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Original article

State-based differences in the prevalence and characteristics of untreated persons with serious psychological distress

Tara W. Strine[1], Satvinder S. Dhingra[1], Catherine A. Okoro[1], Matthew M. Zack[1], Lina S. Balluz[1], Joyce T. Berry[2], Ali H. Mokdad[3]

[1] *Centers for Disease Control and Prevention, Atlanta. GA, USA*
[2] *Substance Abuse and Mental Health Services Administration. Washington, D.C., USA*
[3] *Institute for Health Metrics and Evaluation, University of Washington. Seattle, WA, USA*

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Abstract

Objectives: To examine the state-based prevalence of serious psychological distress (SPD) and its treatment using the Kessler-6 scale.

Methods: SPD and treatment data were obtained from 202,114 respondents in the 2007 Behavioral Risk Factor Surveillance System Mental Illness and Stigma Module in 35 states, the District of Columbia, and Puerto Rico.

Results: Approximately 4.0 % of persons in the 35 states, the District of Columbia, and Puerto Rico had SPD. The prevalence estimates ranged from 2.3 % in Iowa to 6.6 % in Mississippi. Among persons with SPD, 53.4 % were currently untreated, ranging from 33.3 % in Alaska to 67.0 % in Hawaii.

Conclusions: Mental health parity and a multidimensional approach to healthcare with extensive referrals between mental and physical healthcare is warranted.

Keywords: Serious psychological distress – Mental illness – Treatment – Behavioral Risk Factor Surveillance System.

Introduction

Mental health is widely recognized as an important component of overall health.[1] Mental disorders are among the most common debilitating chronic diseases worldwide.[2] Additionally, these disorders increase the severity of other chronic illnesses and the prevalence of health-compromising behaviors.[3] Large-scale surveys such as the National Comorbidity Survey,[4] the National Comorbidity Survey Replication (United States),[5] the Mental Health Supplement to Ontario Health Survey (Canada),[6] the Australian National Survey of Mental Health and Wellbeing,[7] the New Zealand Mental Health Survey,[8] and the Netherlands Mental Health and Incidence Study[9] have reported that the 12-month prevalence of mental health problems is between 19 % and 30 %. In the general U.S. population, the lifetime prevalence of any mental disorder is 46.4 %,[10] and the 12-month prevalence of serious mental illness is 5.4 %.[11]

Most mental health conditions go untreated.[6] In interviews conducted in 14 countries (8 developed, 6 less developed) between 2001 and 2003, 35.5 % to 50.3 % of serious cases of mental illness in developed countries and 76.3 % to 85.4 % in less developed countries went untreated in the 12 months prior to the interviews.[12] In a meta-analysis containing 27 studies (over 150,000 subjects) from 16 European countries, it was estimated that about 27 % of the adult European population between the ages of 18 and 65 had been affected by at least one mental disorder in the past 12 months. Notably, only 26 % of all cases had consulted with a health care professional.[13] In the United States in 1994, Kessler and his colleagues reported that less than 40 % of persons aged 15–54, with a lifetime DSM-III-R psychiatric disorder, ever received any professional treatment and less than 20 % of those with a recent disorder had been in treatment during the past 12 months.[4]

In 2007, state health departments, the Centers for Disease Control and Prevention (CDC), and the Center for Mental Health Services (CMHS) – which is within the Substance Abuse and Mental Health Services Administration (SAMHSA) – collaborated on the implementation of the Mental Illness and Stigma Module for the Behavioral Risk Factor Surveillance System (BRFSS). This module is used to collect

information on serious psychological distress (SPD) using the Kessler-6 measure (K-6). The module also contains a question about current treatment status. While national and international population-based prevalence estimates of mental illness have been established, only synthetic estimates have been produced at the state level[14,15]. This study is designed to produce population-based state level estimates of SPD and its treatment, data currently not available in the literature.

Methods

The Behavioral Risk Factor Surveillance System (BRFSS) monitors the prevalence of key health- and safety-related behaviors and characteristics among U.S. adults.[16,17] As part of the 2007 BRFSS survey, trained interviewers in 35 states, the District of Columbia, and Puerto Rico administered identical questionnaires about mental illness and stigma (the Mental Illness and Stigma Module) over the telephone to an independent probability sample of adults aged 18 or older. BRFSS methods, including the weighting procedure, are described elsewhere.[18] All BRFSS questionnaires, data, and reports are available at www.cdc.gov/brfss.

The K-6 scale was originally developed in 1992 as a short, dimensional measure of nonspecific psychological distress in the past 30 days for the U.S. National Health Interview Survey (NHIS).[19] Subsequently, Public Law 102-321 established a Block Grant for states to fund community mental health services for adults with serious mental illness (SMI) and required SAMHSA to develop an operational definition of SMI and to create an estimation methodology.[19] SAMHSA defined SMI as at least one 12-month Diagnostic Statistical Manual IV disorder other than a substance-use disorder and a serious impairment defined as a Global Assessment of Functioning (GAF) score <50[20] and selected a modified version of the K-6 scale examining the worst 30 days in the past year to estimate its prevalence.[19] SAMHSA studies later elucidated that the K-6 scale may be subject to context effect and that the ≥ 13 cut point originally designed to define SMI may capture less severe cases than those defined by the Public Law.[21] Given this, the term for the ≥ 13 cutpoint was changed from SMI to serious psychological distress (SPD).[21] Only referenced articles using algorithms that adhere to the strict definition of SMI as defined by the Public Law will be referenced as such.

The K-6 scale asks respondents about six manifestations of SPD. The question reads, "Now I am going to ask you some questions about how you have been feeling during the past 30 days… About how often during the past 30 days did you feel:

1. nervous?
2. hopeless?
3. restless or fidgety?
4. so depressed that nothing could cheer you up?
5. that everything was an effort?
6. worthless?

Table 1. Prevalence and adjusted odds of serious psychological distress[a] among U.S. adults, by selected characteristics,* BRFSS, 2007.

	% (95 % CI)	AOR[b] (95 % CI)
Total	4.0 (3.8–4.1)	
Sex		
Male	3.5 (3.3–3.9)	Referent
Female	4.3 (4.1–4.6)	1.2 (1.0–1.3)
Age		
18–24	3.6 (3.0–4.3)	Referent
25–34	4.0 (3.6–4.6)	1.6 (1.2–2.0)
35–44	4.2 (3.8–4.8)	1.7 (1.3–2.2)
45–54	4.6 (4.3–5.0)	1.5 (1.2–2.0)
55+	3.4 (3.1–3.7)	1.0 (0.8–1.4)
Race/ethnicity		
White, non-Hispanic	3.4 (3.2–3.5)	Referent
Black, non-Hispanic	6.1 (5.1–7.2)	1.0 (0.8–1.2)
Hispanic	5.5 (4.8–6.3)	1.1 (0.9–1.3)
Other, non-Hispanic[c]	4.0 (3.3–4.7)	1.0 (0.9–1.3)
Education		
<High school	9.5 (8.6–10.5)	2.3 (1.9–2.7)
High School	5.0 (4.6–5.4)	1.6 (1.4–1.8)
≥College	2.4 (2.3–2.6)	Referent
Marital Status		
Currently married	2.7 (2.5–2.9)	Referent
Previously married[d]	7.0 (6.6–7.5)	1.8 (1.6–2.0)
Never married[e]	5.2 (4.7–5.8)	1.5 (1.3–1.8)
Employment status		
Currently employed	2.2 (2.0–2.4)	Referent
Currently unemployed	11.0 (9.5–12.6)	3.9 (3.2–4.8)
Retired	2.3 (2.1–2.5)	1.4 (1.1–1.6)
Unable to work	25.7 (23.9–27.5)	12.0 (10.3–14.1)
Homemaker/ student	3.4 (3.0–3.9)	1.5 (1.3–1.8)
Health plan		
Yes	3.3 (3.1–3.5)	Referent
No	7.8 (7.1–8.7)	1.7 (1.4–1.9)

AOR = adjusted odds ratio.
* Weighted estimates
[a] Kessler-6 score ≥13.
[b] Adjusted by sex, age, race/ethnicity, education, marital status, employment status, and health plan.
[c] Asian, non-Hispanic; Native Hawaiian/Pacific Islander, non-Hispanic; American Indian/Alaska Native, non-Hispanic; other race, non-Hispanic; multirace, non-Hispanic.
[d] Previously married includes those who are divorced, widowed, or separated.
[e] Never married includes those who never married or are a member of an unmarried couple.

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Table 2. Unadjusted prevalence estimates of serious psychological distress[a] and mean Kessler-6 score among U.S. adults, by state,* BRFSS, 2007.

	Weighted Sample Size	SPD % (95 % CI)	Mean K-6 Score (95 % CI)
State			
Alaska	10,858	2.4 (1.5–3.9)	2.9 (2.7–3.1)
Arkansas	99,945	5.1 (4.4–6.0)	3.8 (3.7–4.0)
California	854,202	3.5 (2.9–4.3)	3.3 (3.2–3.5)
Colorado[b]	102,979	3.2 (2.6–3.9)	3.3 (3.1–3.4)
Connecticut	65,275	2.7 (2.2–3.3)	3.1 (3.0–3.2)
District of Columbia	10,472	2.6 (2.0–3.4)	3.3 (3.1–3.4)
Georgia	306,498	5.0 (4.2–5.9)	3.6 (3.4–3.7)
Hawaii	22,531	2.4 (1.9–3.0)	3.1 (2.9–3.2)
Illinois	277,432	3.0 (2.5–3.7)	3.4 (3.2–3.5)
Indiana	150,216	3.5 (2.9–4.1)	3.4 (3.2–5.0)
Iowa	47,237	2.3 (1.8–2.8)	2.9 (2.8–3.0)
Kansas[b]	50,171	2.6 (2.0–3.3)	3.1 (3.0–3.2)
Kentucky	183,805	6.5 (5.6–7.4)	3.5 (3.3–3.7)
Louisiana	150,994	5.3 (4.6–6.1)	3.8 (3.7–4.0)
Maine[b]	36,863	3.8 (3.1–4.7)	3.2 (3.0–3.3)
Massachusetts[b]	139,438	3.1 (2.4–3.9)	3.2 (3.0–3.4)
Michigan[b]	275,342	3.8 (3.1–4.7)	3.6 (3.4–3.7)
Minnesota	104,561	2.7 (2.1–3.4)	3.1 (2.9–3.2)
Mississippi	131,557	6.6 (5.8–7.5)	4.3 (4.2–4.5)
Missouri	207,087	5.0 (4.2–6.0)	3.8 (3.7–4.0)
Montana	24,074	3.5 (2.9–4.2)	3.3 (3.2–3.4)
Nebraska[b]	30,981	2.5 (1.9–3.3)	2.8 (2.6–3.0)
Nevada	70,465	4.0 (3.2–5.1)	3.4 (3.2–3.6)
New Hampshire	30,694	3.2 (2.7–3.8)	3.1 (3.0–3.3)
New Mexico	53,093	4.1 (3.4–4.8)	3.4 (3.2–3.5)
Ohio[b]	360,708	4.6 (3.8–5.5)	3.5 (3.3–3.6)
Oklahoma	131,746	5.3 (4.6–6.1)	3.8 (3.7–4.0)
Oregon[b]	78,318	2.9 (2.2–3.8)	3.2 (3.0–3.4)
Rhode Island	33,639	4.7 (3.9–5.6)	3.5 (3.3–3.7)
South Carolina	151,760	5.0 (4.3–5.8)	3.5 (3.4–3.7)
Texas[b]	779,559	5.2 (4.3–6.2)	3.6 (3.4–3.8)
Vermont	15,730	3.3 (2.7–4.2)	3.3 (3.1–3.4)
Virginia	173,493	3.3 (2.7–4.0)	3.2 (3.1–3.3)
Washington[b]	137,977	2.9 (2.5–3.4)	3.2 (3.1–3.3)
Wisconsin[b]	105,135	2.7 (2.1–3.4)	2.9 (2.7–3.0)
Wyoming	11,834	3.2 (2.6–3.9)	3.4 (3.2–3.5)
Puerto Rico	164,316	6.0 (5.2–7.0)	4.4 (4.3–4.6)

* Weighted estimates.
[a] Kessler-6 score ≥13.
[b] Estimates based on split sample weights.

Possible responses were "All of the time," "Most of the time," "Some of the time," "A little of the time," and "None of the time". Scoring of individual items is based on a scale of 0–4 points, according to increased frequency of the problem, yielding a total score on a scale of 0–24 for all six items. A score of ≥13 is defined as SPD.[21] In addition to the BRFSS and NHIS, the K-6 questions are also included in the annual National Household Survey on Drug Abuse, the Australian and Canadian equivalents of the NHIS, the National Comorbidity Survey Replication, and in all the national surveys in the World Health Organization's World Mental Health (WMH) Initiative.[22]

Respondents were also asked about current mental health medication or treatment with the following question, "Are you now taking medicine or receiving treatment from a doctor or other health professional for any type of mental health condition or emotional problem?"

There were 220,448 respondents in the 35 states, the District of Columbia, and Puerto Rico. Approximately 8.3 % of respondents did not answer the K-6 questions or the question

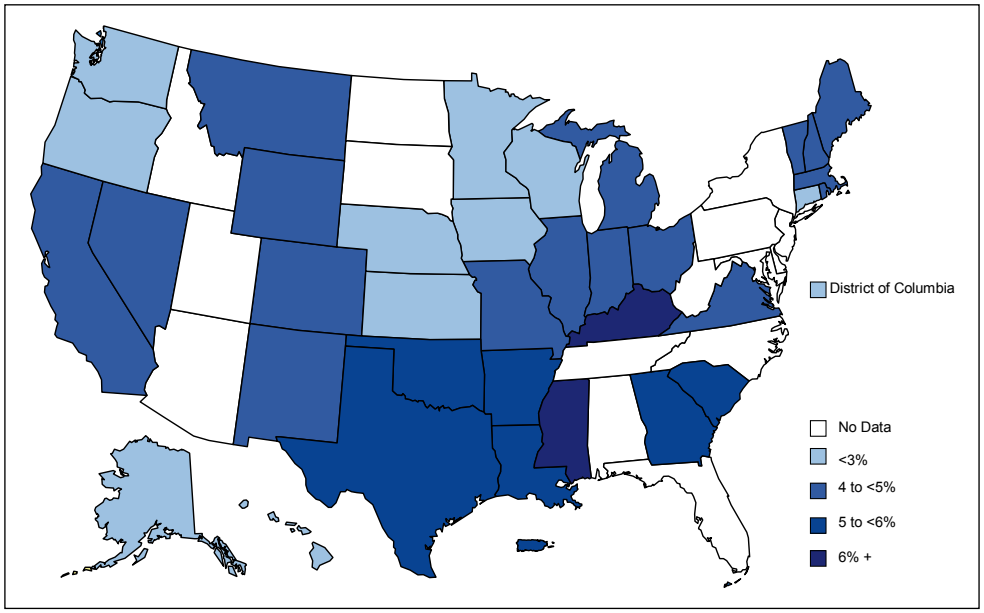

Figure 1. Prevalence of serious psychological distress.

about current mental health treatment or medication. In all, the median cooperation rate of BRFSS – the percentage of eligible respondents who completed the survey – was 72.1 %. To account for the complex survey design, we used SUDAAN (RTI International, release 9.0.1, Research Triangle Park, NC, 2007) to calculate prevalence estimates (%), adjusted odds ratios (AORs), and 95 % confidence intervals (95 % CI). Eleven states – Colorado, Kansas, Maine, Massachusetts, Michigan, Nebraska, Ohio, Oregon, Texas, Washington, and Wisconsin – collected Mental Illness and Stigma Module data on a subset of the state sample rather than on the entire sample, a common practice in BRFSS to increase the number of questions asked in states with large sample sizes. 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/surveydata/2007/2007_dual.htm.

Results

Approximately 4.0 % (95 % CI: 3.8 %-4.1 %) of persons in the 35 states, the District of Columbia and Puerto Rico had SPD (Table 1). After adjusting for age, sex, race/ethnicity, educational status, marital status, employment status, and healthcare coverage, persons aged 25–54 were significantly more likely than those aged 18–24 to have SPD, as were those with, at most, a high school education (versus more than a high school education), persons who were previously and never married (versus currently married), nonworking people (currently unemployed, retired, unable to work, or a homemaker/student) compared to those who currently work, and those without healthcare coverage (versus those with coverage). There was no difference noted by race/ethnicity.

Mississippi (6.6 %, 95 % CI: 5.8 %–7.5 %), Kentucky (6.5 %, 95 % CI: 5.6 %–7.4 %), and Puerto Rico (6.0 %, 95 % CI: 5.2 %–7.0 %) had the highest prevalence of SPD, while Iowa (2.3 %, 95 % CI: 1.8 %–2.8 %), Alaska (2.4 %, 95 % CI: 1.5 %–3.9 %), Hawaii (2.4 %, 95 % CI: 1.9 %–3.0 %), and Nebraska (2.5 %, 95 % CI: 1.9 %–3.3 %) had the lowest (Table 2, Figure 1). The mean K-6 score ranged from 2.8 in Nebraska and 2.9 in Alaska, Iowa, and Wisconsin to 4.4 in Puerto Rico and 4.3 in Mississippi.

Among persons with SPD, 53.4 % (95 % CI: 51.0 %–55.8 %) were currently untreated (Table 3). After adjusting for age, sex, race/ethnicity, education, marital status, employment status, and healthcare coverage, males were more likely to be untreated, as were those aged 18–24 (versus those aged 55 or older), black non-Hispanics, Hispanics, and other non-Hispanics (versus white non-Hispanics), and those with, at most, a high school education (versus those with greater than a high school education). Those currently employed, previously employed, retired, and homemakers and students were also more likely to be untreated than those unable to work, as were those without healthcare coverage versus those with coverage. The states with the highest prevalence of untreated SPD were Hawaii (67.0 %), California (66.0 %), and Colorado (65.2 %), while the states with the lowest prevalence of untreated SPD were Alaska (33.3 %), Kentucky (34.6 %), and Maine (39.5 %) (Table 4, Figure 2).

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Table 3. Prevalence and adjusted odds of untreated psychological distress[a] by selected characteristics* BRFSS, 2007.

	% (95 % CI)	AOR[b] (95 % CI)
Sex		
Male	57.5 (53.3–61.6)	1.3 (1.1–1.7)
Female	50.2 (47.5–53.0)	Referent
Age		
18–24	78.6 (71.5–84.3)	1.8 (1.1–3.0)
25–34	59.9 (53.6–65.9)	0.8 (0.6–1.1)
35–44	53.6 (47.8–59.4)	0.9 (0.7–1.2)
45–54	41.0 (37.1–45.0)	0.6 (0.5–0.8)
55+	49.5 (45.6–53.5)	Referent
Race/ethnicity		
White, non-Hispanic	45.0 (42.4–47.6)	Referent
Black, non-Hispanic	65.5 (57.6–72.6)	2.5 (1.7–3.6)
Hispanic	68.5 (62.5–74.0)	2.0 (1.5–2.8)
Other, non-Hispanic[c]	56.3 (47.6–64.6)	1.6 (1.2–2.2)
Education		
< High school	62.2 (57.4–66.7)	2.0 (1.5–2.6)
High School	54.9 (51.1–58.8)	1.5 (1.2–1.9)
≥ College	45.6 (41.7–49.7)	Referent
Marital Status		
Currently married	50.9 (47.2–54.5)	Referent
Previously married[d]	44.8 (41.6–48.1)	0.9 (0.7–1.1)
Never married[e]	66.2 (61.2–70.9)	1.2 (0.9–1.7)
Employment status		
Currently Employed	66.4 (62.3–70.3)	4.6 (3.5–6.0)
Currently Unemployed	64.3 (57.3–70.8)	2.7 (1.8–4.0)
Retired	50.4 (45.4–55.4)	2.6 (1.9–3.6)
Unable to Work	33.8 (29.4–38.6)	Referent
Homemaker/student	60.6 (54.0–66.9)	2.9 (2.0–4.1)
Healthcare plan		
Yes	46.1 (43.4–48.9)	Referent
No	70.8 (66.4–74.8)	2.5 (2.0–3.3)

AOR=adjusted odds ratio.
* Weighted estimates
[a] Kessler-6 score ≥ 13.
[b] Adjusted by sex, age, race/ethnicity, education, marital status, employment status and health plan.
[c] Asian, non-Hispanic; Native Hawaiian/ Pacific Islander, non-Hispanic; American Indian/Alaska Native, non-Hispanic; other race, non-Hispanic; multirace, non-Hispanic.
[d] Previously married includes those divorced, widowed or separated.
[e] Never married includes those never married or member of unmarried couple.

Table 4. Prevalence of untreated serious psychological distress[a] among U.S. adults, by state,* BRFSS, 2007.

	Weighted sample size	Untreated SPD % (95 % CI)
State		
Alaska	3,443	33.3 (17.0–54.9)
Arkansas	51,656	51.9 (43.9–59.8)
California	564,036	66.0 (56.8–74.2)
Colorado[b]	65,676	65.2 (55.7–73.6)
Connecticut	31,535	48.9 (38.6–59.3)
District of Columbia	6,188	59.1 (45.7–71.3)
Georgia	156,586	51.4 (42.6–60.1)
Hawaii	15,017	67.0 (56.0–76.3)
Illinois	155,070	56.0 (46.1–65.4)
Indiana	64,546	43.4 (35.2–52.0)
Iowa	21,242	45.4 (35.0–56.3)
Kansas[b]	27,773	55.4 (43.3–66.8)
Kentucky	63,023	34.6 (28.5–41.2)
Louisiana	84,751	56.6 (49.6–63.4)
Maine[b]	14,565	39.5 (29.3–50.7)
Massachusetts[b]	61,729	44.3 (32.8–56.4)
Michigan[b]	143,793	52.6 (42.3–62.6)
Minnesota	48,239	46.1 (34.6–58.1)
Mississippi	78,695	60.0 (53.5–66.3)
Missouri	99,662	48.4 (39.4–57.5)
Montana	11,155	46.6 (37.0–56.4)
Nebraska[b]	13,825	45.0 (31.7–59.0)
Nevada	37,598	53.6 (41.7–65.1)
New Hampshire	13,645	44.7 (35.6–54.1)
New Mexico	27,067	51.2 (42.2–60.2)
Ohio[b]	154,419	43.2 (34.0–52.8)
Oklahoma	73,841	56.6 (49.6–63.4)
Oregon[b]	35,187	44.9 (32.1–58.5)
Rhode Island	15,277	45.9 (36.5–55.6)
South Carolina	79,626	53.1 (45.6–60.4)
Texas[b]	431,198	55.4 (46.3–64.1)
Vermont	7,927	50.4 (39.0–61.8)
Virginia	99,141	57.9 (48.2–67.0)
Washington[b]	67,048	48.8 (41.3–56.5)
Wisconsin[b]	53,934	51.3 (38.8–63.6)
Wyoming	6,666	56.8 (46.9–66.1)
Puerto Rico	81,236	49.4 (41.9–57.0)

* Weighted estimates.
[a] Kessler-6 score ≥ 13.
[b] Estimates based on split sample weights.

Discussion

To our knowledge, this is the first population-based state level study examining the prevalence of SPD and its treatment using the K-6 scale. Similar to the variation in the prevalence of mental illness found between countries – even after adjusting for sociodemographic characteristics and healthcare coverage – the prevalence of SPD varies significantly across the United States. These results suggest important opportunities to investigate reasons for these variations that could potentially be used to mitigate the impact of mental illness and identify areas where mental illness prevention and intervention efforts may need to be targeted.

Over half of the persons with SPD are currently untreated – a finding similar to those from the National Comorbidity Survey and the Epidemiologic Catchment Area Study for a given year.[11,23–24] To compound the issue, research conducted by Wang, Delmer, and Kessler[25] using the National Comorbidity Survey

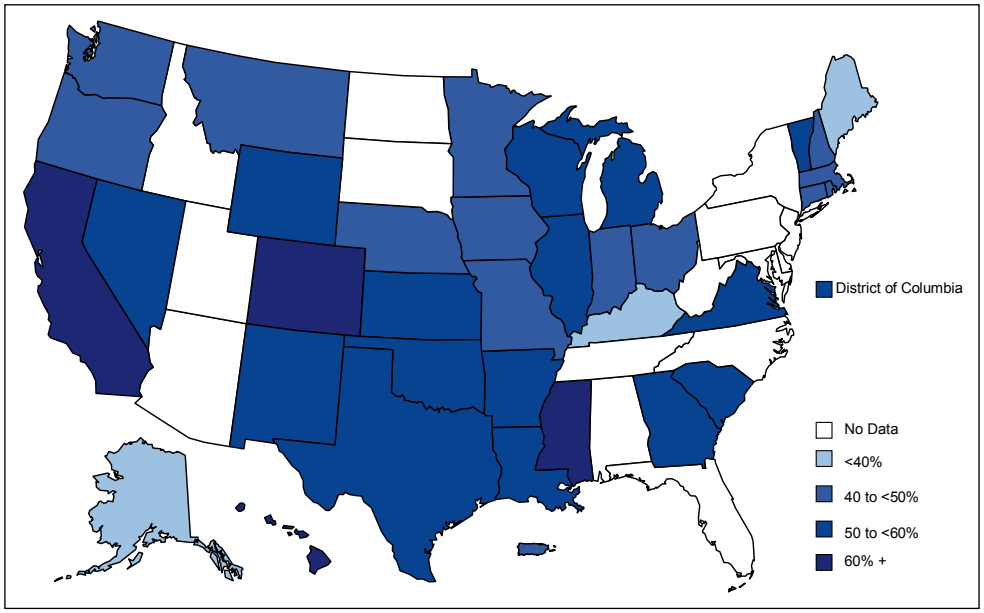

Figure 2. Prevalence of untreated serious psychological distress.

suggest that, among persons with SMI receiving treatment, only 39 % receive care that could be considered at least minimally adequate (i. e., receipt of a prescription for an appropriate medication in combination with four or more visits for a mental health problem to a psychiatrist, general medical health doctor, or other medical doctor; or among persons who are not psychotic, eight or more visits for a mental health problem with either a psychiatrist or another type of mental health professional).[25]

While this study used a 13 point cutpoint to distinguish between persons with and without serious mental illness, it is also important to note that reliance on a particular cutpoint of any given psychological distress measure to determine treatment needs is unfounded. In a study conducted by Kessler and colleagues,[26] severe, serious, moderate, and mild cases of DSM-III-R disorders were associated with graded statistically significant elevated risk of outcomes such as hospitalization for mental health or substance disorders, work disability due to these disorders, suicide attempts, and serious mental illness in a three-year time span, as compared with baseline non-cases. This suggests the potential benefit of treating mild cases to prevent future serious disease.

Several factors known to limit access to and delivery of mental health services include race, age, income, gender, lack of understanding of one's health plan mental health benefits, and stigma associated with mental disorders.[27] Other issues include psychological barriers (e. g., want to deal with it on their own, lack of belief that treatment is needed), uncertainty about where to go, inconvenience, uncertainty about the effectiveness of treatment, and financial barriers due to lack of healthcare parity.[28] For example, the state block grants amount to less than $ 50 per person, per year for persons with serious mental illness.[11,23–24] To further exacerbate these concerns, most people with mental health issues are treated by primary care providers who are often inadequately trained to detect and treat mental illnesses.[27, 29–30] Even among those receiving treatment, a high percentage drop out. For example, among people with depression referred for psychotherapy from a primary care physician, only 20 % follow-up, and half of these do not complete treatment.[31]

Our study has several limitations. First, given that BRFSS is a telephone survey of community-dwelling adults, it underestimates those with severely impaired physical or mental health who are unable to come to the phone, those with low sociodemographic status without a telephone, and those institutionalized – all of whom tend to have higher rates of SPD. Second, BRFSS is based on self-reported data which may be subject to recall bias as well as social desirability bias. Finally, the question regarding treatment does not clarify the type of medication or treatment.

Clinically-controlled trials have revealed an extensive array of treatments for specific mental disorders that demonstrate how mental disorders can now be diagnosed and treated as effectively as other medical disorders.[25] Our research indicates, however, that slightly over half of those with SPD are currently untreated. According to Wang, Delmer, and Kessler,[25] a large portion of this population are receiving suboptimal care. Given this, mental health parity and a multidimensional approach to healthcare with extensive referrals between mental and physical healthcare professionals is warranted.

The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Centers of Disease Control and Prevention.

References

1. U.S. Department of Health and Human Services. Mental Health: A Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health, 1999.

2. Murray CJ, Lopez AD, eds. The global burden of disease. Cambridge: Harvard School of Public Health. 1996.

3. Strine TW, Mokdad AH, Balluz LS, Gonzalez O, Crider R, Berry JT, Kroenke K. Depression and Anxiety in the United States: Findings from the 2006 Behavioral Risk Factor Surveillance System. Psychiatr Serv 2008: 59:1383–90.

4. Kessler RC, McGonagle KA, Zhao S, et al.. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Survey. Arch Gen Psychiatry 1994;51:8–19.

5. Kessler RC, Chiu WT, Demler O, Merikangas KR, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. Arch Gen Psychiatry 2005;62:617–27.

6. Bijl RV, de Graaf R, Hiripi E, et al. The prevalence of treated and untreated mental disorders in five countries. Health Aff 2003;22:122–33.

7. Andrews G, Henderson S, Hall W. Prevalence, comorbidity, disability, and service utilization. Overview of the Australian National Mental Health Survey. Br J Psychiatry 2001;178:145–53.

8. Wells JE, Oakley Browne MA, Scott KM, McGee MA, Baxter J, Kokaua J. Te Rau Hinengaro: the New Zealand Mental Health Survey: overview of methods and findings. Aust N Z J Psychiatry 2006;40:835–44.

9. Bijl RC, Ravelli A, van Zessen, G. Prevalence of psychiatric disorder in the general population: results from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). Soc Psychiatry Psychiatr Epidemiol 1998;33:587–95.

10. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age of onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. Arch Gen Psychiatry 2005;62:593–602.

11. Kessler RC, Berglund PA, Zhao S, et al. The 12-month prevalence and correlates of serious mental illness. In: Manderscheid RW, Sonnenschein MA, eds. Mental Health United States, 1996. Washington, DC: Supt. Of Docs, U.S. Govt Print Off 1996, 59–70.

12. The WHO World Mental Health Survey Consortium. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. JAMA 2004;291:2581–90.

13. Wittchen H-U, Jacobi, F. Size and burden of mental disorders in Europe – a critical review and appraisal of 27 studies. European Neuropsychopharmacol 2005;15:357-76.

14. Kessler, R. C., Berglund, P. A., Walters, E. E., et al. (1999). Population- based analyses: A methodology for estimating the 12- month prevalence of serious mental illness. In Manderscheid, R. W. & M. J. Henderson (Eds.), Mental Health, United States, 1998 (pp. 99–109). Washington, D.C.: U.S. Government Printing Office.

15. Substance Abuse and Mental Health Services. Office of Applied Studies. Mental health problems. (Accessed February 17, 2009 at http://www.oas.samhsa.gov/2k6State/Ch6.htm#Fig6-1).

16. Mokdad AH, Stroup DF, Giles WH. Public health surveillance for behavioral risk factors in a changing environment. Recommendations from the Behavioral Risk Factor Surveillance Team. MMWR Recomm Rep 2003;52:1–12.

17. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System User's Guide. Atlanta, GA: U.S. Department of Health and Human Services, 2006. (Accessed February 17, 2009 at ftp://ftp.cdc.gov/pub/Data/BRFSS/userguide.pdf).

18. Holtzman D. The Behavior Risk Factor Surveillance System. In: Blumenthal DS, DiClemente RJ, eds. Community-based health research issues and methods. Springer, New York: Springer, 2004:115–31.

19. Kessler RC, Barker PR, Colpe LJ, et al. Screening for serious mental illness in the general population. Arch Gen Psychiatry 2003;60:184–89.

20. Substance and Mental Health Services Administration. Final notice establishing definitions for: 1) children with a serious emotional disturbance, and 2) adults with serious mental illness. Fed Regist 1993;58:29, 422–29.

21. Aldworth J, Chromy JR, Foster M, Heller D, Novak S. 2004 National Survey on Drug Use and Health: Serious psychological distress report. (Accessed February 17, 2009 at http://www.oas.samhsa.gov/nsduh/2k4MRB/2k4spd.pdf).

22. National Comorbidity Survey. K10 and K6 scales. (Accessed February 17, 2009 at http://www.hcp.med.harvard.edu/ncs/k6_scales.php).

23. Kessler RC, Berglund PA, Walters EE, et al. A methodology for estimating the 12-month prevalence of serious mental illness. In: Manderscheid RW, Henderson RW, eds. Mental Health, United States, 1998. Washington, D.C.: U.S. Government Printing Office; 1998:99–109.

24. National Advisory Mental Health Council. Healthcare reform for Americans with severe mental illness: report of the National Advisory Mental Health Council. Am J Psychiatry 1993; 150:1447–65.

25. Wang PS, Delmer O, Kessler RC. Adequacy for treatment of serious mental illness in the United States. Am J Public Health 2002;92:92–98.

26. Kessler RC, Merikangas KR, Berglund P, Eaton WW, Kortez DS, Walters EE. Mild disorders should not be eliminated from the DSM-V. Arch Gen Psychiatry 2003;60:1117–22.

27. Mickus M, Colenda CC, Hogan AJ. Knowledge of mental health benefits and preferences for type of mental health provider among the general population. Psychiatr Serv 2000;51:199–202.

28. Kessler RC, Berglund PA, Bruce ML, et al. The prevalence and correlates of untreated serious mental illness. Health Serv Res 2001;36: 987–1007.

29. Borowsky SJ, Rubenstein LV, Meredith LS, Camp P, Jackson-Triche M., Wells KB. Who is at risk for nondetection of mental health problems in primary care? J Gen Intern Med 2000;15:381–88.

30. Young AS, Klap R, Sherbourne CD, Wells KB. The quality of care for depressive and anxiety disorders in the United States. Arch Gen Psychiatry 2001;58:55–61.

31. Mohr DC, Hart SL, Howard I, et al. Barriers to psychotherapy among depressed and nondepressed primary care patients. Ann Behav Med 2006; 32:254–58.

Address for correspondance

Tara W. Strine, MPH
Centers for Disease Control and Prevention
4770 Buford Highway, Mailstop K66
Atlanta, GA 30341
USA
Tel: 770-488-2543
Fax: 770 -488-8150
E-mail: tws2@cdc.gov