BRIEF REPORT

The Burden of Depression in New York City Adults: Results from the 2013–14 NYC Health and Nutrition Examination Survey

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Published online: 9 July 2018
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Abstract Depression is responsible for a large burden of disability in the USA. We estimated the prevalence of depression in the New York City (NYC) adult population in 2013–14 and examined associations with demographics, health behaviors, and employment status. Data from the 2013–14 New York City Health and Nutrition Examination Survey, a population-based examination study, were analyzed, and 1459 participants met the inclusion criteria for this analysis. We defined current symptomatic depression by a Patient Health Questionnaire (PHQ-9) score ≥ 10 . Overall, 8.3% of NYC adults had current symptomatic depression. New Yorkers with current symptomatic depression were significantly more likely to be female, Latino, and unemployed yet not looking for work; they were also significantly more likely to have less than a high school education and to live in a high-poverty neighborhood. Socioeconomic inequalities in mental health persist in NYC and highlight the need for better diagnosis and treatment.

Keywords Depression · Survey · Urban health · New York City · Epidemiology · PHQ-9

Introduction

Depression is a leading cause of disability in NYC and nationwide [1]. In NYC, in 2015, depression was the second leading cause of disability-adjusted life years (DALYs) and the leading cause of years lived with disability [2]. Depression can be treated, but rates of diagnosis and treatment remain low [1]. Low social support, limited education, and unemployment have been linked to depression [3]. Behaviors that negatively affect health have also been linked to depression, including alcohol use, smoking, and physical inactivity [4].

In 2013–2014, researchers at City University of New York School of Public Health (CUNY SPH; researchers are now at NYU) and New York City Department of Health and Mental Hygiene (NYC DOHMH) conducted the New York City Health and Nutrition Examination Survey (NYC HANES). We used these data to characterize the prevalence of current symptomatic depression in order to guide efforts to prevent, identify, and treat depression.

Methods

Design and Variable Definitions

NYC HANES 2013–14 was a cross-sectional, population-based survey of noninstitutionalized NYC adult household residents (ages ≥ 20 years); methods have been described previously [5]. The study had

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1527 participants, with an overall response rate of 36%. The Institutional Review Boards of the NYC DOHMH and CUNY SPH approved the study protocol.

We used the 9-item Patient Health Questionnaire (PHQ-9) to assess symptoms of depression in the past 2 weeks [6]. Items were summed, and scores ≥ 10 were considered indicative of moderate-to-severe depression. This analysis excluded participants who responded to fewer than 7 PHQ-9 questions, for a final sample size of 1459.

Diagnosed depression was defined as having current symptoms (PHQ-9 score ≥ 10), as well as reporting ever being told by a health professional that the participant was depressed. Undiagnosed depression was defined as PHQ-9 score ≥ 10 and not reporting having been told by a health professional that the participant was depressed.

We categorized participants as receiving mental health treatment if they reported seeing or talking to a mental health professional or taking medication prescribed for a mental or emotional condition in the past year. Health insurance status and having seen a primary care provider in the past year were also based on self-report.

We defined binge drinking as self-report of 4+ drinks for women or 5+ drinks for men in one night at least once in the past 30 days. Substance use was defined as self-reported use of cocaine, heroin, or methamphetamine in the past 12 months. We defined current smoking as self-report of smoking cigarettes either occasionally or every day. Participants were categorized as physically active if they reported being somewhat or very active, and inactive if they reported being not very or not at all active. Participants who self-reported an excellent, very good, or good diet were categorized as having a healthy diet, and participants who reported a fair or poor diet were categorized as having an unhealthy diet; self-report of diet has been shown to have good validity [7].

Self-report of work during the previous week was used to define and categorize employment status: employed (working at a job or business, or had a job or business but had not been at work), unemployed (not working and looking for work), and not looking (not working and not looking for work). Those who were not looking were asked for the main reason they did not work. In addition, all participants were asked if a mental or emotional problem kept them from working, and how many days in the past month poor physical or mental health kept them from doing their usual activities.

For race/ethnicity, we combined self-reported race and ethnicity into the following categories: nonLatino white, nonLatino black, Latino, nonLatino Asian, and nonLatino other. Neighborhood poverty was defined as the percentage of households in a census tract with annual income below the federal poverty threshold using American Community Survey 2008–2012 estimates.

Statistical Analysis

We characterized adults with current symptoms of depression (PHQ-9 ≥ 10) and those without (PHQ-9 < 10) by demographic, behavioral, and other characteristics, age-adjusted to the 2000 US standard population. Data were weighted to represent the NYC age 20+ household population, adjusting for complex survey design, non-response, and post-stratification [5], and additionally adjusted for item nonresponse. We conducted all analyses using SAS version 9.4 (SAS Institute Inc., Cary, NC) with SUDAAN version 11.0.1 (Research Triangle Institute, Research Triangle Park, NC). We used two-sided *t* tests with a level of significance of $\alpha > 0.05$.

Results

Overall, 8.3% of adult New Yorkers, representing more than 500,000 people, had symptoms of moderate-to-severe depression (PHQ-9 score ≥ 10) at the time of the NYC HANES interview (95% CI, 6.8–10.1%; Table 1), nearly half (46%, 95% CI 36.4–56.0%) of whom had never been diagnosed. More than half of those with current symptoms of depression (59%; 95% CI 48.7–68.5%) were not receiving counseling or medication. Of those with both symptoms of depression and a previous diagnosis, 39% were not receiving treatment (95% CI, 26.6–53.0%). Table 1 describes characteristics of adult New Yorkers with and without current symptoms of depression. NYC adults who had symptoms of depression were more likely than those without to be female (68%), Latino (42%), not looking for work (49%), and to have less than a high school education (35%) and live in neighborhoods with the greatest poverty (30%).

Adults with symptoms of depression were less likely than those without to be employed (38 vs 63%; $P < .001$) and less likely to have graduated from

Table 1 Adult new yorkers with current symptomatic depression (PHQ ≥ 10), NYC HANES 2013–14, by demographic characteristics

Characteristic	Total	Not depressed ^a % (95% CI) NYC adults	Depressed ^a % (95% CI) NYC adults	<i>P</i> value for difference ^b
Total	1459	91.7 (89.9–93.2)	8.3 (6.8–10.1)	
Sex				
Male	617	47.9 (45.4–50.4)	31.3 (23.1–40.8)	< 0.001
Female	842	52.1 (49.6–54.6)	68.7 (59.2–76.9)	
Age (in years)				
20–39	678	41.6 (38.1–45.1)	46.8 (37.1–56.7)	0.315
40–59	492	34.8 (31.8–38.0)	35.0 (26.4–44.7)	0.975
≥ 60	289	23.6 (20.7–26.7)	18.3 (11.4–27.9)	0.191
Education				
< High school diploma	284	16.4 (13.8–19.3)	35.2 (26.2–45.4)	< 0.001
High school/some college	559	46.8 (43.1–50.5)	48.6 (38.8–58.5)	0.730
College or higher	615	36.9 (32.7–41.2)	16.2 (10.7–23.7)	< 0.001
Marital status				
Never married	495	29.5 (26.6–32.6)	36.3 (28.6–44.7)	0.131
Married/living with partner	695	52.2 (48.5–55.9)	42.7 (34.1–51.8)	0.056
Divorced/separated/widowed	269	18.3 (15.9–21.0)	21.0 (14.0–30.2)	0.531
Place of birth				
United States	768	49.7 (45.5–53.9)	52.3 (42.4–62.0)	0.604
Foreign/US territory	683	50.3 (46.1–54.5)	47.7 (38.0–57.6)	
Race/ethnicity ^d				
NonLatino white	497	35.7 (30.4–41.4)	27.3 (18.9–37.6)	0.068
NonLatino black	329	21.5 (16.7–27.4)	19.4 (12.8–28.2)	0.563
Latino	367	25.8 (21.7–30.3)	41.5 (31.9–51.8)	0.001
NonLatino Asian	192	14.4 (11.2–18.4)	^c 8.4 (4.3–15.6)	0.032
Employment				
Unemployed	118	7.2 (5.7–9.2)	13.2 (7.5–22.4)	0.103
Not looking for work	417	30.0 (27.2–33.0)	49.1 (40.8–57.5)	< 0.001
Employed	923	62.8 (59.7–65.8)	37.6 (29.0–47.2)	< 0.001
Health insurance				
Insured	1214	82.8 (80.3–85.0)	84.7 (77.5–89.9)	0.538
Uninsured	241	17.2 (15.0–19.7)	15.3 (10.1–22.5)	
Neighborhood poverty (% below federal poverty threshold)				
Very high poverty (30–100%)	247	17.0 (11.3–24.8)	^c 29.7 (18.3–44.2)	0.013
High poverty (20–< 30%)	318	20.8 (14.6–28.8)	^c 25.3 (15.2–39.1)	0.352
Medium poverty (10–< 20%)	497	33.0 (25.2–41.7)	^c 29.5 (19.1–42.7)	0.501
Low poverty (< 10%)	397	29.2 (21.7–38.0)	15.4 (9.1–25.0)	< 0.001

NYC HANES, New York City Health and Nutrition Examination Survey; *CI*, confidence interval; *PHQ*, Patient Health Questionnaire

^a Adults with Patient Health Questionnaire (PHQ-9) score < 10 were characterized as not having current symptomatic depression and adults with PHQ-9 score ≥ 10 as having current symptomatic depression. Percentages are age-adjusted to the 2000 US standard population

^b *P* values determined by two-sided *t* tests with a level of significance of $\alpha > 0.05$

^c Estimate should be interpreted with caution. The estimate's relative standard error (a measure of estimate precision) is greater than 30%, or the 95% CI half-width is greater than 10 or the sample size is too small, making the estimate potentially unreliable

^d A "nonLatino other" category was included in calculations, but is not presented

college (16 vs 37%; $P < .001$). Nearly a third (30%) of New Yorkers with symptoms of depression reported that a mental or emotional problem kept them from working, in contrast to only 3% of adults without ($P < .001$). New Yorkers with symptomatic but undiagnosed depression were more than three times as likely to be unemployed than those who had been diagnosed (21 vs 6%; $P = .04$). Among the unemployed who were not looking for work, those with symptoms of depression were more likely than those without to not be looking because of poor health or disability (27 vs 7%; $P < .001$) and were less likely to be retired (6 vs 12%; $P = .04$).

Certain health and behavioral characteristics also varied between those with and without current symptoms of depression. However, the proportions of adults with symptomatic depression and those without were similar when comparing health insurance coverage (85 vs 83%; $P = .54$) and having seen a primary care provider in the past year (70 vs 76%; $P = .23$). Compared to adults without symptomatic depression, adults with symptomatic depression were more likely to report physical inactivity (45 vs 17%; $P < .001$), unhealthy diet (55 vs 27%; $P < .001$), and substance use (14 vs 6%; $P = .02$). New Yorkers who had symptomatic depression reported that poor physical or mental health kept them from doing their usual activities an average of 5.9 days in the last month—significantly higher than the 1.2 days reported by those without symptomatic depression ($P < .001$).

Discussion

We estimate that more than 500,000 NYC adults currently suffer from moderate-to-severe depression. Our findings not only underscore the large societal burden of depression in NYC, but they also suggest that nearly half of adults with depression symptoms have not been diagnosed (46%, 95% CI 36.4–56.0%), and the majority of the diagnosed are not being treated (59%; 95% CI 48.7–68.5%). NYC adults with depression are less likely to be employed and more likely to report that their physical or mental health keeps them from doing their usual activities. The prevalence of symptomatic depression in NYC is similar to that found in national surveys [1, 4]. We found that New Yorkers who had current symptomatic depression were disproportionately female, low

income, or Latino, which is consistent with nationwide findings [1]. Also consistent with our findings, depression nationwide has been associated with physical inactivity, alcohol and substance use, and poor diet [4, 8, 9].

Strengths of this study include the sampling design and weighting used in NYC HANES, which yielded a sample representative of NYC adults, although a higher overall response rate might have improved representativeness. Limitations include the use of survey measures based on self-report, which were susceptible to associated biases. The standardized screening for depression, however, reduced bias. Small sample sizes for some analyses may have limited statistical power to reliably estimate prevalence or detect differences between groups. Also, the cross-sectional survey did not allow us to establish temporality.

Low rates of diagnosis and treatment among New Yorkers with symptomatic depression indicate a need for increased screening in both primary care and mental health settings and for easier access to high-quality mental health treatment. Data from NYC HANES 2013–14 showed that only 36% of individuals with depression visited a mental health provider in the past year, while 70% saw a primary care physician, pointing to the primary care setting as a strategic place to identify, treat, and/or refer individuals with mental health problems. Both mental health and primary care providers can also work with patients to improve nutrition, increase exercise, and decrease substance use. New York City has an initiative called ThriveNYC that aims to address these issues by improving and expanding screening, treatment, and access to care for individuals with mental health disorders. Launched in 2015, ThriveNYC is a set of 54 initiatives aimed at closing treatment gaps, reducing disparities, and expanding resources in underserved communities [2].

Acknowledgments The authors thank Rhoda Schlamm for editorial assistance. The authors also thank the many people at the New York City Department of Health & Mental Hygiene and the City University of New York who provided support to the survey, the dedicated field staff who helped screen and interview participants, and the NYC HANES participants who made the study possible. Support for NYC HANES 2013–14 was primarily provided by the de Beaumont Foundation, with additional support from the Robert Wood Johnson Foundation, Robin Hood, the New York State Health Foundation, Quest Diagnostics, and the Doris Duke Charitable Foundation.

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