Has depression surpassed HIV as a burden to gay and bisexual men's health in the United States? A comparative modeling study

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Abstract

Background.—While advances in HIV prevention and treatment have changed the epidemic for gay and bisexual men, another epidemic faces this population. Gay and bisexual men represent one of the highest risk groups for depression, which potentially poses quality-of-life and public health challenges comparable to those of HIV. The present study seeks to inform comprehensive care for sexual minority men by estimating and comparing the morbidity of HIV and depression for US gay and bisexual men.

Methods.—In 2018, weighted counts of gay and bisexual men living with HIV and depression were derived from the CDC's Medical Monitoring Project and the National Survey on Drug Use and Health, respectively. Years lived with disability for HIV and depression come were calculated using the Global Burden of Disease Study's disability weights.

Findings.—Among gay and bisexual adult men in the US, the prevalence of past-year major depressive episodes is 14.17%, while the prevalence of HIV is 11.52%. We estimate that in calendar year 2015, major depressive episodes imposed 85,361 (95% CI: 58,293–112,212) years lived with disability among US adult gay and bisexual men, whereas HIV posed 42,981 (95% CI: 36,221–49,722) years lived with disability.

Interpretation.—This analysis shows that depression morbidity currently exceeds that for HIV among US adult gay and bisexual men. While gay and bisexual men are frequently understood to be a high-risk population for HIV, including in guidelines for HIV prevention and treatment, the present analysis suggests that this population should also be considered high-risk for depression.

Keywords

depression; HIV/AIDS; morbidity; prevalence; sexual and gender minorities

Introduction

Despite comprising less than 2% of the US population (1), gay and bisexual men currently account for about one-third of all individuals diagnosed with HIV and nearly 70% of new HIV infections (2). Given the magnitude of the HIV epidemic among this population, HIV has understandably been the focus of considerable public health attention. For instance, nearly four-fifths of the research concerning sexual and gender minority health funded by the National Institute of Health between 1989 and 2011 focused on HIV/AIDS among gay and bisexual men (3)

Despite high rates of HIV infection among gay and bisexual men, biomedical and health system advances have been somewhat effective at reducing the HIV disease burden in this population. As of 2015, about half of HIV-positive gay and bisexual men in the US were virally suppressed (4), meaning that their HIV status causes minimal interference with their daily activities and they have virtually no risk of transmitting their infection to HIV-negative partners. While there is still a great deal of work to be done to reduce racial/ethnic disparities, improve access, promote linkage to medical care and antiretroviral therapy, and reduce loss to follow-up, there is also reason to expect that increasing proportions of eligible individuals will successfully traverse the so-called "cascade of care" to achieve viral suppression.

At the same time, the global burden of mental health disorders has been steadily on the rise, now accounting for nearly one-third of the world's entire disease burden as measured by years lived with disability, a standardized measure of morbidity (5). Like in all countries where suitable data exist, in the US gay and bisexual men are especially susceptible to mental health disorders and are approximately twice as likely to experience certain mental health disorders as heterosexual men and women (6, 7). Major depression, in particular, represents a stress-sensitive disorder especially common among gay and bisexual men (8), associated with high disease burden (5). The US Preventive Services Task Force (USPSTF) is the US body charged with making "evidence-based recommendations about clinical preventive services such as screenings, counseling services, or preventive medications" (9). The US Preventive Services Task Force (USPSTF) recommends that primary care physicians

screen all adult patients for both HIV (10) and depression (11). However, only the HIV recommendations identify sexual minority men as a high-risk population. Misperceptions of relative risk may help explain differences in the rates at which primary caregivers provide targeted, routine screening and care for depression to their sexually active, gay and bisexual patients. The objective of the present study is to sensitize the clinical community to the relative burden of depression among gay and bisexual male patients and to prompt the question of whether sufficient attention is being paid to the condition. To do so, the present study aims to estimate and compare the one-year burden of disease posed by HIV and depression on gay and bisexual men's health in the US.

Method

To estimate the morbidity of HIV and depression among gay and bisexual men in the US, we ascertained the prevalence of both conditions among gay and bisexual men 18 years of age and older in calendar year 2015 (12, 13). We calculated years lived with disability, a standardized measure of disease morbidity, for both diseases. Years lived with disability represents the length of time in years that an individual is expected to live with a condition, multiplied by a standard disability weight derived from the World Health Organisation's 2016 Global Burden of Disease Study (14). We then compared years lived with disability for the two conditions among gay and bisexual men in 2015.

In situations in which certain parameters could not be measured directly, we chose the most conservative estimate – that is, we biased the result against our hypothesis that the burden of depression exceeds that of HIV. For example, although depression is a recurring condition, we could not ascertain the likelihood of recurrence for any given individual and therefore assumed no future depressive episode in the calendar year. We also assumed that all persons with HIV infection remained in their respective severity category for the entirety of 2015 (i.e., they will neither receive treatment for their HIV infection, nor will their infection worsen). The general population trend is for more people to receive treatment and become virally suppressed over time. Indeed, for every year between 1997 and 2005, the rate of viral suppression among people living with HIV in the United States has increased (15); therefore, it is likely that we overestimate the time that individuals spend in the higher HIV severity categories. We also conducted a sensitivity analysis where any individual whose severity of HIV infection was unknown was assigned to the highest severity category. The assumptions for this sensitivity analysis represent an extreme and highly unlikely scenario that is strongly biased against the central hypothesis of our study – that the morbidity burden of depression exceeds that of HIV among US gay and bisexual men.

Years Lived with Disability: Depression

Our calculation of years lived with disability for depression is summarized in Table 1. Years lived with disability for depression were calculated using data from the National Survey on Drug Use and Health (NSDUH) (12), a nationally representative survey of the prevalence and correlates of drug use and mental health disorders in the US. In 2016, the NSDUH sampled 67,507 non-institutionalized US civilians over the age of 12. The survey used a coordinated sample design to be representative of the non-institutionalized US population

over the age of 12. Adult respondents (i.e., 18 years old or older) answer the adult depression module, an interviewer-administered assessment of *DSM-IV* diagnostic criteria for major depressive episodes. A major depressive episode requires endorsement of five out of the nine symptoms of major depressive episode as defined by the *DSM-IV*. The NSDUH further categorizes major depressive episodes in terms of role impairment severity across four life domains (i.e., home management, work, close relationships, and social life) using the labels "very severe," "severe," "moderate," mild," and "none" (16).

The NSDUH included the following identity-based question of sexual orientation: "Which one of the following do you consider yourself to be?" with response options: "heterosexual, that is, straight," "lesbian or gay," "bisexual," "don't know." We chose the NSDUH partially because its identity-based measure of sexual orientation closely matches that of the Medical Monitoring Project. To be included in the present analyses, individuals had to: 1) be 18 years old or older, 2) self-identify as a man, 3) self-identify their sexual identity as gay or bisexual, and 4) report symptoms indicating they experienced a major depressive episode in the past year.

Depression disability weights were derived from the World Health Organisation 2016 Global Burden of Disease Study (14). We combined the NSDUH's "severe" and "very severe" categories to correspond to the Global Burden of Disease Study's "severe" disability weight; all other categories corresponded directly to severity weights within the Global Burden Disease Study.

A previous meta-synthesis estimates the average duration of a major depressive episode to be 37.7 weeks (i.e., 0.725 years) (17). This duration estimate has been used in recent Global Burden of Disease Studies to estimate the prevalence and burden of major depressive episodes worldwide (14, 18). In 2016, the NSDUH asked respondents whether they had experienced any of the nine symptoms of a depressive episode within the last year. The present analysis aims to determine person-years spent with depression during 2015, but the NSDUH data report number of people who reported being in the midst of a major depressive episode at a point during the year before the survey. Therefore, we estimate the person-years that occur in 2015 only. Because of the way these questions were asked, the date on which the depressive episode began is not available in the NSDUH. Therefore, each depressive episode was randomly assigned to a start date between April 12, 2014 and December 31, 2016 and each case was estimated to last an average of 0.725 years from that date. This allocation estimates the total person-years spent with depression during 2015. April 12, 2014 was chosen as the earliest date on which a depressive episode of average duration could have begun because it is exactly 0.725 years (the length of the average depressive episode) before the beginning of 2015. If, on January 1, 2016 (the first possible date of responding to the NSDUH survey) a participant in the NSDUH reported having the symptoms of a depressive episode within the past year, the earliest eligible date these symptoms could have occurred is January 1, 2015. If these symptoms occurred on the last day of a depressive episode, which on average lasts 0.725 years, then the average date on which that depressive episode began would have been April 12, 2014. Only person-years which occurred in 2015 were included in the present analysis.

The estimated person-years of each major depressive episode occurring in 2015 was multiplied by the Global Burden of Disease Study's disability weight for the corresponding depressive episode severity level (14) to produce the total years lived with disability due to last-year major depressive episodes among adult gay and bisexual men in the US. This corresponds to the equation:

$$YLD_{depression} = \sum_{1}^{i} duration_i * weight_i$$

Where i is a given depressive episode that occurred at least in part during 2015; $duration_i$ is that part of episode i that occurred in 2015; and $weight_i$ is the Global Burden of Disease Study's disability weight corresponding to episode i.

Confidence intervals for the disease burden of depression among gay and bisexual men in the US were calculated using a bootstrapping method, drawing from a distribution conditional on depression severity category. As the uncertainty interval provided by the Global Burden of Disease data is derived from a non-normal empirical distribution, a Gaussian-approximate (using the same mean and confidence interval length) was used. The value drawn was multiplied by person-years of disease that occurred in 2015 (i.e., ~0.266). We performed 10,000 iterations to obtain 95% confidence intervals (Table 1).

Years Lived with Disability: HIV

Our calculation of years lived with disability for HIV is summarized in Table 2. We estimated the prevalence of gay and bisexual men living with HIV from the Centers for Disease Control and Prevention (CDC) Medical Monitoring Project (13). In order to gather comprehensive clinical and behavioral data on people living with HIV in the US and dependent areas, the Medical Monitoring Project representatively samples from all adults diagnosed with HIV using the National HIV Surveillance System as a sampling frame and conducts face-to-face or computer-assisted interviews and screens relevant medical records. Corresponding closely to the NSDUH, the 2015 Medical Monitoring Project contained the following identity-based question of sexual orientation: "Which one of the following do you consider yourself to be?" with response options: "heterosexual, that is, straight," "lesbian or gay," "bisexual," and "don't know."

We extracted a weighted count representing all gay and bisexual men diagnosed with HIV from the Medical Monitoring Project ($n = 464,524$) in terms of geometric mean CD4 count (cells/μL) categories: 0–199, 200–349, 350–499, and 500. Each CD4 count range was associated with a corresponding disability weight category from the Global Burden of Disease Study. For example, those with a 0-199 CD4 count were allocated to the highest severity category and therefore greatest disability weight (*AIDS without antiretroviral treatment*) and those with 500 were allocated to the lowest severity category and smallest disability weight (*Early HIV*).

CD4 counts were unknown for some participants diagnosed with HIV (n=96,621 of 464,524). CD4 counts in Medical Monitoring Project data are derived from abstraction of

medical records during the 12 months preceding the interview. These records may be incomplete if the patient had not received a CD4 test in the 12 months preceding the interview, or for other reasons. These incomplete records were allocated proportionally to each severity category, based on the category's proportion of the total known persons with HIV infection. To bias the analysis against our hypothesis, we also conducted a sensitivity analysis in which we allocated individual persons with HIV infection for whom CD4 counts were unknown to the 0-199 CD4 count severity category and the highest severity disability weight, thereby overstating the HIV-related burden (Table 3). It was assumed that all persons with HIV infection remained in their respective severity category for the entirety of 2015.

The number of persons with HIV infection allocated to each severity level was multiplied by the Global Burden of Disease Study's disability weight for each respective HIV severity level (14). This produced the years lived with disability in each HIV severity level. These years were then summed across severity levels to produce the total years lived with disability due to HIV among adult gay and bisexual men in the US. This corresponds to the equation:

$$YLD_{HIV} = \sum_{1}^{k} P_k * weight_k$$

Where k is the HIV severity category, P is the number of prevalent cases (i.e., persons with HIV infection) in each severity category k, and $weight$ is the Global Burden of Disease Study's disability weight corresponding to each severity category k.

Confidence intervals for the disease burden of HIV among gay and bisexual men in the US were calculated using a bootstrapping method, drawing from a distribution conditional on HIV severity level. As the uncertainty interval provided by the Global Burden of Disease data is derived from a non-normal empirical distribution, a Gaussian-approximate (using the same mean and confidence interval length) was used. The value drawn was multiplied by duration. We performed 10,000 iterations to obtain 95% confidence intervals (Table 2). All analyses for this paper were conducted using the R programming language and the RStudio integrated development environment (21).

Results

Using an existing pooled estimate of population-based surveys (1) to approximate the total population of gay and bisexual men in the US (n= 4,030,946), as well as the NSDUH's count of total last-year major depressive episodes among gay and bisexual men in the US (n=571,110) (12), the prevalence of recent depressive episodes among self-identified gay and bisexual men in the US is 14.17%. Based on the same estimate of the total population of gay and bisexual men in the US (1) and the total count of gay and bisexual men living with HIV infection derived from the Medical Monitoring Project (n=464,524) (13), the prevalence of diagnosed HIV in the same population is 11.52%.

Based on this analysis, we estimate the morbidity burden of major depressive episodes for all adult gay and bisexual men in the US in 2015 to be equal to 85,361 (95% CI: 58,293–112,212) years lived with disability (Table 1). We estimate the one-year morbidity of HIV in

the same population in 2015 to be equal to 42,981 (95% CI: 36,221 – 49,722) years lived with disability (Table 2). Since the confidence intervals for the one-year morbidity burden of major depressive episodes and HIV do not overlap, this represents a statistically significant difference.

Sensitivity analysis showed that if all persons living with HIV of unknown severity are allocated to the highest severity category (0-199 CD4 count), then the one-year morbidity of HIV among gay and bisexual men in the US in 2015 would be equal to 90,279 (95% CI: 81,398–99,130). Because this confidence interval overlaps with the confidence interval of morbidity of major depressive episodes, the two are not statistically significantly different. However, a sensitivity analysis assuming that all of the person-time of each depressive episode takes place during the 2015 calendar year estimates the one-year morbidity burden of depression among gay and bisexual men in the United States to be 232,749 (95% CI: 159,281–308,079) (Table 4). If the rate of depressive episodes is in steady state, the person-time of depressive episodes reported in 2015 and extending back in 2014 will be equal to the hypothetical person-years reported in 2016 and extending back to 2015. When compared to even the highest estimate for HIV burden above, this estimate for depression is significantly higher.

Discussion

This analysis demonstrates that both the prevalence and morbidity burden, measured in years lived with disability, of past-year major depressive episodes exceeds the prevalence and morbidity burden of HIV among gay and bisexual men in the US. This finding coheres with the only other known comparison of the mental health and HIV burden among gay and bisexual men, which found that mortality from suicide exceeds mortality from HIV among Canadian gay and bisexual men (19, 20). The present analysis adds to that finding by showing that the overall morbidity associated with depression also exceeds the overall morbidity associated with HIV among gay and bisexual men in the US.

The present results suggest that clinicians and public health practitioners ought to increasingly consider the substantial role of depression in gay and bisexual men's lives both within and outside of the context of HIV prevention and treatment. The present results add to the increasing recognition of depression as a sizeable epidemic in-and-of-itself affecting gay and bisexual men, with serious behavioral comorbidities (e.g., suicide). Depression is also known to affect HIV prevention and care. For instance, depression co-occurs with HIV-risk behavior and interferes with HlV-prevention efforts among gay and bisexual men (21-24). Depression is highly prevalent among people living with HIV (25), and among gay and bisexual men with HIV, depression is associated with HIV medication non-adherence (26) and higher viral load (27). By adequately providing evidence-based treatment for depression in this population, healthcare providers and public health officials would therefore also play a role in reducing the HIV epidemic. Such treatments would ideally address the syndemic nature of psychosocial and physical health problems facing gay and bisexual men, for instance by addressing HIV prevention within the context of depression treatment and vice versa (28).

Our best estimate suggests that the burden of depression exceeds that of HIV among gay and bisexual men in the US. Even under extreme assumptions that bias our results against our hypothesis (Table 3), our estimates show that HIV would still not impose more burden than depression. Even our primary estimate of the HIV burden (Table 2) rests on assumptions that, even if shown to be incorrect, would further strengthen this study's key finding that years lived with disability are greater for depression than for HIV among gay and bisexual men. Our estimate assumes that people who have experienced a major depressive episode within the last year did not have a recurring episode within the time interval between April 12, 2014 and December 31, 2016. As major depressive episodes recur in at least half of initially affected persons (29), we likely underestimate the number of years lived with disability burden due to depression among gay and bisexual men.

Our analyses underestimate disability due to mental health conditions overall as we only examine depression. Rates of anxiety disorders are at least as high as depression among gay and bisexual men (30) and gay and bisexual men also experience disproportionate substance abuse problems (31) compared to the general population. Including these other mental health disorders in our analyses would suggest an even greater burden of mental health problems for this population. Because the Medical Monitoring Project provides only aggregate data, multiple imputation of missing values was not possible; for this reason, we used sensitivity analyses to counteract any bias, favoring our hypothesis, that may have been introduced by missing data. Finally, although depression and HIV at least partially co-occur, our analyses do not account for this co-occurrence given lack of evidence regarding the causal ordering of these two conditions and the relative impact that each makes on the other. Therefore, how the co-occurrence of these two diseases might affect their relative morbidity burden remains unknown.

As the Medical Monitoring Project only provides data on people who are known to be HIV-positive, we may underestimate the morbidity of HIV because those who have yet to be diagnosed with HIV are not included in our analysis. Those who do not know that they are HIV-infected are less likely to be suffering from significant disability (as otherwise they would be prompted to seek care), therefore we posit that this is a relatively small limitation to our findings. We also do not account for mortality in our estimate of years lived with disability. It is possible that some people who had HIV in 2015 died before the end of the calendar year, and therefore would not contribute to the total person-years lived with HIV. This overestimate is unlikely to skew our findings given the magnitude of the difference in morbidity from the two conditions.

Conclusion

This present analysis finds that that morbidity for depression currently exceeds that for HIV among adult gay and bisexual men in the US. US government recommendations for the primary care of gay and bisexual men focus primarily on HIV prevention and treatment (32). Our findings suggest that the health risks of depression are even greater. While gay and bisexual men are frequently recognized as a high-risk population for HIV infection, the present analysis suggests that they should also be considered at high-risk for depression and

that healthcare providers should increasingly address this population's mental health prevention, screening, and treatment needs within and outside of the context of HIV.

Acknowledgements

List of Abbreviations

(ART)	Antiretroviral therapy
(CDC)	Centers for Disease Control and Prevention
(NSDUH)	National Survey on Drug Use and Health
(USPSTF)	United States Preventive Services Task Force

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Table 1:

Number of Persons, Average Duration, Disability Weight, and Years Lived with Disability (YLD) of Depressive Episodes, by Severity Level, among Gay and Bisexual Men in the US.

Severity level	Description	Number of Recent Cases of Depressive Episodes in Last Year (95% CI) (N)	Average Duration Within 2015 (95% CI) (t)	Disability Weight from Global Burden of Disease 2016 Study (95% CI) (w)	Years Lived with Disability (95% CI) (YLD)
Mild depressive episode	"Feels persistent sadness and has lost interest in usual activities. The person sometimes sleeps badly, feels tired, or has trouble concentrating but still manages to function in daily life with extra effort."	9,493 (0 –20,201)	0.266	0.145 (0.09-0.2)	382 (0.000 – 810)
Moderate depressive episode	"Has constant sadness and has lost interest in usual activities. The person has some difficulty in daily life, sleeps badly, has trouble concentrating, and sometimes thinks about harming himself (or herself)."	188,160 (123,718–249,398)	0.266	0.396 (0.264 – 0.528)	19,725 (13,808 – 26,551)
Severe depressive episode	"Has overwhelming, constant sadness and cannot function in daily life. The person sometimes loses touch with reality and wants to harm or kill himself (or herself)."	373,457 (251,057–489,501)	0.266	0.658 (0.493–0.823)	65,254 (44,485 – 84,851)
Total		**571,110** (374,774–759,100)			**85,361** (58,293–112,212)

Note. The relationship between the variables corresponds to the formula: $YLD \sim N * T * W$. YLD is not exactly the sum of N, t, and w because the values of YLD are determined by a bootstrapping simulation. Depressive episodes determined to have a severity category of "none" in the NSDUH are not included in the above table, as they do not contribute to total years lived with disability.

Table 2:

Number of Cases, Average Duration, Disability Weight, and Years Lived with Disability (YLD) of HIV, by Severity Level, among Gay and Bisexual Men in the US.

Severity Level	Description	Number of Persons living with HIV (95% CI) (N)	Duration (t)	Disability Weight from Global Burden of Disease 2016 Study (95% CI) (w)	Years Lived with Disability (95% CI) (YLD)
CD4 >500	"Has a disease diagnosis that causes some worry but minimal interference with daily activities."	296,701 (277,332 – 316,718)	1	0.012 (0.0035–0.0205)	3,563 (3,320–3,796)
CD4 350-499	"Has occasional fevers and infections. The person takes daily medication that sometimes causes diarrhea."	86,711 (77,016–96759)	1	0.078 (0.0485–0.1075)	6,769 (5,984 – 7,553)
CD4 200-349	"Has weight loss, fatigue, and frequent infections."	46,825 (40,182 – 54,137)	1	0.274 (0.1775–0.3705)	12,839 (10,821 – 14,863)
CD4 0-199	"Has severe weight loss, weakness, fatigue, cough and fever, and frequent infections, skin rashes and diarrhea."	33,981 (28,463 – 40,476)	1	0.582 (0.4135–0.7505)	19,811 (16,096 – 23,510)
Total		**464,637** (448,951–480,389)			**42,981** (36,220 – 49,722)

Note. The relationship between the variables corresponds to the formula: $YLD \sim N * T * W$. YLD is not exactly the sum of N, t, and w because the values are determined from by a bootstrapping simulation.

Table 3:

Sensitivity Analysis: All Persons with Unknown HIV Severity Assigned to Highest Severity Category.

Severity Level	Description	Number of Persons Living with HIV (95% CI) (N)	Duration (95% CI) (t)	Disability Weight from Global Burden of Disease 2016 Study (95% CI) (w)	Years Lived with Disability (95% CI) (YLD)
CD4 >500	"Has a disease diagnosis that causes some worry but minimal interference with daily activities."	234,942 (221,466–248,657)	1	0.012 (0.0035–0.0205)	2,821 (2,668–2,981)
CD4 350-499	"Has occasional fevers and infections. The person takes daily medication that sometimes causes diarrhea."	68,648 (60,676–76,852)	1	0.078 (0.0485–0.1075)	5,362 (4,728 – 5,991)
CD4 200-349	"Has weight loss, fatigue, and frequent infections.	37,061 (31,350–43,376)	1	0.274 (0.1775–0.3705)	10,182 (8,417–11,881)
CD4 0-199	Has severe weight loss, weakness, fatigue, cough and fever, and frequent infections, skin rashes and diarrhea."	123,682 (113,556–134,658)	1	0.582 (0.4135–0.7505)	71,914 (65,585–78,277)
Total		**464,637** (448,951 – 480,389)			**90,279** (81,398 – 99,130)

Note. The relationship between the variables corresponds to the formula: $YLD \sim N * T * W$. YLD is not exactly the sum of N, t, and w because the values are determined from by a bootstrapping simulation.

Table 4:

Sensitivity Analysis: Years Lived with Disability (YLD) of 2015 Depressive Episodes, by Severity Level, among Gay and Bisexual Men in the US (Allowing Multiple Depressive Episodes per Person per Year)

Severity level	Description	Number of Recent Cases of Depressive Episodes in Last Year (95% CI) (N)	Average Duration Within 2015 (95% CI) (t)	Disability Weight from Global Burden of Disease 2016 Study (95% CI) (w)	Years Lived with Disability (95% CI) (YLD)
Mild depressive episode	"Feels persistent sadness and has lost interest in usual activities. The person sometimes sleeps badly, feels tired, or has trouble concentrating but still manages to function in daily life with extra effort."	9,493 (0 –20,201)	0.725	0.145 (0.09-0.2)	992 (0.000 – 2,100)
Moderate depressive episode	"Has constant sadness and has lost interest in usual activities. The person has some difficulty in daily life, sleeps badly, has trouble concentrating, and sometimes thinks about harming himself (or herself)."	188,160 (123,718–249,398)	0.725	0.396 (0.264 – 0.528)	53,809 (36,327–71,827)
Severe depressive episode	"Has overwhelming, constant sadness and cannot function in daily life. The person sometimes loses touch with reality and wants to harm or kill himself (or herself)."	373,457 (251,057 – 489,501)	0.725	0.658 (0.493–0.823)	177,948 (122,954 – 234,152)
Total		**571,110** (374,774–759,100)			**232,749** (159,281– 308,079)

Note. The relationship between the variables corresponds to the formula: $YLD \sim N * T * W$. YLD is not exactly the sum of N, t, and w because the values of YLD are determined by a bootstrapping simulation. Depressive episodes determined to have a severity category of "none" in the NSDUH are not included in the above table, as they do not contribute to total years lived with disability.