders were strongly related to MDD regardless of time frame. The considerable variability in the ORs by specific anxiety disorder illustrates the importance of examining the disorders separately. In both time frames, specific phobia had the weakest association with MDD (ORs, 2.5 and 2.6); most other anxiety disorders showed ORs ranging from 4.0 to 5.4 in the last 12 months and 3.2 to 3.9 for lifetime. The exception was generalized anxiety disorder, with adjusted ORs of 8.6 and 5.7 in the last 12 months and lifetime, respectively.

With respect to any PD, the adjusted associations were large for 12-month and lifetime MDD. Avoidant (ORs, 4.2 and 3.5), dependent (ORs, 4.0 and 2.6), paranoid (ORs, 3.7 and 2.9), and schizoid (ORs, 3.7 and 3.2) PDs were more strongly related to MDD than other PDs.

COMMENT

These results indicate that in the United States in 2001 through 2002, 5.28% of adults experienced MDD in the prior 12 months and 13.23% experienced MDD during their lifetimes. The diagnosis was associated with significant impairment on a widely used functioning scale, and depression severity (number of symptoms) was highly correlated with impaired functioning. Average duration was almost 6 months longer than the previous estimate of 4 months.[3] Almost half the respondents with MDD thought about suicide or wanted to die. Thus, MDD continues to present a serious personal and public health problem.

Lifetime rates (and odds) of MDD were higher among "baby boom" than younger (18- to 29-year-old) adults, in contrast to earlier surveys showing highest rates in the youngest cohorts.[2,3,11] The findings suggest that the post–World War II increase in lifetime prevalence of major depression may be tapering off and may ultimately be a specific age-period effect rather than a permanent increase. Investigation of factors leading to this important change should clarify environmental or gene × environmental risks for MDD.

Because of its size, the NESARC provides more precise information on ethnic differences than any other source. The findings disclose higher risk for MDD among Native Americans.[73] Information on diagnosed mental disorders among Native Americans is scarce, and attention to the mental health needs of this group appears warranted. Previous studies found blacks at lower risk than whites for lifetime MDD,[3,11] but the NESARC findings of lower risk for Hispanics and Asians contributes new information. The NESARC size, oversampling for Hispanics (20% of the sample), and cultural sensitivity of the survey[69] provide highly accurate findings on Hispanics. Further analyses are needed to understand the protective factors in these groups. However, lower rates among disadvantaged minority groups do not diminish the importance of treating MDD when it occurs. Disparities in the treatment for MDD among minority groups are extensively documented,[74-76] but little is known about whether

comorbidity affects these disparities, an important topic for further investigation.

The results provide new, detailed information on the comorbidity of MDD and substance abuse and dependence, including a strong association of MDD with dependence on alcohol, drug, and nicotine, in contrast with a weak relationship of MDD with substance abuse. These results highlight the importance of not lumping abuse and dependence together when studying comorbidity and the utility of the *DSM-IV* system of diagnosing dependence, a disorder with a strong theoretical basis and abundant validity evidence.[77] Further, MDD showed a stronger relationship to drug dependence than alcohol or nicotine, a difference that remains to be explained. The NESARC findings advance knowledge over the ECA, which used the *DSM-III* to diagnose substance use disorders, and over the NCS and NCS-R, limited by small samples and errors in diagnosing dependence.[53]

Substance disorders are a large public health problem,[78,79] which is increasing in younger cohorts.[80] Clarifying the links between MDD and *DSM-IV* substance use disorders has been an important goal. The NESARC results suggest focusing on dependence when studying the relationship of MDD to substance disorders. This is supported by the earlier finding of excess rates of MDD among 6050 long-abstinent former drinkers,[41] refuting the belief that MDD among alcoholics is simply misdiagnosed withdrawal.[81] Genetic studies are identifying factors underlying the comorbidity of alcohol dependence and MDD.[6,7] Given the stronger association of MDD with drug dependence, investigation of the genetic and environmental factors for this relationship will be important.

The results on MDD and anxiety disorders showed the strongest relationships for disorders in the previous 12 months. The magnitude ranged from ORs of 2.5 for simple phobia to 8.6 for generalized anxiety disorder. Determining the reasons for this variation in magnitude is important. The information in this report can provide a starting point for such investigation.

Information on PDs among US adults was not previously available and is highly relevant to MDD, as indicated by clinical studies.[82-86] All PDs assessed had strong associations with MDD, but magnitudes varied. The cluster B PDs (histrionic, antisocial) showed the lowest association with MDD. Cluster A PDs (paranoid, schizoid) showed intermediate associations. Cluster C PDs (avoidant, dependent) showed the strongest associations with MDD, except for obsessive-compulsive PD. Future studies will address these varying associations and their impact on adult MDD, work that will be enhanced when the remaining PDs assessed in wave 2 are included.

Limitations of this study include its cross-sectional nature; several of these issues may be better addressed longitudinally. Further, the risk for chronicity in 1 condition conferred by a second condition is usually studied in a clinical context.[87] While such information is important to clinicians, it will be of considerable benefit to understand these relationships in a general population setting. Accordingly, wave 2 of the NESARC, a 3-year follow-up of the participants, is currently under way and will be followed by subsequent waves.

The NESARC bipolar rates were presented earlier in the article. Aside from the NESARC, no national survey data exist for *DSM-IV* bipolar disorders. Lifetime *DSM-III* bipolar 1 rates in 15 countries[11,26] were all clearly lower (0.1%-0.8%) than more recent rates from the 6 surveys based on *DSM-III-R* (1.3%-1.6%),[22-25,88] showing the varying prevalence of bipolar 1 disorders. Of the 4 surveys to assess lifetime *DSM-III* bipolar 2 disorder,[11,24,27,89] rates ranged from 0.5% to 3.0%, similar to the variation observed for *DSM-III-R* bipolar 2 disorder (0.2%-2.0%).[11,24,25,90] The NESARC rates for bipolar disorders are somewhat higher than those found for the *DSM-III-R*. Rates across different surveys vary, potentially explained by true differences as well as methodological factors (response rates, diagnostic criteria, instability due to very small numbers of cases in smaller surveys, measures). The NESARC rates of MDD are slightly lower than those from other *DSM-III-R* and *DSM-IV* studies, perhaps due to the assessment of the *DSM-IV* CSC criterion. It is clear, however, that rates of both MDD and bipolar disorders increased since the early 1980s.

The NESARC indicated a continued lack of treatment for many respondents with MDD. This was especially pronounced among men with the disorder, of whom 50.5% received no treatment. The suffering and social and economic burden of this disease is avoidable through highly effective pharmacological and psychological treatments. Projections suggest that by 2020, MDD will be responsible for a larger burden of disease than any other illness.[91] International analysis indicate that the burden of this disease can largely be alleviated by appropriate treatment strategies[92] and that this is cost-effective even in resource-poor regions.[93] While the proportion of treated cases was higher than in previous decades,[94] the NESARC shows that efforts remain needed to deliver effective treatments for major depression to the many who still need them.

The comorbidity of substance dependence with MDD predicts poor outcome among clinic patients,[87] especially in studies with psychometrically sound measures of MDD and response rates greater than 0.70.[95] A decade ago, treating depression among those with substance disorders was discouraged.[96] Today, that picture has changed, informed by epidemiologic surveys[35] and numerous clinical trials of patients with comorbidities. Treating MDD that is comorbid with alcohol or drug dependence is now recommended as long as care is taken in diagnosing depression.[96] As shown, MDD is prevalent and commonly comorbid with substance dependence. Because MDD is treated increasingly in the primary care sector,[97] disseminating information on the treatment of MDD that is comorbid with substance dependence may be helpful for physicians and patients.

The NESARC also showed high comorbidity of MDD with anxiety disorders. While reviews suggest that pharmacotherapy and psychosocial therapy are both viable treatment alternatives,[97-99] far fewer randomized trials have focused specifically on this type of comorbidity[97] compared with comorbid MDD and substance dependence, leaving the treatment response of MDD that is comorbid with anxiety disorders less clear. Similar comments

apply to the need for more information on treating comorbid MDD and PDs.

This study provides the most comprehensive information on the epidemiology of MDD among US adults to date. The study has considerable advantages over other surveys. These include the unprecedented sample size (43 093), providing small, stable estimates of even rare conditions. Other advantages include the high response rate (81%), oversampling of disadvantaged minority groups, inclusion of Axis II disorders, and inclusion of Alaska and Hawaii in the sampling frame. Further, painstaking supervision included reconfirmation of whole sections of the interview with a random 10% of the sample. The 3-year wave 2 now in the field will allow use of wave 1 results as a platform for investigation of prospective questions. Finally, the data set, the interview, descriptive materials, and citations are already on a Web site (http://niaaa.census.gov/), providing rapid transparency and openness about the NESARC and its methods.

Our findings provide new insights into the prevalence of MDD, how this compares with earlier surveys, and its current demographic and psychiatric correlates. The US rates of MDD are clearly higher than they were in the 1980s. With the aging of the "baby boom" cohort, the age distribution of lifetime MDD has changed. The average episode now lasts nearly 6 months. High rates are found in Native Americans. The lower rates found for Hispanics and Asians warrant explanation but do not diminish the need to reduce treatment disparities among minority groups. The variation in comorbidity by specific disorder highlights the importance of not collapsing disorders into broad categories and the need to better understand the variation. Given the seriousness of MDD, the importance of information on its prevalence, demographic correlates, and psychiatric comorbidity cannot be underestimated. This study provides such information and the grounds for further investigation in a number of areas.

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