HHS Public Access

Author manuscript

Am J Orthopsychiatry. Author manuscript; available in PMC 2022 December 08.

Published in final edited form as:

Am J Orthopsychiatry. 2019 ; 89(6): 727–735. doi:10.1037/ort0000370.

Darker days? Recent trends in depression disparities among US adults

Megan Todd[1], **Julien Teitler**[2]

[1]Center for Health and Wellbeing, Woodrow Wilson School of Public and International Affairs, Princeton University

[2]School of Social Work and Department of Sociology, Columbia University

Abstract

Depression is the most prevalent mood disorder in the United States, and disparities in depressive symptoms and treatment by socioeconomic status have been well-documented. Recent evidence suggests the prevalence of depression is increasing, but less is known about time trends in disparities.

Using nationally representative data from the National Health and Nutrition Examination Survey, we examined patterns of depressive symptoms (Patient Health Questionnaire-9) and treatment (self-reported psychotherapy and psychopharmacology). We assessed time trends in depression disparities by educational attainment among US adults 2005–2014 using logistic regression models.

Among the least educated groups, the odds of moderate to severe depressive symptoms increased; for the most educated, they remained stable (women) or decreased (men). At the same time, odds of receiving treatment, conditional on being depressed, declined (women) or remained stable (men) for the least educated group while treatment rates stayed steady (women) or increased (men) for the most educated.

Between 2005 and 2014, overall depression prevalence increased. Despite recent policies designed to improve mental health care coverage, depression treatment rates were unable to keep pace. The least educated consistently had the highest rates of moderate to severe depressive symptoms and the lowest rates of treatment. Disparities in depression by educational attainment have persisted or worsened.

1. Introduction

Adult depression is the most prevalent mood disorder in the United States (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012), is associated with excess mortality from numerous causes (Cuijpers et al., 2014), and is a leading cause of disability (Druss et al., 2009; Murray et al., 2015). Depression bears a large economic cost (Greenberg, Fournier, Sisitsky, Pike, & Kessler, 2015), including substantial lost productivity of workers

Financial disclosure: None to declare.

Conflicts of interest: None to declare.

(Stewart, Ricci, Chee, Hahn, & Morganstein, 2003; Wang, Simon, & Kessler, 2003). Furthermore, depressed parents put their children at risk of poorer health and development (England & Sim, 2009). Rates of depression treatment are very low, with only half of those with depressive symptoms treated at all, and only one fifth receiving treatment in line with clinical guidelines (González et al., 2010). Recent studies suggest depression prevalence is increasing in the United States. For example, participants reporting poor mental health on at least 15 days of the last month increased from 6.6% in 2001–2002 to 8.7% in 2011–2012 (Mojtabai & Jorm, 2015), and the prevalence of depressive symptoms increased from 21% in 2005–2006 to 26% in 2009–2010 (Wittayanukorn, Qian, & Hansen, 2014). The age-adjusted suicide rate increased from 10.5 per 100,000 in 1999 to 13.0 per 100,000 in 2014 (Curtin, Warner, & Hedegaard, 2016), while attempted suicide increased from 620 per 100,000 in 2004–2005 to 790 per 100,000 in 2012–2013 (Olfson et al., 2017).

We follow Braveman et al. (2006) in defining health disparities as a difference in health in which disadvantaged groups—here, the less educated—systematically experience worse health or worse healthcare than more advantaged groups. Theory on health disparities points to various mechanisms that underlie the association between social disadvantage and worse health, including chronic stress and risky health behaviors, which are disproportionately distributed to less-advantaged groups (Adler & Newman, 2002; Seabrook & Avison, 2012). Fundamental cause theory identifies socioeconomic status (SES) as the ultimate cause of health and illness, pointing out that SES underlies access to high quality health care, environmental exposures, and health behaviors (Link & Phelan, 1995).

Disparities in depressive symptoms by socioeconomic status are well documented. In the United States, poverty is associated with screening positive for depression (Pratt & Brody, 2014), lower education is associated with worse depressive symptoms (McFarland & Wagner, 2015), and lower household income and depression is associated with increased odds of experiencing a major depressive episode (Hudson, Neighbors, Geronimus, & Jackson, 2012). Socioeconomic status is associated with access to and quality of mental health care (Cooper et al., 2015; Wang et al., 2005; Young, Klap, Sherbourne, & Wells, 2001). Treatment continuity is also worse for those with less income and education (Edlund et al., 2002; Olfson, Marcus, Tedeschi, & Wan, 2006).

Eliminating health disparities is a public health priority in the United States (Warnecke et al., 2008). Recent major changes to the health insurance and economic landscapes may have had substantial effects on disparities in mental health. For example, the Mental Health Parity and Addiction Equity Act of 2008 (MHPAEA)—later expanded within the Affordable Care Act (ACA) in 2010—was designed to improve access to mental health treatment for those with health insurance. The Medicaid expansion of 2014 increased health insurance coverage for millions of Americans. However, stressors associated with the economic recession starting in 2008, including large increases in foreclosures and unemployment, may have increased mental health problems during recent years, particularly in poor communities, which were disproportionately affected (Houle, 2014). There is evidence from recent nationwide studies that depressive symptoms did indeed increase during this period (Mojtabai & Jorm, 2015; Wittayanukorn et al., 2014). However, we know little about the extent to which disparities in mental health problems and treatment have changed over recent years.

In this study, we used nationally representative data to estimate disparities in adult depressive symptoms and treatment (i.e., reported psychotherapy and/or psychopharmacotherapy) by educational attainment between 2005 and 2014 in the United States.

2. Methods

2.1 Data

Data were from the 2005–2014 waves of the National Health and Nutrition Examination Survey (NHANES), an ongoing nationally representative study of the civilian, non-institutionalized US population. NHANES has collected demographic and health information in two-year waves since 1999 via interviews, examinations, and laboratory tests. Detailed information on NHANES protocol is available from the Centers for Disease Control and Prevention (United States Department of Health and Human Services. Centers for Disease Control and Prevention. National Center for Health Statistics., n.d.).

2.2 Measures

Depressive symptoms were assessed for respondents at least 18 years old as part of the NHANES Mobile Examination Center private interview. Symptoms were evaluated with the Patient Health Questionnaire-9 (PHQ-9), a nine-item screening instrument (Kroenke & Spitzer, 2002). Respondents were asked, “over the last two weeks, how often have you been bothered by the following problems?” (1) little interest or pleasure in doing things; (2) feeling down, depressed, hopeless; (3) trouble falling asleep, staying asleep, or sleeping too much; (4) feeling tired or having little energy; (5) poor appetite or overeating; (6) feeling bad about yourself or that you are a failure or have let yourself or your family down; (7) trouble concentrating on things, such as reading the newspaper or watching television; (8) moving or speaking so slowly that other people have noticed, or the opposite, being so fidgety or restless that you have been moving around a lot more than usual; (9) thoughts that you would be better off dead or of hurting yourself in some way. Response options were not at all (0 points), several days (1 point), more than half the days (2 points), or nearly every day (3 points); points were summed across the nine items to obtain the PHQ-9 score (range: 0–27). The PHQ-9 has been validated in numerous primary care, medical, and general population samples (Kroenke, Spitzer, Williams, & Löwe, 2010); a score of ten or more points corresponds to moderate to severe depressive symptoms and a diagnosis of Major Depressive Disorder (Kroenke & Spitzer, 2002).

Respondents were also asked about mental health treatment. Psychotherapy was measured as a positive response to the question “during the past 12 months have you seen or talked to a mental health professional such as a psychologist, psychiatrist, psychiatric nurse or clinical social worker about your health?” Pharmacotherapy was constructed based on respondents’ reporting a prescription medication classified as an antidepressant by Lexicon Plus, a Cerner Multum, Inc. database.

A respondent was considered depressed if he or she had a PHQ-9 score of ten or greater (the clinical cutoff for Major Depressive Disorder), or reported receiving psychotherapy or

pharmacotherapy. This allowed us to capture patients who had well-controlled depression (i.e., were receiving treatment for depression and received a PHQ-9 score less than ten), those who had poorly-controlled depression (i.e., had a PHQ-9 score of ten or higher despite treatment), and those who had untreated depression (i.e. PHQ-9 score of ten or higher and no treatment). Examining only depressive symptoms or only mental health care utilization would underestimate the burden of depression and the need for effective care. The limitation of including therapy and antidepressant use is that these treatments could be used to treat conditions other than depression. To address this limitation, we included analyses that examine depressive symptoms only, without consideration of psychotherapy or pharmacotherapy.

Educational attainment was reported in four categories: less than 12 years (no high school diploma); high school graduate/GED; some college/AA degree; and college or more.

2.3 Statistical analysis

Out of 30,295 adult Mobile Examination Center respondents across the five two-year waves of data, our analytic sample excluded respondents with missing educational attainment (n=45) or incomplete depression screener information (n=4,238) for a final sample size of 26,037.

We examined time trends in depression within each educational attainment category by including wave * educational category interaction variables in logistic regression models. This allowed us to estimate a linear time trend separately for each education category, and then test whether the time trends within each category were the same using Wald tests. All analyses were stratified by sex and controlled for age and race/ethnicity. We used survey weights to account for the complex multistage probability sampling design of NHANES (United States Department of Health and Human Services. Centers for Disease Control and Prevention. National Center for Health Statistics., 2014). All analyses were performed using Stata 14.2 (StataCorp., 2015).

3. Results

Descriptive statistics of the analytic sample are shown in Table 1. On average, this adult sample was 46 years old (standard deviation: 17.4 years) and 49% male. Moderate or worse depressive symptoms were experienced by 8% of the sample. 16% of respondents reported receiving mental health treatment, either psychotherapy (8%) or psychopharmacology (12%). Our more expansive definition of depression prevalence, estimated as those respondents who had moderate or worse depressive symptoms (PHQ-9≥10) or received mental health treatment (psychotherapy or pharmacotherapy), was estimated at 21%.

Figure 1 shows trends by education in the fraction of respondents with moderate to severe depressive symptoms (regardless of treatment status), based on predicted probabilities from logistic regression models controlling for age and race/ethnicity. In terms of our interest in disparities, this measure compounds disparities in need, treatment, and treatment efficacy by showing the fraction of respondents that were not receiving effective treatment for their depressive symptoms. Differences by educational attainment are clear. A higher fraction of

respondents had a PHQ-9 score of at least 10 in the least educated groups compared to the most educated groups. This pattern held for both men and women, though women had a higher prevalence depressive symptoms. The prevalence of moderate or worse depressive symptoms increased during the 10-year observation window, and the educational differences in symptoms increased over this period as well. This was true for both men and women.

The logistic regression models in Table 2 (Models 1–2) estimated linear time trends in depressive symptoms for women and men in each education category. The odds ratios (ORs) on each education category-survey wave interaction term can be interpreted as the odds of moderate or worse depressive symptoms in a given survey wave relative to the odds of moderate or worse symptoms in the prior survey wave, within a particular category of educational attainment. Model 1 shows that for women with less than twelve years of education, the odds of having moderate or worse depressive symptoms increased about 24% between each two-year survey wave. There was a smaller increase over time in the odds of depression among women with a high school diploma or GED and with some college (15% and 12%, respectively). The odds of moderate or worse depressive symptoms among women with a college education or more did not show a statistically significant increase—or decrease—over time. A Wald test of the equality of the education-survey wave interaction coefficients indicates that the odds of moderate or worse depressive symptoms increased significantly more among the less educated than among the most educated ($p<0.001$). A similar pattern across educational attainment existed for men (Model 2). Those with less than a high school diploma and those with a diploma or GED saw statistically significant increases in the odds of moderate or worse depressive symptoms of about 15% and 10%, respectively, between each survey wave. Men with some college education did not see a statistically significant change in the odds of moderate or worse depressive symptoms, and the odds actually declined over time for men with a college degree or more. For both men and women, non-Hispanic black participants had greater odds of moderate or worse depressive symptoms compared to other race/ethnic groups.

Figure 2 shows depression prevalence between 2005 and 2014 by categories of educational attainment for men and women, using our more expansive definition based on respondents either having depressive symptoms (moderate or worse) or receiving mental health treatment (psychotherapy or psychopharmacotherapy). Among women, lower education levels were associated with higher depression rates across the entire time period (although, as for depressive symptoms, the relationship was not strictly monotonic in every survey wave). Depression prevalence increased between 2005–2006 and 2013–2014, most dramatically among those with lower educational attainment. Depression rates were substantially lower among men than women. Still, the same patterns were present for men as for women: a negative relationship between educational attainment and depression prevalence, and an increase over time in depression, especially among those with less educational attainment.

The logistic regression models in Table 2 (Models 3–4) show the time trends in depression prevalence among each sex-education group. Model 3 shows that the odds of depression increased by about 14% between each survey wave for women with less than twelve years of education. There was a smaller increase over time in the odds of depression among women with a high school diploma or GED and with some college (10%). The increase

in the odds of depression over time among women with a college education or more was substantially lower: about 5% per wave. The odds of depression increased significantly more over this time period among the less educated than among the most educated ($p<0.001$). Men exhibited a similar pattern, though at slightly lower levels (Model 2). Men with some college education or less experienced statistically significant increases in the odds of depression between 10 and 12% per wave compared to about 6% among college educated men. Using this definition of symptoms or treatment, white respondents had higher odds of depression than respondents of other races/ethnicities.

Figure 3 shows trends in depression treatment by educational attainment. That is, of those classified as depressed (meaning moderate or worse symptoms or receiving treatment; n=5,070), what fraction was receiving some kind of mental health treatment? There was substantial variation in treatment levels by educational attainment. Among college educated women and men with depression, over 80% reported receiving treatment in the form of therapy or antidepressants in each wave, while among those with less than twelve years of education, treatment rates were much lower, ranging between 55 and 75%.

The time trend of mental health treatment (conditional on depression) within each education group is indicated in Models 5–6 of Table 2. Treatment patterns over time diverged by educational attainment: the odds of receiving treatment among the least educated women fell by 19% (OR (95% CI): 0.81 (0.75, 0.88)) between each survey wave, while the odds of treatment among the most educated remained stable (1.03 (0.94, 1.13)). Among men, the odds of treatment among the least educated did not change significantly over time (1.01 (0.91, 1.12)), while odds of treatment among the best educated increased substantially (1.28 (1.14, 1.43)). For both men and women, the time trends in odds of treatment were significantly different by educational attainment category ($p=0.003$ and $p<0.001$, respectively). The odds of receiving mental health treatment were significantly higher for non-Hispanic white respondents than respondents of other races/ethnicities. When treatment by psychotherapy and psychopharmacology were considered separately, similar patterns were observed in each treatment (see Supplementary Figures S4–S6 and Supplementary Table S1).

Supplementary Figures S1–S3 replicate Figures 1–3 but focus on differences by family income rather than by education. Trends in depression disparities by income were substantively the same as those by educational attainment.

4. Discussion

In this study, we examined trends in depression disparities by educational attainment among US adults between 2005 and 2014. This was a 10-year period during which major changes occurred in the policy and economic environments that could plausibly affect rates of depression and treatment for depression, particularly among the most economically vulnerable. We found that disparities in depressive symptoms, depression prevalence, and depression treatment persisted or worsened throughout this period. This happened despite implementation of mental health parity laws designed to lower barriers to mental health care. The increase in disparities appears to have been driven primarily by an increase in

depressive symptoms among the least educated without offsetting gains in treatment. That depressive symptoms increased during a recession is not surprising, but the absence of gains in treatment for depression among those that should have been most affected by policy changes—including changes specifically designed to improve access to mental health care—during this period is concerning. The Affordable Care Act (ACA), while passed in 2010, was not implemented until mid-2014, so our data are unable to evaluate whether this policy, together with the Medicaid expansion, mattered for depression disparities by education.

Our findings are consistent with other studies of health disparities trends. Some recent reductions in disparities have been identified, notably in life expectancy, but substantial gaps in most chronic conditions persist (Bleich, Jarlenski, Bell, & LaVeist, 2012; McWilliams, 2009; Meyer et al., 2013).

This study has several limitations. We did not know the exact survey date within each two-year survey wave; perhaps with more frequent data we could better assess trends over time, and could certainly go further toward evaluating specific policy changes. Our data are cross-sectional, thereby limiting any claims on causality. Low education may have causally increased the risk of depression, but we can't rule out the possibility that depression instead limited educational opportunities. The PHQ-9 was a short depression screener; it is possible that a clinician would have reached different conclusions after an in-depth examination. Still, the PHQ-9 has been well-validated against in-depth health questionnaires and assessments by mental health professionals (Kroencke, Spitzer, & Williams, 2001).

Our definition of depression is expansive by design, including both those suffering from depressive symptoms (regardless of treatment) and those obtaining mental health treatment (regardless of symptoms). We used this definition because we wanted to include respondents who were being treated effectively for depression (i.e., well-controlled symptoms with treatment). However, respondents could have been receiving psychotherapy or pharmacotherapy for ailments other than depression, resulting in an overestimate of the prevalence of depression. Thus, all analyses were also conducted using the narrower definition of symptoms only. Still, we feel that this narrow definition likely underestimated the burden of depression by excluding those who were effectively treated for depression. One could think of the estimates based on these expansive and narrow definitions as upper and lower bounds of the true effect.

Another limitation is our inability to assess the quality or appropriateness of any mental health treatment. For example, recent evidence has pointed to potential over-prescription of antidepressants in some settings, particularly for racial/ethnic minorities and Medicaid beneficiaries (Rhee, Schommer, Capistrant, Hadsall, & Uden, 2018). Still, our results show persistent under-treatment of the less educated and racial/ethnic minorities, suggesting that, in aggregate, more treatment is needed, not less.

Future work could examine state-level variation over time to better understand whether state-level health parity laws or Medicaid expansion decisions affected disparities in depressive symptoms and depression treatment. This would provide clearer evidence for evaluating specific laws and policies relating to mental health parity. It would also address

the concern of state-level variation in antidepressant prescription practices (Huybrechts et al., 2013).

The most important implication of this study is that disparities in depressive symptoms and mental health treatment have persisted, despite policies specifically targeted to equalizing mental health care. It would seem that state-level parity laws have not been successful in reducing disparities in effective, high quality depression treatment. Indeed, evaluations of the state-level mental health parity laws have highlighted a number of weaknesses, including exemptions for small employers and self-insured plans (Buchmueller, Cooper, Jacobson, & Zuvekas, 2007). Furthermore, a number of mental health conditions, particularly those related to alcohol and drug abuse, were excluded from the parity laws enacted in some states, which may have limited the ability of patients to seek help for depression related to these conditions. As noted above, we cannot evaluate the impact of the ACA until more recent data are available, though some authors are hopeful that the new policy may have enacted significant improvements (Beronio, Glied, & Frank, 2014). In terms of clinical treatment, our results highlight access to any kind of mental health treatment as a major contributor to disparities.

Despite recent policies designed to increase access to health insurance and mental health care, depression treatment has lagged as depressive symptoms have worsened over the recent past, particularly among the least educated. We must rethink health care policy to ensure that mental health screening is widespread, and that appropriate, high-quality care is available for those who need it.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments:

We thank Katherine Keyes for helpful comments on a draft of this paper.

References

Adler NE, & Newman K (2002). Socioeconomic Disparities In Health: Pathways And Policies. Health Affairs, 21(2), 60–76. [PubMed: 11900187]

Beronio K, Glied S, & Frank R (2014). How the Affordable Care Act and Mental Health Parity and Addiction Equity Act Greatly Expand Coverage of Behavioral Health Care. The Journal of Behavioral Health Services & Research, 41(4), 410–428. 10.1007/s11414-014-9412-0 [PubMed: 24833486]

Bleich SN, Jarlenski MP, Bell CN, & LaVeist TA (2012). Health Inequalities: Trends, Progress, and Policy. Annual Review of Public Health, 33(1), 7–40. 10.1146/annurev-publhealth-031811-124658

Braveman P (2006). HEALTH DISPARITIES AND HEALTH EQUITY: Concepts and Measurement. Annual Review of Public Health, 27(1), 167–194. 10.1146/annurev.publhealth.27.021405.102103

Buchmueller TC, Cooper PF, Jacobson M, & Zuvekas SH (2007). Parity For Whom? Exemptions And The Extent Of State Mental Health Parity Legislation. Health Affairs, 26(4), w483–w487. 10.1377/hlthaff.26.4.w483 [PubMed: 17556379]

Cooper LA, Ortega AN, Ammerman AS, Buchwald D, Paskett ED, Powell LH, … Williams DR (2015). Calling for a Bold New Vision of Health Disparities Intervention Research. American Journal of Public Health, 105(S3), S374–S376. 10.2105/AJPH.2014.302386 [PubMed: 25905830]

Cuijpers P, Vogelzangs N, Twisk J, Kleiboer A, Li J, & Penninx BW (2014). Comprehensive Meta-Analysis of Excess Mortality in Depression in the General Community Versus Patients With Specific Illnesses. American Journal of Psychiatry, 171(4), 453–462. 10.1176/appi.ajp.2013.13030325 [PubMed: 24434956]

Curtin SC, Warner M, & Hedegaard H (2016). Increase in suicide in the United States, 1999–2014. National Center for Health Statistics Data Brief, (241).

Druss BG, Hwang I, Petukhova M, Sampson NA, Wang PS, & Kessler RC (2009). Impairment in role functioning in mental and chronic medical disorders in the United States: results from the National Comorbidity Survey Replication. Molecular Psychiatry, 14(7), 728–737. 10.1038/mp.2008.13 [PubMed: 18283278]

Edlund MJ, Wang PS, Berglund PA, Katz SJ, Lin E, & Kessler RC (2002). Dropping Out of Mental Health Treatment: Patterns and Predictors Among Epidemiological Survey Respondents in the United States and Ontario. American Journal of Psychiatry, 159(5), 845–851. 10.1176/appi.ajp.159.5.845 [PubMed: 11986140]

England MJ, & Sim LJ (2009). Depression in parents, parenting, and children: Opportunities to improve identification, treatment, and prevention (Vol. xvii). Washington, DC, US: National Academies Press.

González HM, Vega WA, Williams DR, Tarraf W, West BT, & Neighbors HW (2010). Depression Care in the United States: Too Little for Too Few. Archives of General Psychiatry, 67(1), 37–46. 10.1001/archgenpsychiatry.2009.168 [PubMed: 20048221]

Greenberg PE, Fournier A-A, Sisitsky T, Pike CT, & Kessler RC (2015). The economic burden of adults with major depressive disorder in the United States (2005 and 2010). J Clin Psychiatry, 76(2), 155–162. [PubMed: 25742202]

Houle JN (2014). Mental health in the foreclosure crisis. Social Science & Medicine (1982), 118, 1–8. 10.1016/j.socscimed.2014.07.054 [PubMed: 25084488]

Hudson DL, Neighbors HW, Geronimus AT, & Jackson JS (2012). The relationship between socioeconomic position and depression among a US nationally representative sample of African Americans. Social Psychiatry and Psychiatric Epidemiology, 47(3), 373–381. 10.1007/s00127-011-0348-x [PubMed: 21293845]

Huybrechts KF, Palmsten K, Mogun H, Kowal M, Avorn J, Setoguchi-Iwata S, & Hernández-Díaz S (2013). National trends in antidepressant medication treatment among publicly insured pregnant women. General Hospital Psychiatry, 35(3), 265–271. 10.1016/j.genhosppsych.2012.12.010 [PubMed: 23374897]

Kessler RC, Petukhova M, Sampson NA, Zaslavsky AM, & Wittchen H-U (2012). Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. International Journal of Methods in Psychiatric Research, 21(3), 169–184. 10.1002/mpr.1359 [PubMed: 22865617]

Kroencke K, Spitzer R, & Williams J (2001). The PHQ-9: validity of a brief depression severity measure [Electronic version]. Journal of General Internal Medicine, 16(9), 606–13. [PubMed: 11556941]

Kroenke K, & Spitzer RL (2002). The PHQ-9: A New Depression Diagnostic and Severity Measure. Psychiatric Annals, 32(9), 509–515. 10.3928/0048-5713-20020901-06

Kroenke K, Spitzer RL, Williams JBW, & Löwe B (2010). The Patient Health Questionnaire Somatic, Anxiety, and Depressive Symptom Scales: a systematic review. General Hospital Psychiatry, 32(4), 345–359. 10.1016/j.genhosppsych.2010.03.006 [PubMed: 20633738]

Link BG, & Phelan J (1995). Social conditions as fundamental causes of disease. Journal of Health and Social Behavior, Spec No, 80–94.

McFarland MJ, & Wagner BG (2015). Does a college education reduce depressive symptoms in American young adults? Social Science & Medicine, 146, 75–84. 10.1016/j.socscimed.2015.09.029 [PubMed: 26513116]

McWilliams JM (2009). Differences in Control of Cardiovascular Disease and Diabetes by Race, Ethnicity, and Education: U.S. Trends From 1999 to 2006 and Effects of Medicare Coverage. Annals of Internal Medicine, 150(8), 505. 10.7326/0003-4819-150-8-200904210-00005 [PubMed: 19380852]

Meyer PA, Penman-Aguilar A, Campbell VA, Graffunder C, O'Connor AE, Yoon PW, & Centers for Disease Control and Prevention (CDC). (2013). Conclusion and future directions: CDC Health Disparities and Inequalities Report - United States, 2013. MMWR Supplements, 62(3), 184–186. [PubMed: 24264513]

Mojtabai R, & Jorm AF (2015). Trends in psychological distress, depressive episodes and mental health treatment-seeking in the United States: 2001–2012. Journal of Affective Disorders, 174, 556–561. 10.1016/j.jad.2014.12.039 [PubMed: 25556674]

Murray CJL, Barber RM, Foreman KJ, Ozgoren AA, Abd-Allah F, Abera SF, … Vos T (2015). Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition. The Lancet, 386(10009), 2145–2191. 10.1016/S0140-6736(15)61340-X

Olfson M, Blanco C, Wall M, Liu S-M, Saha TD, Pickering RP, & Grant BF (2017). National Trends in Suicide Attempts Among Adults in the United States. JAMA Psychiatry 10.1001/jamapsychiatry.2017.2582

Olfson M, Marcus SC, Tedeschi M, & Wan GJ (2006). Continuity of Antidepressant Treatment for Adults With Depression in the United States. American Journal of Psychiatry, 163(1), 101–108. 10.1176/appi.ajp.163.1.101 [PubMed: 16390896]

Pratt LA, & Brody DJ (2014). Depression in the U.S. household population, 2009–2012. NCHS Data Brief, (172), 1–8.

Rhee TG, Schommer JC, Capistrant BD, Hadsall RL, & Uden DL (2018). Potentially Inappropriate Antidepressant Prescriptions Among Older Adults in Office-Based Outpatient Settings: National Trends from 2002 to 2012. Administration and Policy in Mental Health and Mental Health Services Research, 45(2), 224–235. 10.1007/s10488-017-0817-y [PubMed: 28730279]

Seabrook JA, & Avison WR (2012). Socioeconomic Status and Cumulative Disadvantage Processes across the Life Course: Implications for Health Outcomes. Canadian Review of Sociology/Revue canadienne de sociologie, 49(1), 50–68. 10.1111/j.1755-618X.2011.01280.x [PubMed: 22586837]

StataCorp. (2015). Stata Statistical Software: Release 14. College Station, Texas: StataCorp LP.

Stewart WF, Ricci JA, Chee E, Hahn SR, & Morganstein D (2003). Cost of lost productive work time among US workers with depression. Jama, 289(23), 3135–3144. [PubMed: 12813119]

United States Department of Health and Human Services. Centers for Disease Control and Prevention. National Center for Health Statistics. (2014). National Health and Nutrition Examination Survey: Sample Design, 2011–2014 (Vital and Health Statistics No. Series 2, Number 162).

United States Department of Health and Human Services. Centers for Disease Control and Prevention. National Center for Health Statistics. (n.d.). National Health and Nutrition Examination Survey, 2013–2014 Overview. Retrieved from https://www.cdc.gov/nchs/data/nhanes/nhanes_13_14/2013-14_overview_brochure.pdf

Wang PS, Lane M, Olfson M, Pincus HA, Wells KB, & Kessler RC (2005). Twelve-Month Use of Mental Health Services in the United States: Results From the National Comorbidity Survey Replication. Archives of General Psychiatry, 62(6), 629–640. 10.1001/archpsyc.62.6.629 [PubMed: 15939840]

Wang PS, Simon G, & Kessler RC (2003). The economic burden of depression and the cost-effectiveness of treatment. International Journal of Methods in Psychiatric Research, 12(1), 22–33. 10.1002/mpr.139 [PubMed: 12830307]

Warnecke RB, Oh A, Breen N, Gehlert S, Paskett E, Tucker KL, … Hiatt RA (2008). Approaching Health Disparities From a Population Perspective: The National Institutes of Health Centers for Population Health and Health Disparities. American Journal of Public Health, 98(9), 1608–1615. 10.2105/AJPH.2006.102525 [PubMed: 18633099]

Wittayanukorn S, Qian J, & Hansen RA (2014). Prevalence of depressive symptoms and predictors of treatment among U.S. adults from 2005 to 2010. General Hospital Psychiatry, 36(3), 330–336. 10.1016/j.genhosppsych.2013.12.009 [PubMed: 24462337]

Young AS, Klap R, Sherbourne CD, & Wells KB (2001). The Quality of Care for Depressive and Anxiety Disorders in the United States. Archives of General Psychiatry, 58(1), 55–61. 10.1001/archpsyc.58.1.55 [PubMed: 11146758]

Public policy relevance

Recent evidence suggests the prevalence of depression is increasing, but less is known about whether socioeconomic disparities in depression have changed. This study shows that despite policies designed to improve access to mental health care, disparities in depression by educational attainment have persisted or worsened between 2005 and 2014.

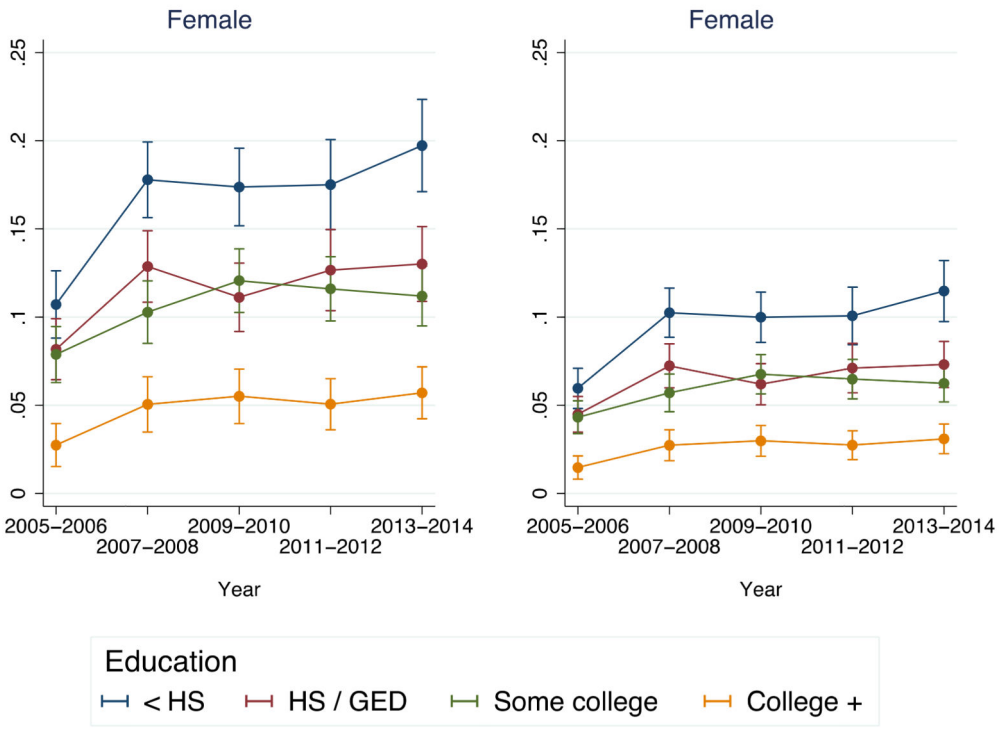

Figure 1: Prevalence of moderate or worse depressive symptoms by educational attainment, US adults 2005 – 2014

Note: Shown are predicted probabilities of a PHQ-9 score of ten or higher from a logistic regression model including education*survey wave interactions, sex, age, and race/ethnicity.

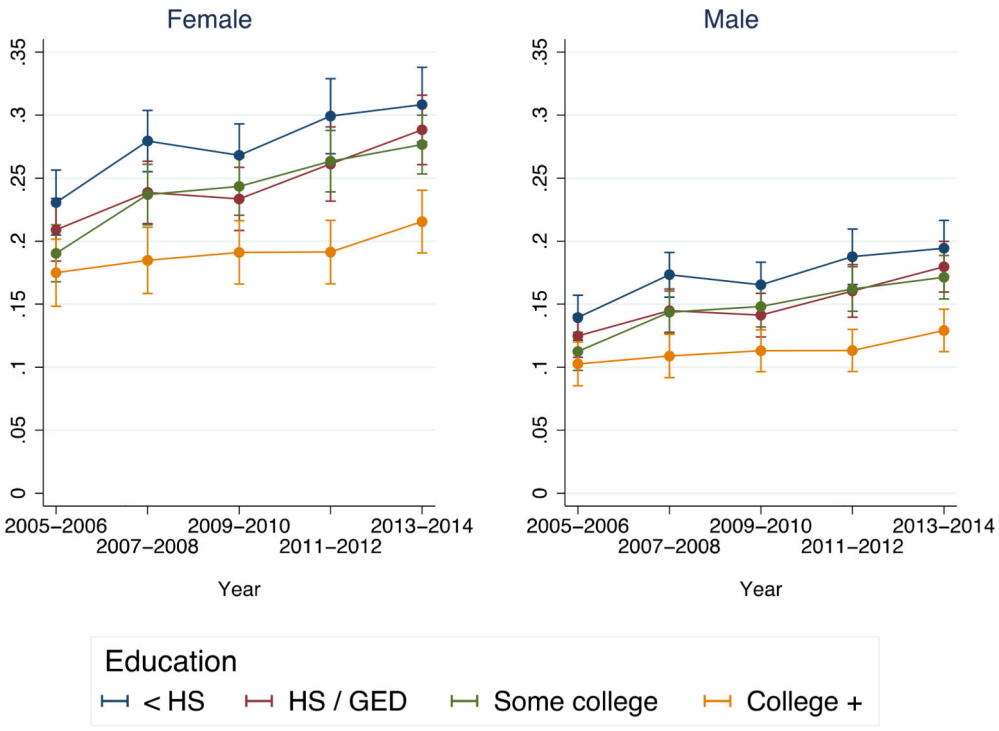

Figure 2: Prevalence of depression (defined by symptoms and/or treatment) by educational attainment, US adults 2005 – 2014

Note: Shown are predicted probabilities from a logistic regression model including education*survey wave interactions, sex, age, and race/ethnicity. An individual was considered depressed if at least one of the following criteria is met: 1) PHQ-9 score of 10 or higher, 2) respondent reported seeing a mental health professional for a health issue in the past twelve months, 3) respondent reported currently taking antidepressant medication.

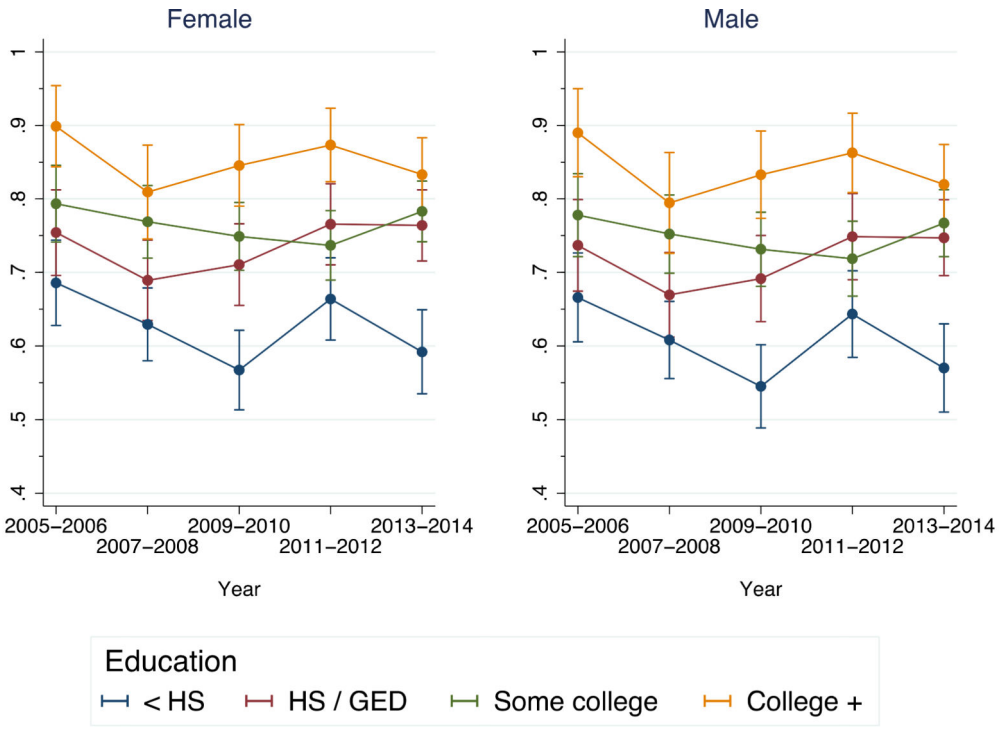

Figure 3: Treatment of depression by educational attainment, US adults 2005 – 2014

Note: Shown are predicted probabilities from a logistic regression model including education*survey wave interactions, sex, age, and race/ethnicity. The sample includes only respondents who scored 10 or higher on the PHQ-9, or reported seeing a mental health professional for a health issue in the last year, or reported currently taking an antidepressant medication.

Table 1:

Descriptive statistics of analytic sample

	Full sample		2005–2006		2007–2008		2009–2010		2011–2012		2013–2014	
	Mean or %	**(SD)**	**Mean or %**	**(SD)**	**Mean or %**	**(SD)**	**Mean or %**	**(SD)**	**Mean or %**	**(SD)**	**Mean or %**	**(SD)**
Male	48.9%		48.5%		48.6%		49.5%		49.3%		48.7%	
Age	46.1	(17.4)	45.4	(17.2)	45.7	(17.1)	46.3	(17.2)	46.6	(17.6)	46.5	(17.6)
Race/ethnicity												
Hispanic	13.4%		11.1%		13.5%		13.8%		13.8%		14.7%	
Non-Hispanic white	69.1%		72.8%		69.9%		69.0%		67.6%		66.6%	
Non-Hispanic black	11.2%		11.2%		11.3%		11.1%		11.3%		11.0%	
Other	6.3%		5.0%		5.3%		6.2%		7.4%		7.7%	
Depression prevalence	20.5%		18.0%		20.2%		19.1%		21.4%		23.6%	
Symptoms: PHQ9 >= 10	7.6%		5.4%		8.1%		7.7%		7.9%		8.6%	
Treatment: antidepressants	11.5%		10.1%		11.2%		9.9%		11.9%		14.0%	
Treatment: seeing therapist	7.9%		8.2%		7.5%		7.2%		8.3%		8.5%	
Any treatment (antidepressants or therapy)	16.3%		15.1%		15.6%		14.5%		17.0%		19.1%	
Education												
< 12 years	17.6%		17.4%		20.4%		18.7%		16.3%		15.5%	
HS grad/GED	23.4%		25.3%		25.6%		23.5%		20.8%		22.1%	
Some college	31.5%		31.6%		29.2%		30.7%		32.8%		32.8%	
College +	27.5%		25.6%		24.8%		27.1%		30.1%		29.6%	
Survey wave												
2005 – 2006	19.3%		100%		0%		0%		0%		0%	
2007 – 2008	19.7%		0%		100%		0%		0%		0%	
2009 – 2010	19.3%		0%		0%		100%		0%		0%	
2011 – 2012	20.3%		0%		0%		0%		100%		0%	
2013 – 2014	21.4%		0%		0%		0%		0%		100%	
N	26,037		4,797		5,412		5,534		4,923		5,371	

Table 2:

Logistic regression models: trends in depression prevalence, depression treatment, and depressive symptoms 2005–2014, by educational attainment

	(1)	(2)	(3)	(4)	(5)	(6)
	Moderate or worse depressive symptoms		Depression prevalence (symptoms and/or treatment)		Prevalence of treatment among the depressed	
	Women	Men	Women	Men	Women	Men
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Education category * survey wave						
< 12 years * wave	1.237	1.150	1.141	1.120	0.813	1.009
	(1.174, 1.304)	(1.074, 1.231)	(1.096, 1.188)	(1.066, 1.176)	(0.751, 0.879)	(0.911, 1.116)
HS graduate/GED * wave	1.147	1.101	1.103	1.110	0.894	1.111
	(1.088, 1.209)	(1.026, 1.181)	(1.060, 1.149)	(1.056, 1.166)	(0.826, 0.967)	(1.008, 1.225)
Some college * wave	1.120	1.067	1.099	1.101	0.916	1.149
	(1.063, 1.179)	(0.995, 1.145)	(1.058, 1.142)	(1.050, 1.155)	(0.849, 0.987)	(1.033, 1.278)
College + * wave	0.984	0.892	1.054	1.057	1.032	1.277
	(0.925, 1.047)	(0.817, 0.973)	(1.013, 1.096)	(1.005, 1.111)	(0.944, 1.128)	(1.137, 1.434)
Age	0.995	1.003	1.004	1.005	1.020	1.004
	(0.992, 0.998)	(0.999, 1.008)	(1.001, 1.006)	(1.002, 1.008)	(1.014, 1.027)	(0.996, 1.011)
Race/ethnicity						
Non-Hispanic white (reference)	-ref-	-ref-	-ref-	-ref-	-ref-	-ref-
	--	--	--	--	--	--
Non-Hispanic black	1.263	1.115	0.618	0.739	0.293	0.466
	(1.075, 1.484)	(0.903, 1.376)	(0.549, 0.696)	(0.639, 0.855)	(0.229, 0.375)	(0.344, 0.631)
Hispanic	1.007	0.895	0.572	0.562	0.315	0.351
	(0.848, 1.195)	(0.715, 1.120)	(0.503, 0.652)	(0.478, 0.661)	(0.247, 0.402)	(0.256, 0.483)
Other	0.930	1.273	0.484	0.743	0.498	0.446
	(0.693, 1.247)	(0.855, 1.894)	(0.392, 0.598)	(0.566, 0.974)	(0.313, 0.791)	(0.252, 0.791)
Constant	0.064	0.035	0.195	0.091	4.246	1.831
	(0.045, 0.092)	(0.021, 0.056)	(0.150, 0.253)	(0.065, 0.127)	(2.492, 7.235)	(0.908, 3.694)
Number of observations	13,219	12,818	13,219	12,818	3,179	1,891

	(1)	(2)	(3)	(4)	(5)	(6)
	Moderate or worse depressive symptoms		Depression prevalence (symptoms and/or treatment)		Prevalence of treatment among the depressed	
	Women OR (95% CI)	Men OR (95% CI)	Women OR (95% CI)	Men OR (95% CI)	Women OR (95% CI)	Men OR (95% CI)
P-value, test of equality of educ * wave coefficients	<0.001	<0.001	<0.001	0.004	<0.001	0.003