Serious psychological distress among adults with and without disabilities

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Abstract

Objectives: Our objective was to examine the extent to which serious psychological distress (SPD) is associated with behavioral and social correlates among US adults with self-reported disabilities.

Methods: Self-reported data on disability, SPD, and behavioral and social correlates were collected from 202,383 participants (aged ≥18 years) of the 2007 Behavioral Risk Factor Surveillance System. Adults with self-reported disabilities were identified using two standardized questions – one relating to activity limitation, the other to special equipment.

Results: The age-adjusted prevalence of SPD among adults with disabilities was nearly seven times higher than among adults without disabilities (14.1 % vs. 1.8 %, respectively). Adults with disabilities who have both activity limitations and who use assistive technology, and those with activity limitations only consistently experienced a higher prevalence of SPD than those who used assistive technology only (age-adjusted prevalence: 21.0 % and 12.7 % vs. 4.9 %). After adjusting for age, sex, race/ethnicity, educational attainment, marital status, and employment status, in the past 30 days SPD was more common among Hispanic persons, and was significantly associated with younger age, lower educational attainment, marital history, and employment status. Adults with SPD and disabilities experienced increased levels of risk behaviors, life dissatisfaction, and inadequate social support. Most importantly, just over half of adults with disabilities and SPD (51.6 % [95 % CI = 48.6–54.6]) were receiving medical care for a mental health condition compared to 20.6 % (95 % CI = 19.9–21.3) without SPD.

Conclusions: Given that SPD is strongly associated with both the behavioral and psychosocial determinants of health, this work underscores the need for evidence-based interventions that may reduce its prevalence among people living with disabilities.

Introduction

According to the US Census Bureau,[1] more than 50 million persons in the United States live with physical and mental disabilities. Worldwide, an estimated 650 million people (10 % of the world's population) are living with a disability.[2] By 2050, the public health measures that have preserved and prolonged life will result in two billion people projected to be aged 60 years or older worldwide and a substantial proportion of these people may be living with disabilities.[3,4] Each person's experience with disability is unique. Disability might have occurred in mid- to late-life as a result of chronic conditions that have affected a person's ability to function over time; or as a result of an event at or before birth, from a sudden illness, or from an injury or an act of violence.[5–7] Regardless of the cause, public health measures for persons with and without disabilities are essential to ensure that years lived are healthy ones.

On a global scale, Mathers and Loncar[8] have projected the burden of disease from 2002 to 2030. By 2030, the three leading causes of global burden of disease are projected to be HIV/AIDS (12.1 %), unipolar depressive disorders (UDD)

(5.7 %), and ischemic heart disease (IHD) (4.7 %); whereas, for high-income countries, UDD is projected to be the leading cause of disease burden (9.8 %), followed by IHD (5.9 %), and Alzheimer's disease and other dementias (5.8 %). Worldwide, by 2030 the projected burden of disease attributable to chronic conditions (57 %) is projected to exceed the combined projected burden of disease contributions of communicable, maternal, perinatal, and nutritional causes (30 %) and injuries (13 %). Furthermore, by 2030, neuropsychiatric conditions are projected to represent over a quarter (26 %) of chronic disease burden.

To address the need for enhanced public health surveillance of mental health at the population level, in 2007 the Centers for Disease Control and Prevention's (CDC's) Behavioral Risk Factor Surveillance Survey (BRFSS) incorporated the Kessler-6 (K-6) scale, a measure of nonspecific serious psychological distress (SPD).[9] The K-6 scale has been validated for surveillance purposes and has been operationalized by agencies in Australia, Canada, and the United States.[9–11] Thus, our study used BRFSS data from 2007 to (a) determine the prevalence of SPD in the past 30 days in adults with self-reported disabilities compared to adults without disabilities; and within the population with disabilities, (b) to characterize the sociodemographic correlates of SPD, and (c) to examine the association between SPD and adverse health behaviors and social functioning.

Methods

The BRFSS is a state-based surveillance system that is operated by state health departments in collaboration with CDC. A detailed description of the survey methods is available elsewhere.[12] Briefly, the BRFSS collects data on many of the behaviors and conditions that place adults (aged ≥ 18 years) at risk for chronic disease.[13,14] Trained interviewers collect data monthly using an independent probability sample of households with telephones among the noninstitutionalized US adult population. The data from each state are weighted to reflect both the respondent's probability of selection and the age- and sex-specific or race-/ethnicity-, age-, and sex-specific population of the state. Representative state estimates are then aggregated. All BRFSS questionnaires and data are available at www.cdc.gov/brfss. In 2007, 35 states, the District of Columbia, and Puerto Rico administered an optional *BRFSS Mental Illness and Stigma Module*.

Definitions
To assess the prevalence of SPD among adults aged 18 years or older, the standardized and validated K-6 scale of nonspe-

cific psychological distress[9] was used. The K-6 scale of nonspecific psychological distress consists of six questions to respondents about how frequently they experienced symptoms of psychological distress during the past 30 days. To create a score, the six questions on the K-6 scale were coded from 0 to 4 so that *all of the tim*e was coded 4, *most of the time* 3, *some of the time* 2, *a little of the time* 1, and *none of the time* 0, with *don't know* and *refuse* coded as missing and excluded from the analysis. The response codes (0–4) were summed to yield a score with a range from 0 to 24. Scores of ≥ 13 are used to define SPD[11]. A strong association between high scores (≥ 13) on the K-6 psychological distress scale and a current CIDI diagnosis of anxiety and affective disorders has been found.[15]

Respondents were considered to have a disability if they answered yes to either of two questions: "Are you limited in any way in any activities because of physical, mental, or emotional problems?" or "Do you now have any health problem that requires you to use special equipment, such as a cane, wheelchair, special bed, or special telephone?" Persons for whom responses to both questions were missing or who answered *don't know* or who refused to respond were excluded from the analysis. A disability status variable was constructed that included adults who indicated that they (1) had activity limitations and also used an assistive device, (2) had activity limitations only, or (3) used an assistive device but did not have activity limitations.

Statistical analyses
For this study, unadjusted prevalence estimates of the characteristics of the adult study population are presented by self-reported disability status. Prevalence estimates and their respective standard errors were obtained using SUDAAN's CROSSTAB procedure.[16] To facilitate comparisons between adults with and without self-reported disability, the prevalence of SPD is presented, age adjusted to the standard 2000 US population.[17] Adjusted prevalence ratios (APRs) for SPD in association with self-reported disability status were obtained using logistic regression analysis after adjustment for age, sex, race/ethnicity, educational attainment, marital status, and employment status. Finally, using only the subsample of adults with self-reported disability, we then used logistic regression analysis to estimate predicted marginal probabilities and APRs of sociodemographic characteristics, health behaviors, health status, life satisfaction, social and emotional support, and receipt of mental health care, by SPD status. For all analyses, *P* values < 0.05 were considered significant. To account for the complex survey design, we used SAS-callable SUDAAN in all analyses.[16] Eleven states – Colorado, Kansas, Maine,

	n	With disability (27.9 million persons) % (95 % CI)	Without disability (109.3 million persons) % (95 % CI)
Age (years)[a]			
18–24	7,493	4.8 (4.3–5.4)	12.9 (12.4–13.4)
25–34	18,490	8.9 (8.3–9.6)	18.8 (18.3–19.3)
35–44	32,549	15.5 (14.8–16.2)	23.0 (22.6–23.5)
45–54	42,711	20.5 (19.8–21.1)	19.5 (19.1–19.9)
55–64	42,006	21.4 (20.8–22.1)	12.8 (12.5–13.1)
65–74	30,513	13.3 (12.8–13.8)	7.4 (7.2–7.6)
≥75	24,708	15.7 (15.1–16.2)	5.6 (5.4–5.8)
Sex[a]			
Male	75,174	45.2 (44.3–46.1)	49.4 (48.9–50.0)
Female	127,209	54.8 (53.9–55.7)	50.6 (50.0–51.1)
Race/ethnicity[a]			
White, non-Hispanic	158,220	74.0 (73.0–74.9)	67.9 (67.4–68.5)
Black, non-Hispanic	14,314	8.9 (8.4–9.6)	7.8 (7.5–8.1)
Hispanic	15,503	10.5 (9.8–11.3)	16.7 (16.1–17.2)
Other[b]	12,659	6.6 (6.1–7.1)	7.6 (7.2–8.0)
Education[a]			
<High school	19,223	14.4 (13.7–15.0)	10.4 (10.0–10.8)
High school	59,385	30.5 (29.7–31.3)	27.0 (26.5–27.5)
>High school	123,444	55.1 (54.3–56.0)	62.6 (62.0–63.1)
Employment status[a]			
Employed	110,373	35.8 (34.9–36.7)	68.0 (67.5–68.5)
Unemployed	7,123	6.1 (5.7–6.6)	4.3 (4.1–4.6)
Retired	51,186	27.2 (26.6–27.9)	12.5 (12.3–12.8)
Homemaker/Student	20,502	9.9 (9.4–10.5)	14.2 (13.8–14.6)
Unable to work	12,742	21.0 (20.2–21.7)	1.0 (0.9–1.1)
Marital status[a]			
Married	114,483	55.3 (54.4–56.2)	63.6 (63.0–64.1)
Previously married	58,665	28.5 (27.8–29.3)	13.6 (13.3–14.0)
Never married	23,853	13.4 (12.6–14.2)	18.4 (17.9–18.9)
Unmarried couple	4,860	2.8 (2.5–3.2)	4.4 (4.1–4.7)
Disability status			
Activity limitations & assistive device use	14,764	25.7 (25.0–26.5)	NA
Activity limitations only	33,510	66.7 (65.9–67.5)	NA
Assistive device use only	4,182	7.6 (7.2–8.0)	NA

Table 1. Prevalence of characteristics of adults aged ≥18 years, by self-reported disability status – BRFSS, 2007.

Note. BRFSS, Behavioral Risk Factor Surveillance System; n, unweighted sample size; %, weighted prevalence; 95% CI, 95% confidence interval.
[a]Statistically significant difference in variable proportions across self-reported disability status, P <0.0001.
[b]Other race includes Asian, non-Hispanic; Native Hawaiian or other Pacific Islander, non-Hispanic; American Indian or Alaska Native, non-Hispanic; multiracial, non-Hispanic; and other race, non-Hispanic.

Massachusetts, Michigan, Nebraska, Ohio, Oregon, Texas, Washington, and Wisconsin – collected the Mental Illness and Stigma Module on a subset of their respective state's sample. Information on the weighting methodology and the weights to use for each of these states can be found at http://www.cdc.gov/brfss/technical_infodata/surveyda-ta/2007/2007_dual.htm.

The median cooperation rate among states for the 2007 BRFSS was 72.1%.[18] Data were available for 202,383 respondents (52,456 with self-reported disability and 149,927 without self-reported disability) who responded to the Mental Illness and Stigma Module and the disability questions in 2007.

	Serious psychological distress	
	With disability	**Without disability**
Prevalence, % (95 % CI)	12.3 (11.7–13.0)	1.8 (1.7–2.0)
Activity limitations & assistive device use	16.5 (15.1–18.1)	
Activity limitations only	11.4 (10.7–12.2)	
Assistive device use only	5.4 (4.2–7.0)	
Age-adjusted prevalence, % (95 % CI)	14.1 (13.2–15.1)	1.8 (1.6–2.0)
Activity limitations & assistive device use	21.0 (18.0–24.4)	
Activity limitations only	12.7 (11.7–13.7)	
Assistive device use only	4.9 (3.4–6.8)	
APR (95 % CI)	4.74 (4.19–5.30)	1.00
Activity limitations & assistive device use	5.78 (4.71–6.85)	1.00
Activity limitations only	4.64 (4.05–5.23)	1.00
Assistive device use only	2.86 (1.89–3.84)	1.00

Table 2. Estimates of prevalence, age-adjusted[a] prevalence, and adjusted[b] prevalence ratio (APR) for serious psychological distress among adults aged 18 years or older by disability status, 2007.

%, weighted prevalence; 95 % CI, 95 % confidence interval.
[a]Age-adjusted to the 2000 US standard population
[b]Adjusted for age, sex, race/ethnicity, educational attainment, marital status, and employment status.

Results

A description of the characteristics of the study population can be found in Table 1. Among adults aged 18 years or older in the 35 states, the District of Columbia, and Puerto Rico, the prevalence of self-reported disability was 20.1 % (95 % confidence interval [CI] = 19.8 %–20.5 %), and the prevalence of SPD was 3.9 % (95 % CI = 3.8 %–4.1 %).

Adults with self-reported disability, when compared to those without self-reported disability, were more likely to report SPD (age-adjusted prevalence: 14.1 % vs. 1.8 %, APR [95 % CI] = 4.74 [4.19–5.30]) (Table 2). Adults with self-reported disability who only reported use of assistive technology had the lowest prevalence of SPD; followed by adults who only reported activity limitations; and finally, those who reported both activity limitation and using assistive technology had the highest prevalence of SPD (age-adjusted prevalence: 4.9 %, 12.7 %, and 21.0 %, respectively; APR: 2.86, 4.64, and 5.78, respectively).

Among adults with self-reported disability, the following sociodemographic characteristics were independently associated with a higher prevalence of SPD: younger persons, Hispanics (vs. white, non-Hispanics), high school education or lower (vs. some college or higher), previously married or never married (vs. currently married), and currently unemployed, retired, homemaker or student, unable to work (vs. currently employed) (Table 3). Notably, employment status and age were strongly correlated with SPD. The prevalence of SPD among adults with self-reported disability who were unable to work was almost four times the prevalence among those who were employed (28.6 % vs. 6.7 %, APR [95 % CI] =

3.72 [3.15–4.30]). Furthermore, the prevalence of SPD among adults who were unemployed was about three times the prevalence among those who were employed (23.2 % vs. 6.7 %, APR [95 % CI] = 2.94 [2.34–3.55]). The prevalence of SPD among adults aged 25–34 years and aged 35–44 years were over three times the prevalence among those aged 75 years or older (17.5 % and 18.3 % vs. 4.8 %, respectively, APRs [95 % CIs] = 3.50 [2.63–4.36] and 3.43 [2.69–4.17], respectively). Sex did not contribute significantly to the prevalence of SPD. Logistic regression analysis determined that, among adults with self-reported disability, those with SPD were significantly more likely than those without SPD to consume <5 servings of fruits and vegetables, to be physically inactive, to be a current smoker, and to be a binge drinker or heavy drinker (Table 4). Persons with SPD were no more likely to be obese than those without SPD (37.6 % vs. 36.4 %, APR [95 % CI] = 1.03 [0.95–1.11]).

Moreover, after adjusting for age, sex, race/ethnicity, educational attainment, marital status, and employment status, we found that adults with self-reported disabilities and SPD surveyed in the 35 states, the District of Columbia, and Puerto Rico were more likely than adults with self-reported disability and no SPD to report fair/poor general health (62.9 % vs. 41.1 %, APR [95 % CI] = 1.53 [1.45–1.61]) (Table 5). Adults with SPD were also significantly more likely than those without this condition to report being dissatisfied or very dissatisfied with life and to report rarely or never receiving the social and emotional support they need (46.2 % vs. 8.8 %, APR [95 % CI] = 5.24 [4.75–5.72] and 29.3 % vs. 9.5 %, APR [95 % CI] = 3.10 [2.74–3.46], respectively). Notably, among adults with self-reported disability and SPD, the prevalence of

| | Serious psychological distress | | |
	Unadjusted prevalence % (95 % CI)	Adjusted prevalence % (95 % CI)	APR (95 % CI)
Total	12.3 (11.7–13.0)	9.6 (8.9–10.3)	
Age group			
18–24	13.3 (10.2–17.3)	12.3 (8.6–16.0)	2.33 (1.52–3.14)
25–34	17.5 (14.7–20.8)	18.5 (15.2–21.7)	3.50 (2.63–4.36)
35–44	18.3 (16.0–20.9)	18.1 (15.8–20.4)	3.43 (2.69–4.17)
45–54	16.1 (14.8–17.5)	15.2 (13.8–16.7)	2.88 (2.31–3.46)
55–64	11.1 (10.0–12.3)	10.7 (9.7–11.8)	2.03 (1.62–2.44)
65–74	6.3 (5.1–7.7)	6.9 (5.4–8.5)	1.31 (0.94–1.69)
≥75	4.8 (4.1–5.5)	5.3 (4.4–6.2)	1.00
Sex			
Male	12.0 (11.0–13.2)	12.1 (11.0–13.2)	1.00
Female	12.5 (11.8–13.3)	12.5 (11.7–13.3)	1.03 (0.92–1.15)
Race/ethnicity			
White, non-Hispanic	10.5 (10.0–11.1)	11.7 (11.0–12.4)	1.00
Black, non-Hispanic	17.3 (13.9–21.2)	12.2 (9.6–14.7)	1.04 (0.82–1.26)
Hispanic	19.2 (16.4–22.4)	15.1 (12.7–17.6)	1.29 (1.07–1.51)
Other, non-Hispanic	14.6 (12.2–17.3)	13.1 (10.8–15.4)	1.12 (0.91–1.33)
Educational status			
<High school	22.5 (20.4–24.7)	17.9 (16.1–19.7)	1.81 (1.56–2.06)
High school	13.9 (12.8–15.1)	13.1 (12.0–14.1)	1.32 (1.15–1.48)
>High school	8.7 (8.0–9.6)	9.9 (9.0–10.8)	1.00
Marital status			
Married	9.4 (8.7–10.2)	10.6 (9.7–11.5)	1.00
Previously married	14.6 (13.7–15.6)	14.6 (13.5–15.7)	1.38 (1.22–1.54)
Never married	17.7 (15.1–20.6)	13.1 (11.1–15.2)	1.24 (1.02–1.46)
Unmarried couple	19.3 (14.6–25.1)	14.6 (10.0–19.1)	1.38 (0.93–1.82)
Employment status			
Employed	6.7 (5.9–7.6)	6.1 (5.3–6.9)	1.00
Unemployed	23.2 (20.0–26.8)	18.0 (15.2–20.9)	2.94 (2.34–3.55)
Retired	5.1 (4.6–5.7)	9.2 (7.7–10.6)	1.49 (1.19–1.80)
Homemaker/Student	11.3 (9.3–13.6)	10.9 (8.7–13.1)	1.78 (1.36–2.21)
Unable to work	28.6 (26.7–30.7)	22.8 (21.0–24.7)	3.72 (3.15–4.30)

%, weighted prevalence; 95% CI, 95% confidence interval.
[a]Adjusted for all variables in the table.

Table 3. Unadjusted prevalence and adjusted[a] prevalence and prevalence ratios (APRs) for serious psychological distress among adults aged 18 years or older with self-reported disability by selected sociodemographic characteristics, 2007.

receiving medication or treatment for a mental health condition was over two times the prevalence among those without SPD (51.6 % vs. 20.6 %, APR [95 % CI] = 2.50 [2.33–2.67]).

Discussion

This study was conducted in a large, state-based population, and has several important findings. First, we found the age-adjusted prevalence of serious psychological distress (SPD) among adults with disabilities was nearly seven times higher than among adults without disabilities (14.1 % vs. 1.8 %,

respectively). Second, among adults with disabilities, those with activity limitations and who use assistive technology, and those with activity limitations only consistently experienced a higher prevalence of SPD than those who used assistive technology only. Third, after adjusting for covariates, SPD in the past 30 days was significantly associated with younger age, being of Hispanic ethnicity, lower educational attainment, being previously or never married, and not being employed. Fourth, we found that SPD among adults with disabilities was associated with an increased level of risk behaviors, life dissatisfaction, and inadequate social support. Finally, and perhaps most importantly, we found that just over half of adults

	Serious psychological distress	
	Yes	**No**
Health-Risk Behaviors		
<5 Fruit or vegetable servings per day		
% (95 % CI)	80.9 (78.7–83.0)[b]	74.9 (74.1–75.7)
Adjusted prevalence, % (95 % CI)	78.8 (76.3–81.2)[d]	75.1 (74.3–76.0)
APR (95 % CI)	1.05 (1.01–1.08)	1.00
Physically inactive		
% (95 % CI)	52.2 (49.3–55.1)[b]	36.0 (35.1–36.8)
Adjusted prevalence, % (95 % CI)	45.7 (42.7–48.7)[b]	36.7 (35.8–37.6)
APR (95 % CI)	1.24 (1.16–1.33)	1.0
Current smoker		
% (95 % CI)	43.9 (41.2–46.7)[b]	22.1 (21.3–22.9)
Adjusted prevalence, % (95 % CI)	32.1 (29.8–34.4)[b]	23.3 (22.5–24.2)
APR (95 % CI)	1.38 (1.27–1.49)	1.00
Binge drinker		
% (95 % CI)	15.1 (13.0–17.4)[c]	10.7 (10.0–11.5)
Adjusted prevalence, % (95 % CI)	14.4 (12.2–16.6)[d]	10.6 (9.9–11.3)
APR (95 % CI)	1.36 (1.13–1.58)	1.00
Heavy drinker		
% (95 % CI)	6.1 (4.9–7.5)[e]	4.5 (4.1–4.9)
Adjusted prevalence, % (95 % CI)	6.5 (5.0–7.9)[d]	4.3 (3.9–4.8)
APR (95 % CI)	1.49 (1.13–1.86)	1.00
Obese (Body mass index ≥30 kg/m²)		
% (95 % CI)	41.2 (38.4–44.1)[c]	35.8 (35.0–36.7)
Adjusted prevalence, % (95 % CI)	37.6 (34.8–40.5)	36.4 (35.5–37.4)
APR (95 % CI)	1.03 (0.95–1.11)	1.00

Table 4. Unadjusted prevalence (%) and adjusted[a] prevalence (%) and prevalence ratios (APRs) of health-risk behaviors and obesity among adults aged 18 years or older with self-reported disability by serious psychological distress status, 2007.

%, weighted prevalence; 95 % CI, 95 % Confidence Interval; APR, adjusted prevalence ratio.
[a]Adjusted for age, sex, race/ethnicity, education, marital status, and employment status.
[b]P <0.0001; [c]P <0.001; [d]P <0.01; [e]P<0.05.

with disabilities and SPD were receiving medical care for a mental health condition.

Our finding that disability is associated significantly with SPD is consistent with scientific literature showing that depressive disorders are among the most prevalent and serious secondary conditions related to disability,[19–27] and indeed, they may also be the primary health condition.[24] One large cross-sectional study found the prevalence of SPD highest among Los Angeles County, CA adults reporting disabilities compared to the general adult population (28 % vs. 5 %).[25] Similarly, using cross-sectional data from the 2002 National Health Interview Survey (NHIS), Shih et al.[28] found a significantly higher prevalence of SPD among adults with arthritis who reported 4 or more functional limitations compared to those without any functional limitations (16.6 % vs. 2.0 %). Furthermore, the NHIS[29] reported that adults with SPD were more likely to have functional limitations than adults without SPD (activities of daily living [ADLs]: 9.8 % vs. 1.4 %; instrumental ADLs: 19.3 % vs. 3.2 %). These results illustrate that it is possible, and in fact,

probable that there is a bi-directional association between SPD and disability. Given the cross-sectional nature of this study, the direction of this association cannot be fully elucidated.

Our result that adults who use assistive technology only had a lower prevalence of SPD than those who have activity limitations may demonstrate the positive psychosocial impact attained by management of functional disabilities through the use of adaptive strategies. For example, electronic aids of daily living have been reported to have a positive psychosocial impact among adults with cervical spine cord injuries and degenerative neuromuscular conditions by increasing functional abilities for a variety of household tasks.[30,31] Moreover, Mann et al.[32] examined how functional status, impairment level, and use of assistive devices changed over a three year period among older adults with depressive symptoms. These researchers reported that even with increased functional disability, the use of assistive technologies to increase independence and extend societal participation, was associated with a decline in severity of depressive symptoms.

	Serious psychological distress	
	Yes	**No**
Fair or poor health status		
% (95 % CI)	71.8 (69.2–74.2)[b]	39.6 (38.7–40.5)
Adjusted prevalence, % (95 % CI)	62.9 (60.1–65.8)[b]	41.1 (40.2–42.0)
APR (95 % CI)	1.53 (1.45–1.61)	1.0
Dissatisfied or very dissatisfied with life		
% (95 % CI)	54.7 (51.8–57.6)[b]	8.4 (7.9–9.0)
Adjusted prevalence, % (95 % CI)	46.2 (43.2–49.3)[b]	8.8 (8.2–9.4)
APR (95 % CI)	5.24 (4.75–5.72)	1.0
Rarely or never receive social and emotional support		
% (95 % CI)	34.8 (31.8–37.8)[b]	9.2 (8.7–9.8)
Adjusted prevalence, % (95 % CI)	29.3 (26.5–32.2)[b]	9.5 (8.9–10.1)
APR (95 % CI)	3.10 (2.74–3.46)	1.0
Receiving medication or treatment for mental health condition		
% (95 % CI)	58.9 (55.9–61.8)[b]	19.8 (19.1–20.5)
Adjusted prevalence, % (95 % CI)	51.6 (48.6–54.6)[b]	20.6 (19.9–21.3)
APR (95 % CI)	2.50 (2.33–2.67)	1.0

Table 5. Unadjusted prevalence (%) and adjusted[a] prevalence (%) and prevalence ratios (APRs) of fair or poor health status, dissatisfaction with life, perceived inadequate social and emotional support, and receipt of care for mental health condition among adults with self-reported disability aged 18 years or older by serious psychological distress status, 2007.

%, weighted prevalence; 95% CI, 95% confidence interval; APR, adjusted prevalence ratio.
[a]Adjusted by age, sex, race/ethnicity, education, marital status, and employment status.
[b]$P < 0.0001$.

Consistent with previous studies,[25,28,29,33–35] younger age and not being employed were the strongest correlates of SPD among the sociodemographic characteristics studied. For instance, Van Gundy and Schieman[35] examined the mediating role played by introspectiveness in the relationships between age, physical disability, and depression; they found that older adults tend to be less introspective than younger adults, which could partially explain the lower rates of depression among older adults. However, McDermott et al.[36] noted that the prevalence of depression may vary depending upon age of disability onset. Specifically, these researchers found a higher prevalence of depression among individuals with adult onset disabilities, such as stroke and traumatic brain injury, compared to those with lifelong disabilities (e.g., mental retardation, cerebral palsy).

Among the general adult population, the NHIS[29] found a higher prevalence of SPD among older Hispanic persons than in other older adults. Similarly, we found that among adults with disabilities, Hispanic people had a higher prevalence of SPD than other racial/ethnic groups. However, other researchers who have reported on the prevalence of SPD in adults with chronic conditions (i.e., arthritis, diabetes, multiple conditions) have not replicated this finding.[25,28,37] Furthermore, NHIS found a higher prevalence of SPD among females than among males in the general adult population. Our research of adults with disabilities and other studies that have focused on chronic conditions has not shown a difference in the prevalence of SPD between males and females.[25,37]

There is growing recognition of the influence of depressive disorders on the health, well-being, and longevity of persons with and without disabilities.[20,24,25,28,38–42] Previous research shows that the presence of depression and mood disorders are associated with adverse health behaviors; impaired health-related quality of life; work role impairment; and loss of valued activities in adults with disabilities.[20,25,26,28,41–45] Our study results also demonstrate the deleterious effect depression can have on the health behaviors, health status, and social connectedness of adults with disabilities. Specifically, among adults with disabilities, those with SPD had a significantly higher prevalence of unhealthy behaviors, fair or poor health, lower levels of life satisfaction, and diminished social and emotional support than those without SPD.

Our study has several limitations. First, because the BRFSS excludes institutionalized persons and those without telephones, as well as those unable to complete the survey because of cognitive or sensory limitations, lack of stamina, or an inability to get to the phone, our findings probably underestimate the true prevalence of depression in the United States. Even so, Kinne and Topolski[46] found that population telephone surveys such as the BRFSS do not underrepresent adults with disabilities. Second, the questions used to define disability are subject to definition circularity; they do not distinguish between psychiatric disabilities and other disabling conditions, which might have depression as a major symptom. Third, we relied on self-reported measures of disability to evaluate other self-reported measures of health (i.e., SPD), a circularity that is hard to avoid

when using population survey data. Fourth, we were not able to determine the duration of the disability, nor could we account for its severity. However, use of disability status (i.e., both activity limitations and use of technology, activity limitations only, and technology use only) might have mitigated these particular limitations. Finally, because our analysis was based on data from 35 states, the District of Columbia, and Puerto Rico, our results are not representative of the entire country.

Despite these limitations, our results provide evidence of the high prevalence of SPD among adults with disabilities, particularly among those with unhealthy lifestyles, impaired health-related quality of life (HRQOL), low levels of life satisfaction, and those with inadequate social and emotional support. Our results demonstrate that, among adults with disabilities, SPD is associated with both the behavioral and psychosocial determinants of health; and, indeed, might be more disabling than the primary disabling condition.

In the United States and worldwide, depression is a leading contributor to burden of disease and disability[8,45] and is associated with adverse health behaviors, medical noncompliance, impaired HRQOL and social functioning, and an increased use of health care resources.[41,42,44,45,47–51] Major depression is especially disabling, affecting more than 16 % of the general US population at some time in their life; although even moderate depression has been shown to affect daily functioning.[20,52] Furthermore, among persons with disabilities, depression could lead to further impairments, progres-

sion of disability, and decreased longevity.[20,24] Kemp[20] indicated that persons with disability may have an increased risk of depression compared to the general population because of the "increased stresses that frequently accompany having a disability" (p. 237). For example, in addition to their health, persons with disabilities are challenged at higher rates than persons without disabilities – economically, environmentally, interpersonally, and vocationally.[20]

Globally, public policy plays a critical role in shaping both the physical and social environments in which we live. Ensuring complete access to these environments is essential for the health, well-being, and full societal participation of persons living with disabilities. Given that SPD is strongly associated with both the behavioral and psychosocial determinants of health, this work underscores the need for evidence-based interventions that may reduce its prevalence among people living with disabilities.

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