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The Epidemiology of Chronic Major Depressive Disorder and Dysthymic Disorder: Results from the National Epidemiologic Survey on Alcohol and Related Conditions

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Abstract

Objective—To examine the prevalence of chronic major depressive disorder (CMDD) and dysthymic disorder (DD), their sociodemographic correlates, patterns of 12-month and lifetime psychiatric comorbidity, lifetime risk factors, psychosocial functioning, and mental health service utilization.

Method—Face-to-face interviews were conducted in the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (n = 43,093).

Results—The 12-month and lifetime prevalence were greater for CMDD (1.5% and 3.1%) than for DD (0.5% and 0.9%). Individuals with CMDD and DD shared most sociodemographic correlates and lifetime risk factors for MDD. Individuals with CMDD and DD had almost identically high rates of Axis I and Axis II comorbid disorders. However, individuals with CMDD received higher rates of all treatment modalities than individuals with DD.

Conclusion—Individuals with CMDD and DD share many sociodemographic correlates, comorbidity patterns, risk factors, and course. Individuals with chronic depressive disorders, especially those with DD, continue to face substantial unmet treatment needs.

Keywords

dysthymic disorder; chronicity; major depressive disorder; epidemiology

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INTRODUCTION

Epidemiological studies estimate 12-month and lifetime prevalence for Major Depressive Disorder (MDD) in the United States to be 5.3% and 13.2%, respectively.¹ Depression is expected to be the second greatest cause of disability by 2020.^{2, 3} Studies of clinical samples suggest that 10–30% of individuals with MDD develop a chronic course despite adequate treatment,^{4–9} indicating that chronic major depression is a major public health problem.

There are two major categories of chronic unipolar depression: chronic major depressive disorder and dysthymic disorder. Chronic major depressive disorder (CMDD) is defined as MDD in which criteria for major depressive episode (MDE) are continually met for at least 2 years.¹⁰ Studies in clinical samples indicate that individuals with CMDD have high rates of comorbid personality disorders, lifetime history of substance use disorders, family history of mood disorders, and history of psychiatric hospitalization.^{7, 11}

Dysthymic disorder (DD), a closely related construct, is characterized by a chronic depressed mood that persists most of the day, for more days than not, for at least 2 years, associated with symptoms below the severity threshold for MDD.^{10, 12, 13} Most knowledge about DD derives from clinical studies. In clinical samples, individuals with DD commonly experience superimposed MDEs^{13–16} and protracted clinical courses.^{15, 17–19} Older age, lower levels of education, comorbid anxiety disorder, greater familial loading for chronic depression, and history of childhood sexual abuse predict greater depressive symptom severity and worse psychosocial functioning.²⁰

Three studies have reported the prevalence of DD in the United States.^{21–23} The Epidemiological Catchment Area survey (n=18,572) found a 3.1% lifetime prevalence of DSM-III DD, with greater risk among females under the age of 65, unmarried individuals, and young persons of low income.²³ DD was associated with MDD, panic disorder, and substance abuse. Because this study used the DSM-III definition of DD, it also found bipolar disorder to be associated with DD. Individuals with DD used general health and psychiatric services at higher rates than the general population.²³ The National Comorbidity Survey (NCS, n=8,098) found a 2.5% 12-month and 6.4% lifetime prevalence of DD,²² whereas the National Comorbidity Survey-Replication (NCS-R, n=9,282)²¹ reported a 12-month prevalence of 1.5%. Outside the US, using DSM-III R criteria, the Netherlands Mental Health Survey and Incidence Study (NEMESIS, n=7,076) reported a 2.3% 12-month and 6.3% lifetime prevalence of DD.²⁴ Neither the NCS, NCS-R, nor NEMESIS examined the correlates or treatment patterns of dysthymic individuals.

Important questions remain regarding the epidemiology of chronic depression. Despite the recognized burden of MDD for the individual and for society, and the greater difficulties associated with treatment of chronic cases,^{25–28} no epidemiological study to date has investigated the prevalence, sociodemographic and clinical characteristics, and course of CMDD in a nationally representative sample. Only one study,²³ conducted over two decades ago, examined correlates of DD, and no study has investigated the patterns of mental health service use by adults with CMDD or DD in the community. Furthermore, studies of clinical samples have found little difference between different types of chronic depressive disorders on measures of symptomatology, comorbidity, functional impairment, family history, and treatment response.^{29, 30} No epidemiological study, however, has yet compared the sociodemographic and clinical characteristics, comorbidity, risk factors, psychosocial functioning, and treatment-seeking patterns of these two groups.

The present study was designed to fill these gaps in knowledge by drawing on a large, nationally representative epidemiological study, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), which included assessments of a broad range

of Axis I and II DSM-IV psychiatric disorders with good to excellent psychometric properties. Specifically, we sought to: 1) examine the prevalence and sociodemographic correlates of CMDD and DD; 2) compare patterns of psychiatric comorbidity for 12-month and lifetime CMDD and DD; 3) compare psychosocial functioning, family history of various psychiatric disorders, and risk factors for lifetime CMDD and DD, and 4) estimate their rates of mental health service utilization.

METHOD

Sample

The 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a nationally representative sample of the adult population of the United States conducted by the US Census Bureau, under the direction of the National Institute of Alcoholism and Alcohol Abuse (NIAAA), is described in detail elsewhere.^{31, 32} The NESARC targeted the civilian, non-institutionalized population, ages 18 years and older, residing in the 50 states and the District of Columbia. The final sample included 43,093 respondents drawn from individual households and group-quarters such as dormitories and half-way houses. African Americans, Latinos, and young adults (aged 18 to 24 years) were oversampled, with data then adjusted to account for oversampling and respondent and household nonresponse. The overall survey response rate was 81%. The weighted data were adjusted, using the 2000 Decennial Census, to be representative of the US civilian population across numerous sociodemographic variables.

Diagnostic Assessment

Sociodemographic measures included age, sex, race-ethnicity, nativity, marital status, place of residence, and geographical region. Socioeconomic measures included education (less than high school, completed high school, or some college or higher), family and personal income (\$0–19,999, \$20,000–34,999, \$35,000–69,999, or \$70,000 or higher), and insurance type (public, private, or no insurance) measured as categorical variables.

All diagnoses were made according to DSM-IV criteria using the NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV Version (AUDADIS-IV), a valid, reliable, fully structured diagnostic interview designed for use by non-clinician professional interviewers.³³ Due to concerns about the validity of psychotic diagnoses in general population surveys as well as the length of the interview, possible psychotic disorders were elicited by asking respondents if a doctor or other health professional had ever told them that they had schizophrenia or a psychotic disorder. Most Axis I diagnoses included in the AUDADIS-IV fall into three groups: 1) substance use disorders (including any alcohol abuse/dependence, any drug abuse/dependence, and nicotine dependence); 2) mood disorders (MDD, DD, and bipolar disorder); and 3) anxiety disorders (panic disorder, social anxiety disorder, specific phobia, and generalized anxiety disorder). Other disorders included pathological gambling and personality disorders. Personality disorders (avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic, antisocial) and conduct disorder were assessed on a lifetime basis only.

Following the DSM-IV, all these disorders were considered “primary” disorders since they excluded mental disorders due to substance use or medical conditions. Detailed test-retest reliability and validity of AUDADIS-IV measures of DSM-IV disorders have been reported elsewhere.^{34, 35} Test-retest reliability was good for MDD ($\kappa=0.65\text{--}0.73$) and reliability ($\kappa>0.74$) and validity were good to excellent for substance use disorders.^{34, 36–43} Reliability was fair to excellent for other mood and anxiety disorders ($\kappa=0.40\text{--}0.60$) and personality

disorders ($\kappa=0.40-0.67$). Clinical reappraisal showed that AUDADIS-IV measures and psychiatrists' diagnoses agreed well for DD ($\kappa=0.49-0.67$) and MDD ($\kappa=0.64-0.68$).³⁴

CMDD was diagnosed when DSM-IV criteria for MDD were reported continually present for at least two years. Lifetime DSM-IV CMDD was thus defined as having had at least one MDE with these characteristics over the life course without a history of manic, mixed, or hypomanic episodes (i.e., excluding bipolar I and bipolar II disorders). This was assessed in the major depression module among respondents meeting MDD criteria who stated that their most recent or longest MDE lasted at least 2 consecutive years. Respondents with lifetime CMDD the onset of whose most recent episode occurred at least two years before the time of the interview, and who reported remaining symptomatic at the time of the assessment, were classified as having 12-month (current) CMDD.

Diagnostic criteria for DD were met if the individual endorsed depressed mood for most of the day, for more days than not, for at least 2 years. While depressed, two or more additional criteria had to be met: 1) poor appetite/overeating, 2) insomnia/hypersomnia, 3) low energy/fatigue, 4) low self-esteem, 5) poor concentration/difficulty making decisions, and 6) feeling of hopelessness. It was further required that during this interval there had been no periods of euthymia lasting more than two months. Consistent with DSM-IV criteria, meeting lifetime criteria for manic/hypomanic episodes or cyclothymic disorder precluded the diagnosis of DD, and respondents could not have met DSM-IV criteria for MDE during the first two years of the disorder. They could, however, have an MDE if the episode had remitted for at least 2 months before the onset of DD, or if the MDE onset occurred after the first 2 years of the first onset of DD. To maintain consistency with DSM-IV criteria and to employ the definition conservatively, we used information from the AUDADIS MDD module, which inquired about the onset and duration of MDEs, and the DD module, which inquired about depressed mood for 2 years and included the criteria described above. Our DD sample, thus operationalized was consistent with the DSM-IV definition of DD which currently comprises three ways of meeting the diagnostic criteria for DD (DSM-IV Criterion D): those who met full criteria for DD (in the last 2 years) with no lifetime history of MDE; those reporting onset of DD at least 2 years before their first MDE; and those for whom the endpoint of a MDE preceded the onset of DD by a time period calculated to be at least 2 months. Twelve-month prevalence was defined as the percentage of respondents who met criteria for DD at the interview after having at least 2 years of symptoms as with CMDD and met the aforementioned criteria.

We also included variables measuring any substance use, any alcohol use, non-prescription drug use, any tobacco use (in the last 12-months and lifetime), and use of alcohol to relieve depressive symptoms. The reliability of the alcohol consumption and drug use measures has been documented to range from good to excellent.⁴⁴

The study further included variables considered risk factors for depressive disorders that have been extensively studied in MDD. For consistency with previous research,⁴⁵⁻⁴⁷ we queried about lifetime risk factors for depression based on the developmental model of MDD proposed by Kendler and colleagues.

Following the model, we organized the factors into three sets: 1) familial influences, including family history of depression, substance and alcohol disorders, and antisocial personality disorder; 2) risk factors with childhood onset including parental loss before age 18, vulnerable family environment (defined as history of separation from a biological parent before age 18), early onset of anxiety disorder (viz., before age 18), conduct disorder and low self-esteem (defined as present most of the time throughout their lives); and, 3) risk

factors manifested into adulthood, including history of separation or divorce, low emotional reactivity, and social support.

Subjects were classified as having low social support if they answered positively to the question: “Are there very few people that you’re really close to outside of your immediate family?” Emotional reactivity was assessed using the question: “Do you rarely show much emotion?” Low self-esteem was determined if responding positively to the at least one of the questions: “Do you believe that you’re not as good, as smart, or as attractive as most other people?” or “Are you usually quiet or do you have very little to say when you meet new people because you believe they are better than you are?”

To examine the characteristics of our DD sample we also compared the risk factors of the three subsamples of individuals with DD: 1) those who met criteria for DD with no lifetime history of MDEs; 2) those meeting DD criteria for at least 2 years and later had an MDE; and, 3) those who had DD after an MDE, the latter remitting for at least 2 months. Furthermore, we also compared risk factors among individuals with DD, chronic MDD, and non chronic MDD (those with MDEs that lasted less than 2 years). We indicate the differences with the main analyses (full results of the additional analyses are available on request).

Psychosocial functioning in the past 12 months was assessed using subscales from the Short Form-12v2 (SF-12), a reliable and valid measure of disability used in population surveys: physical component summary, social functioning scale, role emotional scale, and mental health scale.⁴⁸ Each SF-12v2 disability scale yields a norm-based score with a mean of 50 and standardized range of 0–100. Higher scores indicate less disability.

Lifetime assessments included mean age at onset, mean number of MDEs, and mean duration of longest chronic depressive episode (either CMDD or DD).

Mental Health Treatment

To estimate rates of mental health service utilization, respondents with either form of chronic depression were classified as receiving treatment if they sought help from a counselor, therapist, doctor, or psychologist; from an emergency room; were hospitalized for psychiatric reasons for at least one night; or were prescribed medications. Treatment utilization questions were disorder-specific (i.e., separate questions for DD and MDD). Analyses were conducted on respondents diagnosed with the disorder of interest in the time frame under consideration (lifetime). Mean age at first mental health service contact was also assessed.

Statistical Analyses

All means, percentages, and odds ratios (ORs) were based on weighted data. Because the combined standard error of two means (or percents) always equals or is less than the sum of the standard errors of those two means, we conservatively consider two non-overlapping confidence intervals (CIs) to differ significantly from one another.^{49, 50} We consider significant ORs those whose CI does not include 1. All standard errors and 95% confidence intervals were estimated using SUDAAN⁵¹ to adjust for design characteristics of the survey.

In a small percentage of cases (3.9% of those with CMDD and 13.3% of those with DD, constituting 0.1% of the sample), individuals met criteria for both diagnoses at some point during their lifetime (although not simultaneously, since CMDD rules out concurrent DD). Our main analyses included all individuals with a lifetime diagnosis of both CMDD and DD in the DD group but, to examine the robustness of our assumption, we conducted identical analyses categorizing the individuals with both diagnoses in the CMDD group (results

available from Dr. Blanco). Since the results were almost identical in both analyses, we report the results in which individuals carrying both diagnoses are classified as having DD.

Supplementary Analyses

To guard against the possibility of variations in the results due to the operationalization of DD we conducted identical analyses using the subsample of respondents with lifetime pure DD (no lifetime MDEs). We also conducted additional analyses comparing DD and non chronic MDD (i.e., all MDEs <2 years). We present the analyses comparing individuals with pure DD and CMDD, and those comparing DD and non chronic MDD indicating the differences with the main analyses. Full results of the additional analyses are available from us on request.

RESULTS

Prevalence and Sociodemographic Correlates

The 12-month and lifetime prevalence of CMDD were 1.5% and 3.1%, respectively. For DD, the 12-month and lifetime prevalence of DD were 0.5% and 0.9%.

The odds of lifetime diagnoses of CMDD or DD were both greater in women than in men (Table 1). Blacks, Asians, and Hispanics had lower odds, whereas Native-Americans had greater odds for lifetime CMDD, compared to Whites. U.S.-born individuals were significantly more likely than foreign-born individuals to have a lifetime diagnosis of CMDD, but not DD.

Individuals aged 45 to 64 had greater odds of having CMDD and DD than those aged 18 to 29. Additionally, individuals older than 29 had greater odds of CMDD than those 18–29. Lower educational attainment was associated with greater odds of DD but not of CMDD. Personal and family income above \$20,000 were associated with lower odds of both CMDD and DD. The only exception was a family income between \$20,000–\$35,000 which did not differ between individuals with CMDD and the general population. Widowhood increased the odds of both diagnoses when compared to married status, whereas having never been married decreased the odds for CMDD. Individuals living in rural areas had increased risk for CMDD. There were no other differences by geographic region. Individuals with either CMDD or DD were more likely to have public insurance than those with neither disorder.

Moreover, individuals with DD were more likely than those with CMDD to be male, Black, Hispanic, foreign-born and to never have married, but less likely to be 30 or more years old, and to have individual or family incomes between \$35,000 and \$69,999.

Risk factors

Odds for positive first degree relative history of depression, substance use disorders, and antisocial personality disorder were all significantly greater for both CMDD and DD than the general population (Table 2). For both disorders, the highest odds were those for family history of depression. Most of the risk factors of Kendler's model evaluated in our study were associated with both types of chronic depression. The two exceptions were parental loss and conduct disorder, which did not statistically differ for CMDD compared to the general population. All the childhood and adulthood risk factors increased the odds for DD.

The most frequent risk factors were early onset of an anxiety disorder and lack of social support in adulthood. Compared to the general population, low self-esteem was associated with the highest odds for both types of chronic depression. Prevalence of risk factors was also compared between DD and CMDD. Individuals with DD were more likely to present

childhood risk factors such as parental loss and conduct disorder before age 15, and less likely to have a history of divorce/loss of a spouse than individuals with CMDD.

DD sample

The DD sample was comprised by individuals with pure DD (0.68% of the general population or 73.12% of individuals with DD, $n=329$), individuals with a DD that was followed by a MDE (0.17% of the general population or 18.28% of individuals with DD, $n=79$), and individuals with DD after a 2 month remission from a MDE (0.08% of the general population or 8.60% of individuals with DD, $n=48$). Individuals with DD followed by MDE were more likely to have all family risk factors, a vulnerable family environment, early onset anxiety disorder, and low self-esteem than those with pure DD. Individuals with MDE followed by DD after a 2 month remission were more likely than those with pure DD to have low self-esteem and low social support. Furthermore, those with MDE followed by DD after a 2 month remission were less likely than those with DD followed by a MDE to have a family history of substance use disorders, and parental loss (full results available upon request).

DD, CMDD, and non chronic MDD

Individuals with CMDD were more likely to have a family history of substance use disorders and antisocial personality disorder, low self-esteem and a history of divorce/loss of a spouse than those with non-chronic MDD. Furthermore, those with DD were more likely to have a history of parental loss, vulnerable family environment, and low self-esteem than those with non-chronic MDD (results available upon request).

Comorbidity

Approximately three-quarters of respondents with either DD or CMDD had an additional lifetime psychiatric disorder, usually including at least one Axis I disorder (Table 3). Compared to the general population, individuals with CMDD and DD had significantly greater odds for almost all Axis I and Axis II disorders, both lifetime and in the past 12 months (Tables 3 and 4). The few exceptions included alcohol abuse, which was not associated with DD or CMDD; conduct disorder and pathological gambling, associated with DD but not CMDD; and drug abuse and dependent personality disorder, associated with CMDD but not with DD. For both DD and CMDD, the odds for generalized anxiety disorder compared to the general population (5.7 and 8.3, respectively) were among the highest for any comorbid diagnosis. Further, approximately one-third of respondents with DD reported at least one lifetime MDE.

Approximately one third of individuals with CMDD or DD met criteria for at least one personality disorder. The personality disorders with highest prevalence linked to either chronic mood disorder were obsessive-compulsive and paranoid personality disorder, which were also the most prevalent personality disorders in the general population.⁵² However, compared to the general population, the highest odds were for avoidant personality disorder for both CMDD and DD, and dependent personality disorder for CMDD. Any Axis I disorder and specific phobia (and, consequently, presence of any anxiety disorder) were significantly more prevalent among individuals with lifetime CMDD than DD, whereas conduct disorder was more prevalent among individuals with DD than CMDD. There were no other significant differences in lifetime prevalence of comorbid Axis I or II disorder for the two diagnoses.

Individuals with 12-month DD had higher prevalence than the general population of all Axis I disorders except specific phobia, and alcohol and drug abuse. Individuals with CMDD had significantly higher rates of all Axis I disorders except alcohol abuse and pathological

gambling. Twelve-month comorbidity rates did not significantly differ between CMDD and DD.

Lifetime and current substance use

Lifetime tobacco, alcohol, and drug use were significantly higher for individuals with either chronic depressive disorder than the general population, but did not statistically differ between these two groups (Table 3). Similarly, tobacco and drug use rates in the past 12 months for both CMDD and DD significantly exceeded those of the general population, but did not differ between the two disorders (Table 4). Lifetime and past 12 months self-medication was significantly higher in individuals with CMDD and DD. The only exception was past 12 months non-prescription medicine use in individuals with DD. There were no differences between the two groups (Table 3 and 4).

Past 12-month psychosocial functioning

Individuals meeting 12-month criteria for either chronic mood disorder had significantly lower scores on all SF-12 subscales compared to the general population, indicating greater disability on physical and all psychosocial measures (Table 4). For both disorders, the lowest scores were on the role emotional scale. Individuals with CMDD scored significantly higher than those with DD on the social functioning scale.

Lifetime Course and Mental Health Treatment

There were no significant differences in the age of onset of CMDD and DD, average number of lifetime major depression episodes, or the duration of the longest episode (Table 5). Over half (57.1%) of individuals with DD, and a significantly greater percentage with CMDD (72.5%), received some type of mental health treatment in their lifetime, but age at first treatment did not differ across disorders for those who sought treatment. Rates of outpatient, inpatient, and pharmacological treatment were significantly greater for CMDD. After adjusting for sociodemographic variables, all treatment modalities except for pharmacological treatment remained significantly higher for individuals with CMDD.

Supplementary Analyses

Pure DD vs. CMDD—Although there were some differences between identical analyses of the sample including only individuals with pure DD (with no lifetime MDEs), the overall pattern of results remained the same. Most differences involved changes in the level of significance of the findings (but never change in direction) due to the smaller size of the sample excluding from the DD group individuals with lifetime MDE. The odds of having public insurance and living in the Northeast, which were not statistically significant when comparing DD versus CMDD in the main analyses, became significantly greater for individuals with pure DD, whereas the odds of living in a rural area, having a family history of substance use disorder, lifetime GAD, SAD, panic disorder, nicotine dependence, an avoidant personality disorder, and 12-month SAD, any anxiety disorder, any substance use disorder, and alcohol use became significantly lower for individuals with pure DD. There were no differences in being 65 years or older, having a history of parental loss, the social functioning scale, and rates of pharmacological treatment among individuals with pure DD and CMDD (results available upon request).

DD vs. non chronic MDD—The comparison between individuals with DD and those with non-chronic MDD (episodes <2 years) revealed several differences, as expected. The odds of having public insurance, living in the Northeast, being widowed, having less than high school education, and having past 12-month conduct disorder became significantly greater for individuals with DD. The odds of having a family income between \$20,000-

\$34,000 or greater than \$70,000, having a lifetime any psychiatric disorder, panic disorder, SAD, past 12 months any substance use disorder, nicotine dependence, any anxiety disorder, SAD and the physical component scale became significantly lower for individuals with DD. On the other hand, the odds of being male, never being married, being 30 years or older, having a parental history of divorce, a lifetime conduct disorder, past 12 month alcohol use, and the social functioning scale no longer differed among individuals with DD and non chronic MDD. With regards to treatment, any treatment, hospitalization, and outpatient treatments were no longer significant in the unadjusted analyses. Likewise, there were no differences for any type of treatment, pharmacological treatment, emergency room, hospitalization, and outpatient treatment in the adjusted analyses (results upon request).

DISCUSSION

In a large, nationally representative sample of US adults, we found that: 1) the prevalence of CMDD exceeds the prevalence of DD; 2) CMDD and DD share most sociodemographic correlates; 3) individuals with CMDD and DD have high rates of Axis I and Axis II comorbidity, with an almost identical pattern in both disorders; 4) the prevalence of most previously identified risk factors for MDD and level of psychosocial functioning and disability are similar in CMDD and DD; and, 5) whereas more than half of individuals with each disorder have a lifetime history of treatment-seeking for depression, individuals with CMDD have higher treatment rates than individuals with DD.

Our study found lower prevalence of CMDD and DD than previously estimated.^{21–23} The prevalence of MDD in the US appears to be increasing, including in NESARC findings¹ suggesting that our lower estimates of CMDD and DD are unlikely due to true decreases in prevalence. A more likely explanation is that differences in prevalence estimates of CMDD and DD reflect changes in their operationalization across DSM editions or in the assessment instruments.^{23,22} Inclusion of individuals with bipolar disorder in previous studies^{21, 22} may have led to overestimation of DD prevalence in previous studies. Furthermore, other studies did not assess CMDD, which may have led to the inclusion of some cases of CMDD in DD samples, given how DD was defined in the DSM-III and the differences in instruments to assess for the disorders. Though less likely, improvements in the quality of antidepressant treatment may have also contributed to decreasing the chronicity of depressive disorders.⁵³

Nevertheless, even the conservative estimates from our study indicate that about 4% of the general population met lifetime criteria for a chronic depressive disorder, and half of those met criteria at the time of the interview. This finding is consistent with studies documenting that one-fourth to one-third of individuals with unipolar depression present chronic episodes.^{4–9} The prevalence of CMDD and DD, the high number of depressive episodes experienced by individuals suffering from them, the extended length of some of those episodes, and their impact on the quality of life highlight the public health significance of chronic depressive disorders.

Consistent with epidemiological studies of depressive disorders^{1, 54–56} we found that women have an increased risk for both CMDD and DD. Our sample also confirmed other previously identified correlates of depressive disorders such as lower educational status and lower personal and family income.^{22, 23} Previous studies have associated early-onset MDD and chronic depression with significant psychosocial consequences such as lower educational attainment^{57,58} and marriage rates,^{57, 59} especially among women.⁶⁰ Our findings document that those results hold for CMDD and DD, and that the strength of associations with sociodemographic correlates is similar in both diagnoses. Furthermore, risk factors for MDD^{45,46} increase the risks of CMDD and DD by an equal magnitude. The increased odds

of chronic depression (CMDD and DD) in older age have been hypothesized to represent a residual state that follows MDD.²³

Similarities between CMDD and DD also extended to patterns of psychiatric comorbidity. Individuals with either CMDD or DD had high rates of Axis I and II comorbidity, as found in previous studies.^{61–63} Individuals with either disorder had greater odds of most psychiatric disorders relative to individuals without chronic depression. Our findings suggest that comorbidity patterns for CMDD and DD in a large community sample are almost identical, in both the lifetime and 12-month time frames. The chronicity of depression over time may overshadow differences in acute symptom severity between CMDD and DD and lead to clinical presentations.

The rate of previously known risk factors for MDD,^{47, 64, 65} such as family history of several psychiatric disorders (including depression), and childhood and adulthood risk factors, were also similar in CMDD and DD. Our findings accord with family studies^{66, 67} that have found similar patterns of familial aggregation of psychiatric disorders (particularly mood disorders) among individuals with various chronic depressive disorders, regardless of whether the index diagnosis was CMDD or DD.^{68, 69} Furthermore, CMDD and DD had similar ages of onset and number of MDEs. To the extent that shared risk factors and course suggest commonalities between nosological entities,^{70, 71} these findings suggest the similarity between CMDD and DD. Longitudinal studies of clinical samples and studies examining the validity of the distinction between the various forms of chronic depressive disorders have also suggested important similarities between CMDD and DD.^{20, 29, 30, 72} Prospective studies have reported that almost all patients with DD eventually experience exacerbations that meet criteria for MDEs and have suggested that these different subtypes of chronic depression represent phases of the same disorder.¹⁵ Future studies should examine whether there are also genetic and neuroimaging similarities between CMDD and DD, as well as the clinical utility of maintaining them as two separate nosological entities.

Both CMDD and DD were associated with delays in seeking and failure to seek treatment. Treatment rates for individuals with CMDD were significantly higher than those with DD, resembling those previously reported for individuals with episodic MDD.¹ Chronic MDD may be more likely to attract notice and lead to treatment than DD, which many individuals may consider a fixed feature of their personality.^{66, 73} Our data suggest a significant increase in the treatment rate of DD from the approximately 25% reported in the only prior estimate twenty years ago.²³ This increase in treatment rates is consistent with recent trends in the treatment of MDD.^{74–76} Greater access to care, educational campaigns, and advent of safer and better tolerated pharmacological treatment have been hypothesized to improve the use of mental health services by patients with MDD,⁷⁵ and these factors may have encouraged treatment of DD. Nevertheless, our data continue to document substantial unmet need among chronically depressed individuals, despite the availability of evidence-based treatments.^{77, 78} Although the severity and functional impairment of these disorders may promote treatment-seeking, their chronicity may lead individuals to misinterpret their symptoms as unmodifiable personality traits, interfering with their recognition and impeding their treatment.⁷³

Our study has the limitations common to most large epidemiological studies. First, subtle distinctions in the course of the disorders and assessment with structured interviews and reliance on interviewed self-report, raise the possibility of misclassification, recall bias, and increased error variance. Second, diagnoses were gathered by lay interviewers. Nonetheless, the reliability of AUDADIS diagnoses ranges from good to excellent. Third, because the NESARC sample only included civilian households and group quarters populations 18 years and older, information was unavailable on adolescents and incarcerated individuals. Fourth,

the cross-sectional design precludes identifying the directionality between DD and CMDD and their correlates. Fifth, some individuals in the sample met criteria for the two diagnoses at some point during their lifetime, which could have contributed to artificially increasing the similarity between DD and CMDD. However, the same pattern of results emerged regardless of whether those individuals were included in the CMDD or DD group, suggesting that our findings are robust to sample specification. Sixth, to limit subject burden, the comorbidity assessments, although extensive, did not include all major Axis I or Axis II diagnoses.

Despite these limitations, the NESARC constitutes the largest nationally representative survey to date and the first to include detailed information on DSM-IV DD and CMDD. CMDD and DD appear to have important similarities in sociodemographic correlates, patterns of comorbidity, risk factors, course, and unmet treatment needs. Studies examining genetic and other biological markers are still needed to help improve the nosology of CMDD and DD and the adequacy of their treatment.

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Table 1

Sociodemographic/socioeconomic characteristics for lifetime DD and CMDD

	Dysthymic Disorder N=456 (0.9%) % (95%CI)	Chronic MDD N=1,377 (3.1%) % (95%CI)	General Population N=41,260 (96.0%) % (95%CI)	OR Dysthymic Disorder [†] OR (95%CI)	OR CMDD [‡] OR (95%CI)	OR DD versus CMDD OR (95%CI)
Sex						
Male	40.05 (34.15–46.26)	29.84 (26.96–32.89)	48.57 (47.93–49.22)	0.71 (0.55–0.92)	0.45 (0.39–0.52)	1.57 (1.17–2.08)
Female*	59.95 (53.74–65.85)	70.16 (67.11–73.04)	51.43 (50.78–52.07)	1.00	1.00	1.00
Race/Ethnicity						
White*	69.98 (63.41–75.83)	78.63 (75.28–81.63)	70.65 (67.34–73.76)	1.00	1.00	1.00
Black	11.64 (8.10–16.47)	7.84 (6.34–9.65)	11.16 (9.95–12.51)	1.05 (0.73–1.51)	0.63 (0.52–0.77)	1.67 (1.07–2.60)
Native Americans	3.23 (1.88–5.51)	3.83 (2.77–5.26)	2.06 (1.76–2.40)	1.59 (0.90–2.80)	1.67 (1.18–2.36)	0.95 (0.49–1.82)
Asian	4.04 (1.79–8.83)	2.46 (1.42–4.25)	4.43 (3.46–5.66)	0.92 (0.39–2.16)	0.50 (0.30–0.84)	1.84 (0.66–5.13)
Hispanic	11.10 (7.48–16.17)	7.24 (5.36–9.72)	11.70 (9.42–14.44)	0.96 (0.66–1.39)	0.56 (0.43–0.72)	1.72 (1.19–2.49)
Nativity						
US-born*	85.44 (79.47–89.90)	91.67 (88.79–93.86)	85.20 (81.93–87.97)	1.00	1.00	1.00
Foreign-born	14.56 (10.10–20.53)	8.33 (6.14–11.21)	14.80 (12.03–18.07)	0.98 (0.69–1.40)	0.52 (0.41–0.67)	1.87 (1.25–2.82)
Age						
18–29*	18.32 (13.89–23.78)	11.29 (9.32–13.61)	22.17 (21.43–22.93)	1.00	1.00	1.00
30–44	22.65 (18.39–27.55)	29.61 (26.49–32.93)	31.01 (30.37–31.66)	0.88 (0.61–1.29)	1.88 (1.48–2.37)	0.47 (0.30–0.73)
45–64	45.10 (39.34–51.01)	43.58 (40.27–46.94)	30.53 (29.92–31.14)	1.79 (1.25–2.56)	2.80 (2.24–3.51)	0.64 (0.42–0.98)
65+	13.93 (10.77–17.82)	15.52 (13.34–17.99)	16.29 (15.63–16.96)	1.03 (0.69–1.54)	1.87 (1.41–2.48)	0.55 (0.33–0.93)
Education						
< High School	20.47 (16.42–25.21)	16.67 (14.23–19.44)	15.57 (14.61–16.58)	1.33 (1.01–1.74)	1.10 (0.90–1.34)	1.21 (0.86–1.69)
High School	24.89 (20.10–30.39)	29.56 (26.47–32.85)	29.36 (28.25–30.50)	0.85 (0.64–1.14)	1.03 (0.88–1.21)	0.83 (0.59–1.17)
College*	54.64 (49.02–60.14)	53.77 (50.25–57.25)	55.07 (53.79–56.34)	1.00	1.00	1.00
Individual Income						
0–19,000*	59.86 (53.98–65.47)	53.96 (50.31–57.56)	46.92 (45.77–48.07)	1.00	1.00	1.00
20–34,000	20.58 (16.31–25.62)	20.67 (17.95–23.68)	22.73 (22.00–23.48)	0.71 (0.53–0.96)	0.79 (0.66–0.95)	0.90 (0.63–1.27)
35–69,000	14.55 (11.05–18.93)	19.02 (16.44–21.91)	22.12 (21.37–22.89)	0.52 (0.38–0.70)	0.75 (0.62–0.90)	0.69 (0.49–0.97)
>70,000	5.01 (2.64–9.30)	6.35 (4.79–8.38)	8.23 (7.51–9.01)	0.48 (0.24–0.93)	0.67 (0.51–0.89)	0.71 (0.37–1.37)

	Dysthymic Disorder N=456 (0.9%)	Chronic MDD N=1,377 (3.1%)	General Population N=41,260 (96.0%)	OR Dysthymic Disorder [†]	OR CMDD [†]	OR DD versus CMDD
	% (95%CI)	% (95%CI)	% (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
Family Income						
0–19,000 *	36.31 (31.27–41.67)	28.49 (25.45–31.74)	23.27 (22.34–24.24)	1.00	1.00	1.00
20–34,000	19.63 (15.35–24.75)	21.36 (18.87–24.08)	20.16 (19.50–20.83)	0.62 (0.46–0.85)	0.87 (0.72–1.04)	0.72 (0.50–1.04)
35–69,000	25.44 (20.34–31.31)	29.47 (26.04–33.14)	32.28 (31.61–32.96)	0.51 (0.38–0.68)	0.75 (0.61–0.91)	0.68 (0.47–0.97)
>70,000	18.63 (14.24–23.99)	20.68 (17.68–24.04)	24.29 (22.93–25.70)	0.49 (0.36–0.68)	0.70 (0.57–0.85)	0.71 (0.50–1.01)
Marital Status						
Married *	46.07 (40.58–51.65)	53.69 (50.44–56.92)	62.03 (61.09–62.96)	1.00	1.00	1.00
Widowed	32.90 (28.10–38.09)	32.22 (29.38–35.19)	16.84 (16.38–17.31)	2.63 (2.07–3.35)	2.21 (1.92–2.55)	1.19 (0.90–1.58)
Never Married	21.03 (16.48–26.45)	14.09 (12.11–16.33)	21.13 (20.19–22.10)	1.34 (0.98–1.84)	0.77 (0.64–0.92)	1.74 (1.20–2.52)
Urbanicity						
Urban *	81.59 (74.80–86.87)	75.75 (71.23–79.76)	80.41 (77.00–83.42)	1.00	1.00	1.00
Rural	18.41 (13.13–25.20)	24.25 (20.24–28.77)	19.59 (16.58–23.00)	0.93 (0.65–1.32)	1.31 (1.14–1.51)	0.70 (0.49–1.02)
Region						
Northeast	24.57 (16.03–35.73)	19.39 (13.83–26.50)	19.63 (13.69–27.34)	1.18 (0.85–1.63)	0.91 (0.73–1.13)	1.30 (0.91–1.86)
Midwest	22.89 (16.30–31.16)	23.18 (17.72–29.72)	23.15 (17.37–30.14)	0.93 (0.65–1.33)	0.92 (0.74–1.14)	1.01 (0.70–1.46)
South	29.29 (21.93–37.93)	33.60 (27.75–39.99)	35.32 (29.08–42.10)	0.78 (0.57–1.07)	0.87 (0.71–1.07)	0.89 (0.63–1.27)
West *	23.25 (15.94–32.61)	23.83 (17.74–31.22)	21.90 (15.68–29.73)	1.00	1.00	1.00
Insurance						
Private *	59.35 (53.65–64.82)	63.36 (59.89–66.70)	68.30 (66.73–69.82)	1.00	1.00	1.00
Public	23.33 (18.78–28.59)	18.55 (16.04–21.36)	12.70 (12.04–13.38)	2.11 (1.61–2.77)	1.57 (1.31–1.89)	1.34 (0.97–1.86)
No insurance	17.32 (13.34–22.18)	18.09 (15.62–20.85)	19.01 (17.79–20.29)	1.05 (0.76–1.44)	1.03 (0.84–1.25)	1.02 (0.72–1.45)

* Reference group

[†] Compared to the general population

Table 2

Risk factors for lifetime DD and CMDD

	Dysthymic Disorder N=456 (0.9%)	Chronic MDD N=1,377 (3.1%)	General Population N=41,260 (96.0%)	OR Dysthymic Disorder*	OR CMDD*	OR DD versus CMDD
	% (95%CI)	% (95%CI)	% (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
Family Risk Factors						
Family history of depression	62.50 (56.59–68.06)	64.82 (61.43–68.07)	30.26 (28.98–31.57)	3.84 (2.98–4.96)	4.25 (3.66–4.92)	0.90 (0.68–1.19)
Family history of alcohol problems	48.42 (42.26–54.64)	54.29 (51.02–57.51)	33.16 (31.96–34.37)	1.89 (1.49–2.41)	2.39 (2.10–2.73)	0.79 (0.60–1.03)
Family history of drug problems	26.03 (21.38–31.30)	31.02 (27.96–34.26)	15.79 (15.10–16.51)	1.88 (1.45–2.42)	2.40 (2.07–2.78)	0.78 (0.58–1.05)
Family history of antisocial personality disorder	32.7 (27.26–38.65)	35.14 (32.10–38.32)	16.83 (15.98–17.71)	2.40 (1.86–3.11)	2.68 (2.34–3.07)	0.90 (0.67–1.19)
Childhood Risk Factors						
Parental loss	14.39 (10.96–18.68)	9.71 (8.00–11.73)	9.71 (9.35–10.08)	1.56 (1.14–2.14)	1.00 (0.81–1.23)	1.56 (1.08–2.27)
Vulnerable family environment	38.81 (33.54–44.36)	32.91 (29.82–36.16)	28.52 (27.78–29.26)	1.59 (1.27–1.99)	1.23 (1.07–1.42)	1.29 (0.98–1.71)
Early onset of anxiety disorder	52.09 (45.73–58.38)	49.20 (45.57–52.84)	33.71 (32.42–35.03)	2.14 (1.66–2.75)	1.90 (1.64–2.21)	1.12 (0.85–1.47)
Conduct Disorder	3.10 (1.24–7.56)	1.09 (0.62–1.91)	1.03 (0.90–1.18)	3.07 (1.19–7.94)	1.06 (0.59–1.89)	2.91 (1.07–7.93)
Low self-esteem	24.92 (20.36–30.11)	27.04 (24.05–30.24)	10.85 (10.24–11.50)	2.73 (2.11–3.53)	3.04 (2.55–3.63)	0.90 (0.66–1.22)
Adult Risk Factors						
Social Support	64.24 (58.19–69.87)	58.06 (54.69–61.37)	44.87 (43.48–46.26)	2.21 (1.72–2.84)	1.70 (1.48–1.96)	1.30 (0.98–1.73)
History of divorce/loss spouse	43.65 (38.56–48.87)	50.38 (47.11–53.65)	28.81 (27.76–29.89)	1.91 (1.54–2.37)	2.51 (2.20–2.86)	0.76 (0.60–0.97)
Low emotional reactivity	23.11 (18.83–28.02)	21.47 (18.90–24.28)	17.75 (17.07–18.46)	1.39 (1.07–1.81)	1.27 (1.08–1.48)	1.10 (0.82–1.48)

* Compared to the general population

Table 3

Lifetime Psychiatric comorbidity, substance use, and self-medication rates for lifetime DD and CMDD

	Dysthymic Disorder N=456 (0.9%)	Chronic MDD N=1,377 (3.1%)	General Population N=41,804 (97.2%)	Dysthymic Disorder** OR (95%CI)	Chronic MDD** OR (95%CI)	DD versus CMDD OR (95%CI)
Any Psychiatric Disorder[‡]	77.22 (70.70–82.65)	78.91 (76.02–81.55)	48.53 (46.76–50.31)	2.92 (2.16–3.95)	3.97 (3.37–4.67)	0.73 (0.52–1.03)
Any Axis I Disorder[‡]	72.97 (66.49–78.60)	75.45 (72.57–78.12)	45.35 (43.50–47.21)	2.53 (1.90–3.36)	3.70 (3.19–4.30)	0.68 (0.50–0.94)
Any Substance Use Disorder	53.14 (47.22–58.97)	54.74 (51.42–58.03)	37.73 (36.04–39.44)	1.87 (1.47–2.38)	2.00 (1.73–2.31)	0.94 (0.71–1.23)
Alcohol Use Disorder	41.59 (35.97–47.44)	41.15 (37.88–44.50)	29.83 (28.30–31.40)	1.68 (1.33–2.11)	1.65 (1.43–1.90)	1.02 (0.78–1.33)
Alcohol Abuse	17.36 (13.30–22.35)	19.06 (16.35–22.10)	17.76 (16.74–18.84)	0.97 (0.70–1.35)	1.09 (0.90–1.32)	0.89 (0.61–1.30)
Alcohol Dependence	24.22 (19.67–29.44)	22.09 (19.17–25.32)	12.06 (11.39–12.77)	2.33 (1.79–3.02)	2.07 (1.72–2.48)	1.13 (0.84–1.52)
Drug Use Disorder	18.84 (14.47–24.17)	19.02 (16.65–21.64)	9.97 (9.35–10.62)	2.10 (1.52–2.90)	2.12 (1.79–2.51)	0.99 (0.71–1.38)
Drug Abuse	11.01 (7.36–16.15)	11.26 (9.21–13.70)	7.60 (7.13–8.09)	1.50 (0.97–2.34)	1.54 (1.23–1.94)	0.97 (0.61–1.55)
Drug Dependence	7.83 (5.40–11.24)	7.76 (6.13–9.77)	2.37 (2.14–2.63)	3.50 (2.32–5.27)	3.46 (2.65–4.52)	1.01 (0.63–1.62)
Nicotine Dependence	30.05 (24.95–35.70)	32.59 (29.47–35.87)	17.12 (16.18–18.11)	2.08 (1.61–2.69)	2.34 (2.01–2.72)	0.89 (0.66–1.19)
Major Depression	27.12 (22.46–32.34)	100.00	10.33 (9.81–10.87)	3.23 (2.50–4.17)		
Any Anxiety Disorder	36.19 (30.51–42.29)	47.57 (44.27–50.90)	16.02 (15.17–16.90)	2.97 (2.30–3.84)	4.76 (4.15–5.46)	0.63 (0.47–0.82)
Panic Disorder	13.50 (10.34–17.45)	17.21 (14.86–19.83)	4.78 (4.48–5.09)	3.11 (2.29–4.22)	4.14 (3.43–5.00)	0.75 (0.53–1.06)
Social Anxiety Disorder	12.23 (9.06–16.32)	16.55 (14.15–19.26)	4.53 (4.17–4.91)	2.94 (2.09–4.13)	4.18 (3.47–5.04)	0.70 (0.49–1.01)
Specific Phobia	13.42 (10.11–17.60)	22.18 (19.25–25.42)	8.94 (8.37–9.54)	1.58 (1.15–2.18)	2.90 (2.44–3.46)	0.54 (0.38–0.78)
Generalized Anxiety Disorder	16.86 (12.65–22.12)	22.71 (20.08–25.57)	3.42 (3.13–3.74)	5.72 (4.08–8.04)	8.29 (6.99–9.85)	0.69 (0.47–1.01)
Conduct Disorder	3.10 (1.24–7.56)	1.09 (0.62–1.91)	1.03 (0.90–1.18)	3.07 (1.19–7.94)	1.06 (0.59–1.89)	2.91 (1.07–7.93)
Pathological Gambling	1.41 (0.56–3.52)	0.68 (0.36–1.29)	0.41 (0.34–0.49)	3.51 (1.35–9.10)	1.69 (0.86–3.30)	2.08 (0.66–6.59)
Any Psychotic Disorder	1.77 (0.82–3.77)	2.15 (1.34–3.44)	0.23 (0.17–0.30)	7.86 (3.47–17.83)	9.59 (5.46–16.86)	0.82 (0.33–2.01)
Any Personality Disorder	38.13 (32.41–44.19)	36.79 (33.61–40.08)	13.87 (13.20–14.57)	3.83 (2.97–4.93)	3.61 (3.14–4.16)	1.06 (0.79–1.41)
Avoidant Personality Disorder	8.85 (5.89–13.07)	10.78 (8.77–13.17)	2.02 (1.83–2.24)	4.70 (2.99–7.38)	5.85 (4.59–7.45)	0.80 (0.50–1.30)
Dependent Personality Disorder	0.94 (0.36–2.40)	2.18 (1.42–3.32)	0.43 (0.35–0.53)	2.17 (0.85–5.56)	5.11 (3.25–8.04)	0.43 (0.16–1.15)
Obsessive-Compulsive Disorder	15.85 (12.01–20.62)	17.37 (14.68–20.44)	7.50 (7.07–7.96)	2.32 (1.68–3.22)	2.59 (2.13–3.15)	0.90 (0.61–1.31)
Paranoid Personality Disorder	13.82 (10.39–18.15)	12.08 (10.05–14.44)	4.08 (3.79–4.39)	3.77 (2.72–5.32)	3.23 (2.59–4.03)	1.17 (0.80–1.70)
Schizoid Personality Disorder	11.31 (8.04–15.68)	9.84 (7.85–12.28)	2.83 (2.60–3.08)	4.37 (2.99–6.41)	3.75 (2.89–4.85)	1.17 (0.73–1.87)
Histrionic Personality Disorder	4.09 (2.46–6.73)	4.06 (2.79–5.85)	1.75 (1.59–1.93)	2.39 (1.39–4.12)	2.37 (1.62–3.48)	1.01 (0.53–1.92)
Antisocial Personality Disorder	10.21 (7.01–14.62)	8.64 (7.01–10.61)	3.41 (3.14–3.71)	3.22 (2.12–4.88)	2.68 (2.11–3.40)	1.20 (0.75–1.92)

	Dysthymic Disorder N=456 (0.9%)	Chronic MDD N=1,377 (3.1%)	General Population N=41,804 (97.2%)	Dysthymic Disorder** OR (95%CI)	Chronic MDD** OR (95%CI)	DD versus CMDD OR (95%CI)
Any Substance Use*	92.60 (88.91–95.13)	91.57 (89.54–93.24)	85.68 (84.51–86.78)	2.09 (1.38–3.18)	1.82 (1.42–2.32)	1.15 (0.70–1.91)
Any Tobacco Use	58.67 (53.32–63.82)	58.81 (55.41–62.13)	46.35 (44.84–47.88)	1.64 (1.32–2.05)	1.65 (1.44–1.90)	0.99 (0.77–1.28)
Any Alcohol use	88.80 (84.55–91.99)	86.94 (84.25–89.24)	82.53 (81.23–83.76)	1.68 (1.19–2.37)	1.41 (1.13–1.76)	1.19 (0.77–1.83)
Any Drug Use	37.50 (32.19–43.14)	37.65 (34.49–40.92)	22.18 (21.20–23.20)	2.11 (1.66–2.67)	2.12 (1.84–2.44)	0.99 (0.77–1.28)
Self-Medication†						
Alcohol use to relieve symptoms	22.30 (17.79–27.58)	21.76 (19.27–24.49)	3.57 (3.28–3.88)	7.76 (5.85–10.29)	7.52 (6.27–9.01)	1.03 (0.76–1.41)
Use of non-prescription medicine	9.10 (5.94–13.71)	9.94 (7.94–12.37)	1.30 (1.13–1.49)	7.62 (4.72–12.32)	8.40 (6.31–11.17)	0.91 (0.57–1.45)

* Any Substance Use includes Any Tobacco Use, Any Alcohol Use, and Any Drug Use

† Either self-medication for DD or CMDD

‡ Any Psychiatric Disorder and Any Axis I Disorder does not include either DD or CMDD

** Compared to the general population

Table 4
Past 12-month psychiatric comorbidity, substance use, self-medication rates, and level of disability for DD and CMDD

	Dysthymic Disorder N=261 (0.5%)	Chronic MDD N=655(1.5%)	General Population (GP) N=42,177(98.0%)	Dysthymic Disorder** OR (95%CI)	Chronic MDD** OR (95%CI)	DD versus CMDD OR (95%CI)
	% (95%CI)	% (95%CI)	% (95%CI)			
Any Axis I Disorder[‡]	45.37 (37.61–53.36)	55.01 (49.78–60.13)	25.90 (24.73–27.11)	2.38 (1.73–3.26)	3.48 (2.83–4.27)	0.68 (0.46–1.00)
Any Substance Use Disorder	26.51 (20.37–33.73)	32.25 (27.66–37.22)	18.57 (17.67–19.52)	1.58 (1.12–2.23)	2.08 (1.68–2.58)	0.76 (0.51–1.13)
Alcohol Use Disorder	13.03 (8.59–19.29)	12.69 (9.48–16.77)	8.37 (7.91–8.86)	1.64 (1.03–2.61)	1.59 (1.15–2.19)	1.03 (0.59–1.80)
Alcohol Abuse	5.03 (2.46–10.02)	5.78 (3.87–8.55)	4.63 (4.28–5.01)	1.09 (0.52–2.29)	1.26 (0.82–1.94)	0.86 (0.37–2.01)
Alcohol Dependence	8.01 (4.69–13.33)	6.91 (4.45–10.59)	3.74 (3.48–4.02)	2.24 (1.25–4.01)	1.90 (1.19–3.04)	1.71 (0.57–2.43)
Drug Use Disorder	5.85 (2.95–11.28)	4.90 (2.93–8.08)	1.94 (1.75–2.14)	3.15 (1.52–6.51)	2.58 (1.52–4.36)	1.21 (0.50–2.93)
Drug Abuse	2.69 (0.97–7.24)	3.16 (1.68–5.88)	1.52 (1.37–1.70)	1.78 (0.62–5.10)	2.10 (1.09–4.05)	0.84 (0.25–2.85)
Drug Dependence	5.42 (2.60–10.96)	3.44 (1.75–6.67)	0.56 (0.47–0.66)	10.21 (4.69–22.23)	6.07 (2.96–12.43)	1.61 (0.57–4.50)
Nicotine Dependence	21.00 (15.56–27.72)	24.76 (20.55–29.51)	12.54 (11.79–13.32)	1.85 (1.29–2.67)	2.29 (1.80–2.90)	0.81 (0.52–1.25)
Major Depression	26.94 (19.95–35.30)	100.00	4.10 (3.84–4.38)	N.A.	N.A.	N.A.
Any Anxiety Disorder	29.85 (22.68–38.15)	37.62 (32.47–43.08)	10.59 (9.98–11.24)	3.59 (2.49–5.18)	5.04 (4.00–6.33)	0.71 (0.46–1.08)
Panic Disorder	11.84 (7.30–18.66)	9.99 (7.40–13.34)	2.00 (1.84–2.17)	6.60 (3.88–11.21)	5.31 (3.79–7.42)	1.21 (0.66–2.22)
Social Anxiety Disorder	7.60 (4.26–13.21)	10.76 (7.62–14.98)	2.61 (2.37–2.86)	3.07 (1.64–5.76)	4.46 (3.03–6.56)	0.68 (0.34–1.35)
Specific Phobia	10.79 (6.45–17.51)	18.04 (14.31–22.50)	6.95 (6.46–7.47)	1.62 (0.93–2.83)	2.94 (2.23–3.88)	0.55 (0.29–1.03)
Generalized Anxiety Disorder	15.33 (10.75–21.39)	17.20 (13.36–21.85)	1.76 (1.59–1.95)	10.10 (6.63–15.40)	11.12 (8.15–15.18)	0.87 (0.53–1.42)
Conduct Disorder	3.92 (1.16–12.35)	2.14 (1.07–4.22)	1.02 (0.89–1.17)	3.95 (1.14–13.69)	2.09 (1.03–4.24)	1.86 (0.44–7.92)
Pathological Gambling	0.00	0.20 (0.05–0.82)	0.16 (0.12–0.21)	N.A.	1.26 (0.30–5.35)	N.A.
Any Psychotic Disorder	3.12 (1.39–6.86)	3.09 (1.73–5.49)	0.29 (0.23–0.37)	11.02 (4.66–26.03)	10.38 (5.48–19.68)	1.01 (0.37–2.77)
Any Substance Use *	69.52 (61.99–76.14)	77.63 (73.07–81.61)	71.83 (70.72–72.92)	0.89 (0.64–1.25)	1.36 (1.08–1.72)	0.66 (0.44–0.99)
Any Tobacco Use	40.19 (32.76–48.09)	39.64 (34.89–44.60)	28.13 (27.03–29.27)	1.72 (1.24–2.38)	1.67 (1.37–2.04)	1.02 (0.69–1.51)
Any Alcohol use	57.32 (49.60–64.70)	64.44 (59.31–69.26)	65.54 (64.38–66.68)	0.71 (0.52–0.96)	0.95 (0.77–1.18)	0.74 (0.52–1.06)
Any Drug Use	11.97 (7.77–17.98)	10.23 (7.33–14.09)	6.11 (5.74–6.51)	2.09 (1.28–3.40)	1.74 (1.22–2.49)	1.19 (0.66–2.17)
Self-Medication[†]						
Alcohol use to relieve symptoms	11.38 (7.46–16.98)	8.38 (5.93–11.73)	1.30 (1.16–1.45)	9.77 (6.06–15.75)	6.68 (4.52–9.86)	1.40 (0.77–2.57)
Use of non-prescription medicine	0.66 (0.17–2.58)	1.78 (1.01–3.09)	0.30 (0.23–0.39)	2.24 (0.55–9.23)	6.05 (3.20–11.42)	0.37 (0.08–1.66)
SF-12						
Physical component summary	45.51 (43.29–47.74)	47.26 (45.99–48.53)	50.63 (50.41–50.85)	T-score p-value –4.64 <0.0001	T-score p-value –5.25 <0.0001	T-score p-value –1.38 0.17

	Dysthymic Disorder N=261 (0.5%)	Chronic MDD N=655(1.5%)	General Population (GP) N=42,177(98.0%)	Dysthymic Disorder** OR (95%CI)	Chronic MDD** OR (95%CI)	DD versus CMDD OR (95%CI)
	% (95%CI)	% (95%CI)	% (95%CI)			
Social function scale	41.26 (39.27–43.26)	44.35 (42.91–45.79)	51.92 (51.78–52.05)	–10.74 <0.0001	–10.53 <0.0001	–2.59 0.01
Role emotional scale	40.44 (38.07–42.80)	42.21 (40.79–43.62)	51.14 (50.98–51.31)	–9.07 <0.0001	–12.60 <0.0001	–1.34 0.19
Mental health scale	41.55 (39.37–43.73)	42.40 (41.16–43.64)	52.33 (52.16–52.50)	–9.91 <0.0001	–15.98 <0.0001	–0.68 0.50

* Any Substance Use includes Any Tobacco Use, Any Alcohol Use, and Any Drug Use

† Either self-medication for DD or CMDD

‡ Any Psychiatric Disorder and Any Axis I Disorder does not include neither DD nor CMDD

** Compared to the general population

Table 5

Lifetime course and treatment-seeking for DD and CMDD

	Dysthymic Disorder N=456(0.9%)		Chronic MDD N=1,377 (3.1%)		DD versus Chronic MDD		p-value
	Mean (95%CI)		Mean (95%CI)		DD versus Chronic MDD	DD versus Chronic MDD	
Age at onset (mean), years	31.46 (29.54–33.38)		31.30 (30.22–32.38)		–0.84		0.41
Mean number of of MDEs (episodes)	5.58 (3.82–7.34)		6.87 (5.70–8.04)		–1.28		0.21
Age at first treatment (mean), years	35.96 (33.50–38.42)		35.43 (34.06–36.80)		1.05		0.30
Duration of longest episode (mean), years	5.35 (4.57–6.12)		6.11 (5.45–6.78)		–1.43		0.16

	% (95%CI)	% (95%CI)	OR (95% CI)	AOR* (95%CI)
Any treatment	57.10 (51.58–62.44)	72.46 (69.28–75.42)	0.65 (0.49–0.85)	0.74 (0.56–0.98)
Treated as outpatient	49.24 (43.93–54.56)	64.73 (61.22–68.08)	0.66 (0.51–0.86)	0.74 (0.57–0.95)
Treated as inpatient (hospitalized)	8.66 (6.30–11.79)	15.68 (13.69–17.91)	0.71 (0.50–0.99)	0.62 (0.42–0.90)
Emergency room admittance	7.30 (5.10–10.34)	12.46 (10.46–14.79)	0.70 (0.46–1.07)	0.62 (0.40–0.97)
Received pharmacological treatment	43.97 (38.58–49.51)	58.75 (55.33–62.10)	0.71 (0.55–0.93)	0.79 (0.60–1.04)

* adjusted by age, sex, race, nativity, marital status, urban city, family and individual income, region, and insurance