

ORIGINAL PAPER

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Prevalence of mood disorders in a national sample of young American adults

Accepted: 1 May 2003

Abstract *Background* Availability of nationally representative mood disorder prevalence estimates in the United States, based on structured psychiatric interviews is limited. This report estimates overall lifetime prevalence of major depressive episode, dysthymia, and bipolar disorder using the Third National Health and Nutrition Examination Survey (NHANES III) and compares these estimates to the Epidemiologic Catchment Area Study (ECA) conducted 10 years earlier. Additionally, prevalence estimate breakdowns by selected socio-demographic and health characteristics are investigated. *Methods* NHANES III, conducted from 1988 to 1994, is a large nationally representative cross-sectional sample of the United States. A population-based sample of 8,602 men and women 17–39 years of age were eligible to participate, of whom 7,667 (89.1%) completed interviews. Mood disorder assessments came from the Diagnostic Interview Schedule (DIS) administered as one component of the NHANES III. *Results* Lifetime prevalence estimates were assessed for six mood measures: 1) major depressive episode (MDE) 8.6%, 2) major depressive episode with severity (MDE-s) 7.7%, 3) dysthymia 6.2%, 4) MDE-s with dysthymia 3.4%, 5) any bipolar disorder 1.6%, and 6) any mood disorder 11.5%. All estimates except for MDE and MDE-s were significantly higher than comparable ECA estimates. *Conclusions* These data provide recent national prevalence estimates. Based on their overall magnitudes, subgroup ex-

cesses, and observed increases compared to the ECA, continued monitoring of these estimates is warranted.

Keywords mood disorders – prevalence – depression – dysthymia – bipolar disorder – Diagnostic Interview Schedule – NHANES III

Introduction

In a recent report on mental health by the Surgeon General [1], the following points were raised: 1) unipolar major depression ranked first among the top ten causes of worldwide disability; 2) depression is a leading cause of absenteeism and diminished productivity in the workplace; 3) only a minority of those afflicted seek help for depression; and 4) some persons with undiagnosed depression visit physicians seeking other explanations for their difficulties. The World Health Organization [2] projected that, in 2020, unipolar major depressive disorder (MDD) would account for approximately 11% of the world's total disease burden. It has been established that unipolar MDD is primarily a chronic and often life-long illness [3–6] that is among the most prevalent illnesses in the health care spectrum [7].

There are few population-based surveys in the United States that use structured psychiatric interviews to identify mood disorders. The Epidemiologic Catchment Area Study (ECA) [8], conducted from 1980 to 1985, was the first community-based epidemiologic study of mental disorder prevalence rates based on operationalized Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria in the United States. The National Comorbidity Survey (NCS), conducted from 1990 to 1992, was the first survey of mental disorders administered to a national probability sample of the non-institutionalized population of the United States [7]. Prior to the ECA and NCS, prevalence data on mood disorders were primarily based on patient samples [9] or small select community samples [10–12]. These prior studies generally reported only on major depression rather than the fuller

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range of mood disorders. Moreover, reviews of these studies showed that most of the variation in prevalence findings could be attributed to differences between diagnostic procedures rather than differences associated with time and/or location of the study [9]. Since the majority of persons with mood disorders do not seek treatment, clinical studies may also distort estimates of prevalence in the population at large. Since their completion, the ECA and NCS studies have been the main sources of data in the United States on the prevalence of mood disorders and associated socio-demographic data [13–15].

This report presents data on the lifetime prevalence of selected mood disorders including major depressive episode, dysthymia, and bipolar disorder in young adults 17–39 years of age using the Third National Health and Nutrition Examination Survey (NHANES III) and compares these estimates to the ECA conducted 10 years earlier. Persons with mood disorders are further described in terms of selected socio-demographic and health characteristics.

Subjects and methods

■ Survey Sample

The NHANES III was conducted by the National Center for Health Statistics, Centers for Disease Control and Prevention, from 1988 to 1994. NHANES III used a complex, multistage sampling design of the civilian, noninstitutionalized United States population. Survey sample weights were used that accounted for the complex survey design by adjusting for differential selection, non-response, and non-coverage probabilities for each respondent. These weights were used to produce estimates representative of the noninstitutionalized civilian U. S. population. Non-Hispanic Blacks and Mexican Americans were oversampled. Further details about the survey and its methods have been published elsewhere [16]. During a household interview, 8,602 persons who were 17–39 years of age were eligible to complete a series of questionnaires administered by trained interviewers. Respondents were then invited to undergo extensive physical examinations and further health assessments in special mobile examination trailers. Of these 8,602 persons, 7,968 participated in the examination. During this examination, the Diagnostic Interview Schedule (DIS) was administered in a private room. Valid assessments for major depressive episode were obtained for 7,667 subjects. Thus, the overall response rate, with respect to those eligible to participate, was 89.1%. Comparisons of the distributions of age, sex and race-ethnicity were virtually identical between the 8,602 persons eligible to participate and the 7,667 persons who completed interviews with valid assessments for major depressive episode. These 7,667 persons were used as the study sample for this report.

■ Mood disorders

The Diagnostic Interview Schedule (DIS) [17], administered as one component of the NHANES III [16], is a structured psychiatric interview schedule. It was developed for use by trained lay interviewers in two versions: one that employs the same criteria used by clinicians as found in the *Diagnostic and Statistical Manual of Mental Disorders Third Edition (DSM-III)*, and another that employs the same criteria used by clinicians as found in the *DSM Revised Edition (DSM-III-R)* [18–19]. The *DSM-III* version of the DIS was used in the NHANES III.

Lifetime prevalence estimates were assessed for six mood measures: 1) major depressive episode (MDE), 2) major depressive episode with severity (MDE-s), 3) dysthymia, 4) MDE-s with dys-

thymia, 5) any bipolar disorder, and 6) any mood disorder. Lifetime prevalence was defined as the proportion of the sample who ever experienced a given disorder.

If MDE criteria were met, but solely due to bereavement, then the respondent was not classified as having MDE. Any bipolar disorder was jointly defined as having either Bipolar Disorder, Type I or Bipolar Disorder, Type II (Atypical Bipolar Disorder). In the NHANES III data, the majority of cases of any bipolar disorder (86.3%) met the criteria for Bipolar Disorder, Type I. Any mood disorder was defined as the diagnosis of one or more of MDE, dysthymia, or any bipolar disorder. Further details regarding the diagnosis of these mood disorders have been published elsewhere [17].

■ Socio-demographic and health characteristics

Selected socio-demographic and health characteristics were assessed including: age (17–19 years, 20–29 years, 30–39 years), gender, race-ethnicity (non-Hispanic White, non-Hispanic Black, Mexican American), education (11 years or less, 12 years, 13 or more years), marital status (married, widowed/separated/divorced, never married), current smoking status (smoker, non-smoker), and self-reported health status (excellent/very good, good, fair/poor). Income categories were defined using the poverty income ratio (PIR) which was the ratio of the total family income to the poverty threshold for the year of the interview (low: PIR < 1.3, middle: PIR ≥ 1.3 and < 3.5, high: PIR ≥ 3.5). A history of asthma and hypertension was based on self-reported doctor's diagnoses.

Race/ethnicity was categorized according to the NHANES III analytic guidelines [16] as non-Hispanic White, non-Hispanic Black, Mexican American, and Other. This latter group ("Other") includes all other race/ethnic groups not captured in the first three categories e. g., Asian, non-Mexican American Hispanics, etc. In this report, only the first three categories were included. Nine health conditions: 1) arthritis, 2) heart failure, 3) stroke, 4) asthma, 5) bronchitis, 6) emphysema, 7) cancer, 8) diabetes, and 9) hypertension were originally examined, but all conditions except for hypertension and asthma were too rare in this sample of 17 to 39-year-old adults to enable stable estimation of mood disorder lifetime prevalence. Details on the other socio-demographic and health characteristics have been published elsewhere [16].

■ Statistical analysis

SAS [20] and SUDAAN [21] were used to perform statistical analysis. Survey sampling weights were used in all the analyses reported to produce estimates that were representative of the civilian, noninstitutionalized U. S. population. The SUDAAN program incorporates the sample weights and adjusts for the survey's stratified multistage sample design in calculating the appropriate standard errors (SE's). Lifetime prevalence estimates and standard errors are reported for all respondents for the six mood measures described above and their associations with selected socio-demographic and health characteristics. Significance testing was conducted employing t-tests (paired contrasts) and used SUDAAN which takes into account design effects. All contrasts were identified a priori based on past research findings [7, 8].

Results

■ Lifetime prevalence of mood disorders

The overall lifetime prevalence estimates and standard errors for each mood disorder are shown in Table 1 for both the NHANES III and the ECA conducted 10 years earlier. The most common diagnoses in the NHANES III were MDE (8.6%), MDE-s (7.7%), and dysthymia (6.2%). Compared to these conditions, bipolar disorder was less common (1.6%). The proportion with a history

Table 1 Lifetime prevalence of mood disorders among 17- to 39-year-old respondents from the Third National Health and Nutrition Examination Survey (NHANES III) and 18- to 39-year-old respondents from the Epidemiologic Catchment Area Study (ECA)

	NHANES III	ECA
Major depressive episode (MDE)	8.6 (0.6)	7.6 (0.4)
Major depressive episode with severity (MDE-s)	7.7 (0.5)	6.7 (0.4)
Dysthymia	6.2 (0.5)	3.3 (0.3)*
Dysthymia with MDE-s	3.4 (0.4)	1.7 (0.2)*
Any bipolar disorder	1.6 (0.3)	0.9 (0.2)*
Any mood disorder	11.5 (0.6)	9.4 (0.4)*

Notes: Prevalence estimates are per 100 persons

Standard errors of the prevalence estimates are in parentheses

* $p < 0.05$

of both dysthymia and MDE-s (3.4%) was roughly half of either disorder individually. More than one in nine persons had a history of any mood disorder. The ECA had a similar pattern of most to least common diagnoses.

As regards comparing the NHANES III to the ECA, the prevalence estimates for dysthymia, dysthymia with MDE-s, any bipolar disorder, and any mood disorder were significantly higher in the NHANES III. In particular, estimates for dysthymia and dysthymia with MDE-s were approximately twice as high as in the ECA. Estimates for any bipolar disorder were nearly 80% higher than in the ECA. The prevalence estimates for MDE and MDE-s in NHANES III were one percentage point higher than in the ECA study which did not reach statistical significance.

Lifetime prevalence estimates and standard errors by socio-demographic and health characteristics are presented in Table 2. Estimates were significantly higher for women compared to men for all disorders except bipolar disorder. This higher proportion of women affected by different disorders compared to men varied somewhat, but generally approached prevalence estimates that were 75% higher for women.

Non-Hispanic Blacks and Mexican Americans had significantly lower estimates of MDE and MDE-s in comparison to non-Hispanic Whites while non-Hispanic Blacks had significantly higher estimates of dysthymia when compared to non-Hispanic Whites. Mexican Americans had a lifetime prevalence estimate of dysthymia similar to that of non-Hispanic Blacks. Although not shown in the table, the estimate of MDE was highest for non-Hispanic white women (12.7%) and lowest for non-Hispanic black men (4.6%).

Higher lifetime prevalence estimates were observed across all of the mood disorders, except MDE, for persons from low income families as compared to those persons from high income families. In comparison to married persons, the estimates for all mood disorders, with the exception of bipolar disorder, were significantly higher for widowed, separated, and divorced persons with 22.7% of this group diagnosed with any mood dis-

order. The prevalence estimates for all mood disorders were significantly higher for persons in the category of fair or poor health, as compared to those reporting excellent or very good health, with 26.7% of those in the fair or poor health category diagnosed with any mood disorder. Prevalence estimates for all mood disorders were also significantly higher for smokers compared to non-smokers and for persons with a history of hypertension compared to those without hypertension. Prevalence estimates for major depressive episode and any mood disorder were also significantly higher for persons with a history of asthma compared to those without asthma.

Discussion

The pattern of lifetime prevalence estimates found in this report confirms findings from earlier studies using structured psychiatric interviews [7, 8], namely that major depression is the most common mood disorder, followed by dysthymia, with bipolar disorder occurring less frequently. However, further comparisons between the NHANES III and these earlier studies are made difficult by the presence of substantial methodological differences. The differences between the ECA and the NCS have been extensively examined in recent publications [22, 23] and are informative for comparisons with NHANES III. First, there were differences in diagnostic instruments, with the NHANES III and the ECA [8] employing the DIS based on DSM-III criteria, and the NCS [7] using a modified version of the Composite International Diagnostic Interview (the "UM-CIDI"), which was based on DSM-III-R. The NCS interview also included a "commitment question" and placed all of the CIDI stem questions at the beginning of the CIDI interview, neither of which was the case for the NHANES III and the ECA. The NHANES III and the NCS were based on national samples, while the ECA was a multi-site study with representative samples from five communities. Finally, the context of the surveys differed in that in NHANES III the DIS was conducted in a private setting as part of a clinical exam, while the ECA and NCS conducted in-home interviews focusing mainly on mental health conditions.

In the NHANES III data, the majority of persons with major depressive episode (89.5%) also met the criteria for severity. Overall, nearly 8% of persons suffered from severe major depressive episode and over 6% from dysthymia. Approximately 3.5% of persons had both conditions. Prevalence estimates, for any mood disorder, of 22.7% for widowed, separated, or divorced persons and 26.7% for persons in fair or poor self-reported health status were among the highest observed. There was broad consistency in the patterns of associations observed between each of these mood disorders and the selected socio-demographic and health characteristics. Persons reporting fair or poor health, persons reporting a history of hypertension and smokers had significantly

Table 2 Lifetime prevalence of mood disorders among 17- to 39-year-old respondents from the Third National Health and Nutrition Examination Survey (NHANES III), by selected characteristics

	Major depressive episode (MDE)	Major depressive episode with severity (MDE-s)	Dysthymia	Dysthymia with MDE-s	Any bipolar disorder	Any mood disorder
Age						
17–19	7.2 (1.5)	6.4 (1.5)	4.7 (0.9)	2.6 (0.8)	1.6 (0.8)	9.4 (1.6)
20–29 (ref)	8.0 (0.7)	7.0 (0.7)	5.1 (0.6)	2.5 (0.4)	1.3 (0.3)	10.6 (0.9)
30–39	9.7 (0.8)	8.8 (0.7)	7.7 (1.0) *	4.5 (0.8)*	1.9 (0.4)	12.9 (1.0)
Sex						
Men (ref)	6.0 (0.7)	5.2 (0.6)	4.7 (0.6)	2.5 (0.5)	1.5 (0.4)	8.4 (0.7)
Women	11.2 (0.8)*	10.2 (0.7)*	7.7 (0.8)*	4.3 (0.5)*	1.7 (0.4)	14.5 (1.0)*
Race-Ethnicity						
White non-Hispanic (ref)	9.6 (0.8)	8.5 (0.7)	5.7 (0.6)	3.4 (0.5)	1.8 (0.4)	11.9 (0.8)
Black non-Hispanic	6.8 (0.7) *	6.3 (0.6)*	7.8 (0.7)*	3.6 (0.5)	1.5 (0.3)	11.0 (0.8)
Mexican American	6.7 (0.9) *	6.0 (0.8)*	7.5 (1.0)	3.3 (0.5)	1.0 (0.3)	10.8 (1.3)
Education						
0–11 years	8.9 (0.9)	8.3 (0.8)	10.6 (1.2)*	5.0 (0.8)*	2.0 (0.6)	14.7 (1.2)*
12 years	8.8 (1.0)	7.7 (0.9)	6.3 (1.1)*	3.9 (0.8)*	1.8 (0.5)	11.1 (1.3)
13 or more years (ref)	8.4 (0.8)	7.5 (0.7)	3.9 (0.5)	2.2 (0.3)	1.2 (0.3)	10.1 (0.8)
Income¹						
Low	11.2 (1.4)	10.4 (1.4)*	11.3 (1.3)*	6.4 (1.3)*	3.6 (0.9)*	16.2 (1.4)*
Middle	8.5 (0.9)	7.4 (0.8)	5.8 (0.7)*	2.9 (0.6)	1.0 (0.3)	11.4 (1.0)
High (ref)	7.5 (1.0)	6.7 (0.9)	3.2 (0.7)	2.0 (0.4)	1.1 (0.4)	8.7 (1.2)
Marital Status						
Married (ref)	7.6 (0.7)	7.0 (0.7)	5.1 (0.6)	3.1 (0.5)	1.8 (0.4)	9.8 (0.8)
Widowed, Separated, Divorced	16.6 (2.5)*	15.7 (2.4)*	15.5 (2.4)*	8.8 (1.8)*	2.6 (0.8)	22.7 (2.9)*
Never Married	8.3 (0.9)	7.0 (0.8)	5.8 (0.6)	2.5 (0.5)	1.1 (0.3)	11.5 (0.9)
Self-reported Health Status						
Excellent, Very Good (ref)	6.9 (0.7)	6.0 (0.6)	3.4 (0.4)	1.8 (0.3)	1.0 (0.3)	8.4 (0.7)
Good	9.2 (0.9)*	8.6 (0.9)*	7.8 (1.0)*	4.6 (0.8)*	2.0 (0.6)	12.8 (1.0)*
Fair, Poor	17.6 (2.6)*	15.8 (2.5)*	19.0 (2.7)*	9.7 (2.3)*	4.3 (1.3)*	26.7 (2.9)*
Current Smoking Status						
Smoker	11.6 (1.2)*	11.0 (1.2)*	8.9 (1.0)*	5.5 (0.9)*	2.7 (0.6)*	15.3 (1.3)*
Non-Smoker (ref)	7.2 (0.6)	6.1 (0.5)	4.9 (0.5)	2.3 (0.4)	1.1 (0.2)	9.6 (0.6)
Asthma – Yes	13.6 (2.0)*	13.2 (2.1)*	8.0 (1.9)	5.0 (1.6)	3.9 (1.3)	17.2 (2.6)*
Asthma – No (ref)	8.2 (0.5)	7.3 (0.5)	6.1 (0.5)	3.3 (0.4)	1.4 (0.3)	10.2 (0.5)
Hypertension/HBP – Yes	14.2 (1.9)*	13.7 (1.9)*	10.9 (1.8)*	7.5 (1.6)*	4.3 (1.2)*	17.3 (2.1)*
Hypertension/HBP – No (ref)	8.0 (0.6)	7.0 (0.6)	5.7 (0.5)	2.9 (0.4)	1.3 (0.3)	9.9 (0.7)

Notes: Prevalence estimates are per 100 persons. Standard errors of the prevalence estimates are in parentheses

* $p < 0.05$; (ref) – reference group

¹ Income categories were defined using the poverty income ratio (PIR), the ratio of the total family income to the poverty threshold for the year of interview. Low income: PIR < 1.3, Middle: PIR \geq 1.3 and < 3.5, High: PIR \geq 3.5

higher prevalence estimates for all mood disorders. Persons from families with low income had significantly higher prevalence estimates for all mood disorders with the exception of MDE. Women and widowed, separated, or divorced persons had significantly higher prevalence estimates for all mood disorders except for any bipolar disorder.

The NHANES III results show that some of the selected prevalence estimates may be higher than among young adults of a similar age group (18–39 years) in the ECA study [8] conducted 10 years earlier. As regards monitoring trends in prevalence between surveys, several authors [7] have pointed out that methodological factors, including differences in structured research diagnostic interviews capable of generating psychiatric diagnoses, differences in survey sample age ranges,

among other arguments, are issues that need to be assessed when attempting to make such comparisons. The strengths of this comparison include that the NHANES III and ECA both used the DIS based on DSM-III criteria and comparisons were based on comparable age groups. On the other hand, the higher NHANES III lifetime prevalence estimates could be due, at least in part, to the methodological factors mentioned above. Furthermore, lifetime prevalence estimate comparisons are likely to be relatively insensitive to period changes in prevalence. Nevertheless, a number of these mood disorders are substantially higher than previous estimates. In particular, since lifetime prevalence estimates for dysthymia and dysthymia with MDE-s were approximately twice as high as the ECA cohort conducted 10 years earlier, further exploration of these trends is warranted.

For the most part, the associations for each of the mood disorders with the socio-demographic characteristics reported above were consistent with previous research. In the present study, the lifetime prevalence estimates for any bipolar disorder were comparable for men and women, while women's estimates for MDE, MDE-s and dysthymia were 87%, 96%, and 64% higher than men's estimates, respectively. Thus, the sex difference in estimates of mood disorders was accounted for primarily by major depression and dysthymia in the NHANES III study. These findings on sex differences were corroborated by the ECA study [8], which also found comparable gender estimates for bipolar disorder in contrast to higher estimates for MDE and dysthymia among women compared to men. Similar findings were found in other clinical, epidemiologic and family studies [24, 25]. The disproportionately higher estimates of mood disorders among persons from lower income families and those with less education are well documented in prior epidemiologic research [26, 27], although they stand in contrast to the ECA study [8] which did not find significant differences among income or education groups in the prevalence of major depressive episode. The association of marital problems and mood disorders was consistent with much of the epidemiologic literature on subclinical depression as well as clinical research [28–30]. The findings concerning the health characteristics were also broadly consistent with previous research [31–33] in showing a positive association between the presence of mood disorders and increased rates of smoking, fair or poor self-reported health status, hypertension, and asthma. Using data from the First National Health and Nutrition Examination Epidemiologic Follow-up Survey, Jonas et al. [32] and Jonas et al. [33] found differences in estimates of depression for persons with a history of hypertension or asthma, respectively, compared to those without such history, that were similar to those found in the present investigation.

In contrast to this generally consistent pattern, results concerning race-ethnicity found in the present investigation were different from race-ethnicity results available in the ECA [8]. While the ECA did confirm significantly higher prevalence estimates for MDE among Whites compared to Blacks and Hispanics, race-ethnicity differences in prevalence were not evident for dysthymia. The NHANES III study found non-Hispanic Blacks and Mexican Americans had significantly lower estimates of major depressive episode than non-Hispanic Whites. In contrast, non-Hispanic Blacks had significantly higher estimates of dysthymia than non-Hispanic Whites, and estimates for Mexican Americans were similar to those for non-Hispanic Blacks. We further found that this pattern of race-ethnicity results was consistent for men and women when analyzed separately. NHANES III over-sampled non-Hispanic Blacks and Mexican Americans, which should lead to more stable estimation of prevalence for these race-ethnicity groups. This could perhaps explain, in part, differences in the results observed. Other explanations for the race-

ethnicity differences in dysthymia observed in the present study should be the focus of further research.

Major depressive episode (MDE) and dysthymia are not synonymous. While MDE has a more lenient requirement for lowered mood (2-week period) compared to dysthymia's 2-year period, MDE's requirement for the presence of four or more symptom groups out of eight is stricter than dysthymia's three or more out of seven. We found that among those persons with severe major depression, 44.2% were also diagnosed with dysthymia. Among those persons with dysthymia, 54.8% were also diagnosed with severe major depression. The ECA [8] also reported similar findings. The pattern of associations across the socio-demographic and health characteristics presented here was generally similar for both conditions. Since the prevalence estimate for dysthymia is nearly as high as for MDE, it is important that this condition also continues to be closely monitored.

Bipolar disorder had fewer significant associations with the socio-demographic and health characteristics in comparison to MDE or dysthymia. There were no significant associations between bipolar disorder with sex in the NHANES III study, a finding which is also corroborated by earlier investigations [7, 8]. There were also no significant associations between bipolar disorder with race-ethnicity groups in the NHANES III study, a finding which is also corroborated by the ECA [8]. However, the lifetime prevalence of bipolar disorder is rare in comparison to MDE or dysthymia in the NHANES III as well as other surveys [7, 8] and, therefore, the relative lack of significant associations could easily be attributable to reduced statistical power of detection of differences between proportions. For example, the prevalence rates for any bipolar disorder range from 1.8% in non-Hispanic Whites to 1% in Mexican Americans, representing an 80% relative difference that is certainly of interest. However, this relative difference is overshadowed by the standard errors of these prevalence estimates. Thus, even though the NHANES III is a large dataset, re-examining relative differences in bipolar disorder in a larger dataset and/or using meta-analytic techniques would be warranted.

Although MDE is not required for a diagnosis of bipolar disorder, in NHANES III, the majority of cases of any bipolar disorder also met the criteria for a major depressive episode. Thus, the manic component, which is characteristic of bipolar disorder, may occur more uniformly across sex and race-ethnicity groups in comparison to an MDE. This finding may support a different etiology for bipolar disorder compared to a major depressive episode.

Mood disorders in the DSM-III are, by definition, dichotomous measures. However, several authors [32, 34–36] have noted that subsyndromal levels of depression, while not analyzed in this report, have high morbidity, comorbidity and also have similar associations with the socio-demographic factors as observed here. Other authors [37] have explored the associations between subsyndromal levels of depression and low socio-

economic conditions. Given the increased burden subsyndromal levels of depression have on comorbidity, in addition to the mood disorders analyzed here, the relationship between subsyndromal levels of depression and disorders meeting full criteria needs further study.

There were several strengths to the present investigation. The NHANES III data were taken from a large and carefully constructed nationally representative survey. The over-sampling of non-Hispanic Blacks and Mexican Americans provided more stable estimates for these race-ethnicity groups. The selected socio-demographic and health characteristics available for these analyses were chosen to give stable estimation of the descriptive prevalence estimate breakdowns for the six mood disorders analyzed. This estimation stability is evidenced by the standard errors of the prevalence estimates provided. The DIS, as a diagnostic assessment instrument, has been shown to be reliable and has evidence of concurrent validity [38]. The structured psychiatric interview format of the DIS enabled the diagnosis of these mood disorders based on criteria specified in the Diagnostic and Statistical Manual of Mental Disorder, Third Edition (DSM-III) [17]. Among the important attributes in its development were ease of administration for both nonclinical interviewers and subjects, and diagnostic wording and criteria that closely parallel the DSM-III. For example, since DIS diagnosis of MDE conforms to DSM criteria, it is close to what a clinician would diagnose as depression.

Several methodological limitations must be noted in the estimation of prevalence. NHANES III is a cross-sectional survey that relies solely on retrospective reports to assess the lifetime prevalence of mood disorders. These reports were subject to recall bias that could have been magnified due to retrospective time frames that included ever experiencing a given symptom. Diagnostic assessment was based on a single structured interview administered by non-clinicians. On the other hand, even clinical diagnoses are made by assessment of symptoms in an interview and there is some evidence that clinical diagnoses in community settings are overly inclusive [38]. Improved precision in prevalence estimation would also have been possible if ancillary information from significant family and friends in addition to institutional records could have been obtained. In addition, lack of specific markers among the socio-demographic and health characteristics, e. g., single parenthood, limits the ability of these analyses to pinpoint clusters of high prevalence mood disorders.

Despite these limitations, the NHANES III provides a comprehensive picture of the prevalence of mood disorders in a large nationally representative sample of young adults. The large number of socio-demographic and health characteristics with significantly higher lifetime prevalence estimates show that certain population subgroups disproportionately share the burden of these mood disorders. Recent research has shown that these mood disorders may be predictive of subsequent onset of certain chronic diseases such as hypertension, heart

disease, and stroke [32, 36, 39–42]. Given that these mood disorders have detrimental emotional, social, and cognitive sequelae, as well as a potential for increased onset of physical disease and disability, and diminished productivity, continued monitoring of their prevalence and related socio-demographic and health characteristics is warranted.

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