

# *The footprint of humans with serious psychological distress: a cross-sectional study of 1.5 million adults in the United States*

## BACKGROUND

This study investigates the prevalence of serious psychological distress (SPD) in the United States during 2012–2018 as well as the characteristics of people with SPD with the ultimate goal to find statistically significant indicators for SPD.

## PARTICIPANTS AND PROCEDURE

The statistical methods used to analyze the results of this study are the chi-square and one-way analysis of variance (ANOVA) tests. Additionally, a multiple logistic regression analysis was used with the odds ratio (OR) to find statistically significant prognostic factors for SPD.

## RESULTS

The prevalence of SPD was found to be 3.4%. The number of individuals with SPD increased from 2012 to 2018 by 34.1%. As indicated by multiple logistic regression analyses, individuals who have less than \$35 000 family income

have six times higher risk of SPD occurring (OR = 6.31), while white females (OR = 1.93) in the age group of 45–64 (OR = 2.01) who are not employed but have worked previously (OR = 1.25), and are divorced or separated (OR = 1.57) have a two-fold higher risk for the occurrence of this type of disorder. In addition, the risk of SPD is fivefold higher in poor individuals (OR = 4.81) with inadequate education (OR = 5.44).

## CONCLUSIONS

The results of this study explain the significance of deprivation (of financial comfort, education, husband, and work) as the main prognostic risk factor for SPD. Moreover, individuals with SPD are more likely to be white females in the age group of 45–64.

## KEY WORDS

serious psychological distress; prognostic factors; socioeconomic factors

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AUTHORS' CONTRIBUTIONS – A: Study design · B: Data collection · C: Statistical analysis · D: Data interpretation · E: Manuscript preparation · F: Literature search · G: Funds collection

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## BACKGROUND

Serious psychological distress (SPD) includes serious mental health problems that cause social and occupational dysfunction and require treatment (Pratt, Dey, & Cohen, 2007). It is characterized by depressive and anxiety symptoms, and is an indication of common psychiatric conditions such as depression and anxiety disorders (Mirowsky & Ross, 2002). The six-item Kessler psychological scale (K6) has been developed for the assessment of SPD (Kessler et al., 2002). It has been demonstrated that the K6 has a sensitivity of 0.34 and specificity of 0.96 at a cut-point of  $\geq 13$  to identify psychological distress associated with common mental illness (Kessler et al., 2003). Recent studies have reported an alarming increase in SPD levels in adults in the United States (Case & Deaton, 2015; Curtin, Warner, & Hedegaard, 2016b). More specifically, the annual rates of US adults who receive outpatient mental health care have risen from 5.0% (2008-2009) to 5.7% (2014-2015) (Han, Olfson, Huang, & Mojtabai, 2017), while the rate of using antidepressants has risen from 6.4% (2000-2002) to 10.7% (2011-2014), and the corresponding rate of using anxiolytics/hypnotics increased from 3.3% to 5.3% (National Center for Health Statistics, 2016). There has also been reported an increase in national suicide rates (Curtin, Warner, & Hedegaard, 2016a), opioid use (Dart et al., 2015), and opioid-related deaths, reflecting a further increase in SPD. Prior studies have linked SPD with financial stress (Yang & Yang, 1992; Case & Deaton, 2015; Weissman, Russell, Jay, & Malaspina, 2018). More precisely, financial stress due to a reduction in wealth has been proved to be the cause of poorer mental and physical health (Case & Deaton, 2015). Moreover, US adults with SPD are more likely to announce that they have not recovered from the 2008-2009 recession and they are having trouble accessing health care and prescriptions due to cost (Weissman et al., 1997).

Previous studies have shown a strong link between SPD and mortality in people with lower socioeconomic status (Smith, Hart, Blane, Gillis, & Hawthorne, 2017; Mackenbach et al., 2003; Lazzarino, Hamer, Stamatidis, & Steptoe, 2013a, 2013b). Unemployment has been reported to be a risk factor for SPD, while white adults with a low educational level are more likely to have SPD (Weissman, Russell, & Mann, 2020). In addition, adults with SPD are more likely to be uninsured (Garfield, Zuvekas, Lave, & Donohue, 2011), and to experience delays in health care (Weissman et al., 2017). Finally, individuals with SPD are more likely to suffer from chronic diseases such as cardiovascular disease, chronic obstructive pulmonary disease, and diabetes (Weissman, Pratt, Miller, & Parker, 2015).

It is of the utmost importance to acknowledge the seriousness of SPD in adults, which in return reflects the responsibility of underlying factors that lead to barriers to mental health. For this purpose, this study

investigates SPD in the United States during the period 2012-2018 to identify the underlying factors with the highest risk for SPD.

## PARTICIPANTS AND PROCEDURE

### PARTICIPANTS AND MEASURES

The data used in this work originate from the National Health Interview Survey dataset (National Center for Health Statistics, 2016) and cover the period 2012-2018. The data were available for each year. SPD was measured with the Kessler 6 scale (K-6). To identify the adults with SPD, each household was asked to answer how often in the past 30 days they had felt sadness, hopelessness, worthlessness, that everything is an effort, nervousness, and restlessness. Respondents could choose among five response categories: "All of the time", "Most of the time", "Some of the time", "A little of the time", or "None of the time". Responses to the questions regarding feelings of sadness, hopelessness, worthlessness, that everything is an effort, nervousness, and restlessness were combined to create an indicator of serious psychological distress. The total number of adults examined was 1 697 236, while the number of individuals with SPD was 57 259.

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### STATISTICAL ANALYSIS

The statistical methods used to extract the results of this work are the  $\chi^2$  test for categorical and one-way analysis of variance (ANOVA) for continuous variables in order to evaluate the null hypothesis that the mean number of adults in the United States with SPD did not differ according to their socio-economic characteristics such as gender, age, race, origin, parent's education, family income, poverty status, health insurance coverage, current health status, family structure, place of residence and region. Predictive factors that determine the prevalence of SPD were assessed using multiple logistic regression analysis. To assess the predictors of SPD, we used data on adults with a new diagnosis of SPD compared to a matched cohort of adults without SPD. In particular, the control group was all the target population without SPD with the same socioeconomic characteristics as the group of adults with SPD. Predictors were represented using the odds ratio (OR) and 95% confidence intervals and  $p < .05$  was considered as statistically significant. To be more specific, the OR was used to determine whether a particular characteristic is a risk factor for SPD, and to compare the magnitude of various risk factors for that outcome. An OR  $> 1.00$  means that the characteristic is associated with higher odds of outcome and finally an OR  $< 1.00$  implies that the characteristic is associated with lower odds of the

outcome (Szumilas, 2010). The study was carried out using the IBM SPSS 25 software package for Windows. The data were weighted before being analyzed.

## RESULTS

To test the null hypothesis that the mean number of US patients with SPD did not differ in accordance

with their socio-economic characteristics, the chi-square test and the one-way analysis of variance (ANOVA) were used. As shown in Table 1, there is a statistically significant difference in the number of SPD in relation to gender and it occurs mainly in women (61.7%). Additionally, the age with the more frequent occurrence of SPD is from 18 to 44 years old (43.6%), while the most common origin and race are white (83.7%), not Hispanic or Latino (45.3%).

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Table 1  
*Chi-square and one-way ANOVA test*

Characteristics of patients with serious psychological distress: United States 2012-2018	Number of patients	%	<i>p</i> -value
Gender			< .001
Male	21 944	38.32	
Female	35 315	61.68	
Age (years)			< .001
18-44	24 948	43.57	
45-64	24 606	42.97	
65-74	4 829	8.43	
75 and over	2 879	5.03	
Race			< .001
White	45 044	83.75	
Black or African American	6 962	12.94	
Asian	1 779	3.31	
Origin			< .001
Hispanic or Latino	8 882	8.49	
Mexican or Mexican American	5 348	5.11	
Not Hispanic or Latino	47 379	45.29	
White single race	36 386	34.78	
Black or African American, single race	6 616	6.32	
Education			< .001
Less than a high school diploma	12 361	24.43	
High school diploma	15 903	31.43	
Some college	15 866	31.36	
Bachelor's degree or higher	6 469	12.78	
Employment			< .001
Employed	18 644	24.75	
Full-time	12 656	16.80	
Part-time	5 439	7.22	
Not employed but has worked previously	33 982	45.12	
Not employed and has never worked	4 602	6.11	

(Table 1 continues)

Table 1  
(Table 1 continued)

Characteristics of patients with serious psychological distress: United States 2012-2018	Number of patients	%	p-value
Family income			< .001
Less than \$35,000	31 709	42.83	
\$35,000 or more	21 628	29.21	
\$35,000-\$49,999	5 682	7.67	
\$50,000-\$74,999	6 775	9.15	
\$75,000-\$99,999	3 540	4.78	
\$100,000 or more	4 704	6.35	
Poverty status			< .001
Poor	17 436	32.05	
Near poor	15 368	28.25	
Not poor	21 600	39.70	
Health insurance coverage			
Under 65			< .001
Private	17 078	34.63	
Medicaid	15 745	31.93	
Other coverage	5 878	11.92	
Uninsured	10 615	21.52	
65 and over			< .001
Private	2 158	32.82	
Medicaid	1 555	23.65	
Other coverage	2 071	31.49	
Uninsured	792	12.04	
Marital status			< .001
Married	20 029	35.03	
Widowed	4 083	7.14	
Divorced or separated	12 386	21.66	
Never married	15 366	26.88	
Living with a partner	5 309	9.29	
Place of residence			< .001
Large MSA (population size 1 million or more)	25 053	46.20	
Small MSA (less than 1 million)	18 247	33.65	
Not in MSA	10 928	20.15	
Region			< .001
Northeast	8 759	16.00	
Midwest	12 885	23.53	
South	19 617	35.83	
West	13 496	24.65	

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Note. MSA – metropolitan statistical area.

One third of patients with SPD have a high school diploma (31.4%) and they are not employed but have worked previously (45.1%). Moreover, 35% of patients are married, not poor (39.7%), with a family income of less than \$35 000 (42.8%). Health insurance coverage which is statistically significant in both age groups under 65 (34.6%) and 65 and over (32.8%) is private. Finally, the region with the most frequent occurrence of SPD is the South (35.8%), in a place of

residence with a population size of one million or more (46.2%).

Table 2 shows the multiple logistic regression analysis with the odds ratios to find the predictors for the occurrence of SPD. As can be seen in Table 2, all prognostic factors are statistically significant ( $p < 0.05$ ), except origin. Based on multiple logistic regression, the risk of SPD is significantly higher with the female gender (OR = 1.00), age 45-64

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Table 2

*Statistically significant predictors of serious psychological distress using multivariate logistic regression*

Socio-economic characteristics of patients: United States 2012-2018	Patients	Controls	OR (95% CI)	p-value
Gender				< .001
Male	21 944	795 532	0.66 (0.64-0.67)	
Female	35 315	844 445	1.00 (ref)	
Age (years)				< .001
18-44	24 948	764 757	1.48 (1.42-1.54)	
45-64	24 606	555 797	2.01 (1.93-2.09)	
65-74	4 829	186 471	1.17 (1.12-1.23)	
75 and over	2 879	131 112	1.00 (ref)	
Race				< .001
White	45 044	1 292 323	1.93 (1.84-2.02)	
Black or African American	6 962	200 113	1.92 (1.82-2.03)	
Asian	1 779	98 580	1.00 (ref)	
Origin				.534
Hispanic or Latino	8 882	255 041	1.00 (0.97-1.03)	
Mexican or Mexican American	5 348	155 300	0.99 (0.95-1.03)	
Not Hispanic or Latino	47 379	1 384 456	0.98 (0.96-1.01)	
White single race	36 386	1 063 656	0.98 (0.96-1.01)	
Black or African American, single race	6 616	191 026	1.00 (ref)	
Education				< .001
Less than a high school diploma	12 361	173 601	5.44 (5.28-5.61)	
High school diploma	15 903	348 820	3.48 (3.38-3.59)	
Some college	15 866	411 360	2.94 (2.86-3.03)	
Bachelor's degree or higher	6 469	494 683	1.00 (ref)	
Employment				< .001
Employed	18 644	1 026 651	0.35 (0.33-0.36)	
Full-time	12 656	833 876	0.29 (0.28-0.30)	
Part-time	5 439	178 499	0.58 (0.56-0.61)	
Not employed but has worked previously	33 982	521 994	1.25 (1.21-1.29)	
Not employed and has never worked	4 602	88 653	1.00 (ref)	

(Table 2 continues)

Table 2  
(Table 2 continued)

Socio-economic characteristics of patients: United States 2012-2018	Patients	Controls	OR (95% CI)	p-value
Family income				< .001
Less than \$35,000	31 709	438 328	6.31 (6.12-6.51)	
\$35,000 or more	21 628	1 045 979	1.80 (1.74-1.86)	
\$35,000-\$49,999	5 682	184 037	2.69 (2.59-2.80)	
\$50,000-\$74,999	6 775	260 445	2.27 (2.18-2.35)	
\$75,000-\$99,999	3 540	191 856	1.61 (1.54-1.68)	
\$100,000 or more	4 704	410 570	1.00 (ref)	
Poverty status				< .001
Poor	17 436	182 816	4.81 (4.71-4.91)	
Near poor	15 368	266 953	2.90 (2.84-2.96)	
Not poor	21 600	1 089 447	1.00 (ref)	
Health insurance coverage				< .001
Under 65				
Private	17 078	907 115	0.34 (0.34-0.35)	
Medicaid	15 745	150 395	1.94 (1.89-1.99)	
Other coverage	5 878	58 348	1.86 (1.80-1.93)	
Uninsured	10 615	196 817	1.00 (ref)	
65 and over				< .001
Private	2 158	144 557	0.47 (0.44-0.51)	
Medicaid	1 555	20 926	2.38 (2.18-2.59)	
Other coverage	2 071	75 211	0.88 (0.81-0.95)	
Uninsured	792	25 371	1.00 (ref)	
Marital status				< .001
Married	20 029	875 011	0.52 (0.50-0.53)	
Widowed	4 083	96 321	0.96 (0.92-1.00)	
Divorced or separated	12 386	178 583	1.57 (1.52-1.63)	
Never married	15 366	365 362	0.95 (0.92-0.98)	
Living with a partner	5 309	120 725	1.00 (ref)	
Place of residence				< .001
Large MSA (population size 1 million or more)	25 053	914 192	0.57 (0.56-0.59)	
Small MSA (less than 1 million)	18 247	496 865	0.77 (0.75-0.79)	
Not in MSA	10 928	230 475	1.00 (ref)	
Region				< .001
Northeast	8 759	292 683	0.84 (0.82-0.86)	
Midwest	12 885	366 758	0.98 (0.96-1.01)	
South	19 617	601 673	0.91 (0.89-0.93)	
West	13 496	379 889	1.00 (ref)	

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Note. MSA – metropolitan statistical area.

(OR = 2.01), white race (OR = 1.93), and “less than a high school diploma” education status (OR = 5.44). Moreover, those who are not employed but have worked previously have a higher risk of developing SPD (OR = 1.25). In addition, the risk of SPD is six-fold higher with the family income “less than \$35 000” (OR = 6.31), five-fold higher with the poverty status “poor” (OR = 4.81), and two-fold higher with health insurance coverage “Medicaid” under 65 years old and “Medicare and Medicaid” over 65 years old (OR = 1.94 and 2.38 respectively). Individuals who are divorced or separated have almost a two-fold higher risk of developing SPD (OR = 1.57). Finally, the risk of SPD is significantly higher with the region “West” (OR = 1.00) and place of residence “not in a metropolitan statistical area” (OR = 1.00).

Figure 1 represents the trend in SPD as well as the trend in education, family income, employment and

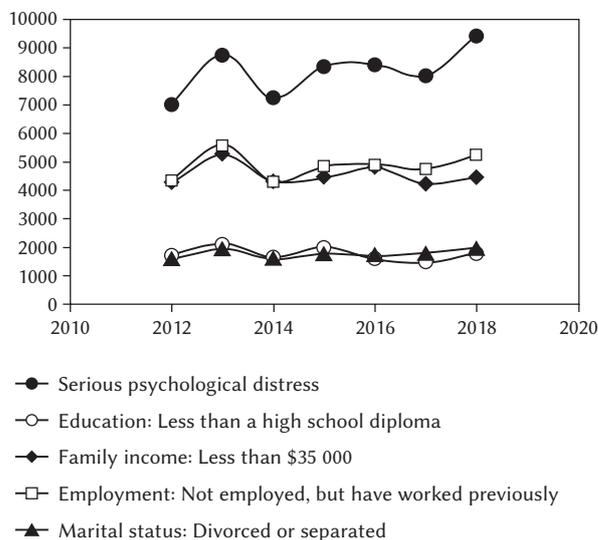


Figure 1. The trend in serious psychological distress as well as the trend in education, family income, employment and marital status with the highest OR during the years 2012-2018 in the United States.

marital status with the highest OR during the years 2012-2018 in the United States. The occurrence of SPD increased from 2012 to 2018 by 34.1%. The prevalence of SPD in these seven years was found to be 3.4%. Figure 2 represents the prognostic risk factors with the odds ratios for SPD. As can be seen, family income ranks first, followed by education status, and poverty status.

## DISCUSSION

It is worth noting that the socioeconomic characteristic of patients with the highest risk is family income and more specifically, it has been found that individuals with less than \$35 000 family income have six times higher risk of developing SPD (OR = 6.31). Additionally, education level plays a key role in the occurrence of this type of disorder. Individuals with the lowest education level have five times the risk of having SPD (OR = 5.44). This can be explained by the fact that the lack of education reflects problems in vocational rehabilitation. Moreover marital status and employment are crucial factors in human psychology. Divorced or separated individuals have an almost two-fold higher risk of developing SPD (OR = 1.57). This can be explained by the fact that the lack of a husband reflects problems in the psychopathology of the partner such as higher levels of depression, and fear, as well as lower levels of self-esteem (Strohschein, McDonough, MonettMe, & Shao, 2005). Combining, however, the higher risk of individuals who are not employed (OR = 1.25), the lack of a husband reflects the financial distress faced by these people.

It is also noted that the number of patients with serious psychological distress in the United States during the years 2012-2018 increased at an alarming rate of 34.1%. The prevalence of SPD was found to be 3.4%, while in the previous years (2009-2013) it was estimated at 3.3% (Weissman et al., 2015), that is, it increased slightly. Factors influencing the prevalence of SPD in the United States have been found to be the same as in other regions, such as Japan, Panama, and Bangladesh,

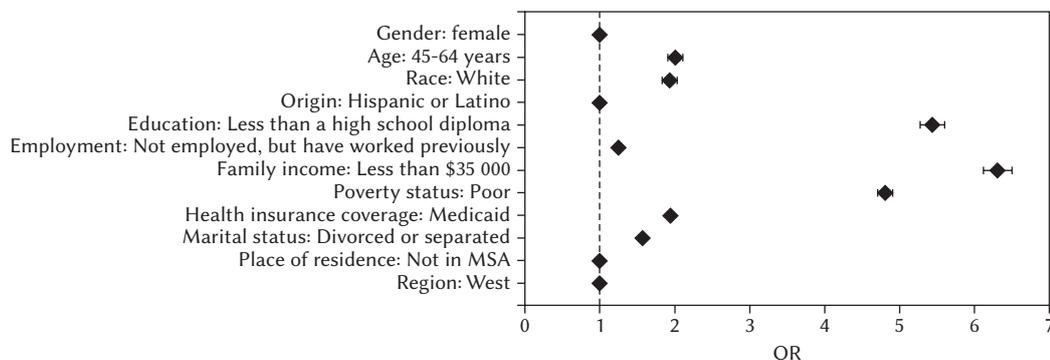


Figure 2. Prognostic risk factors with odds ratios for serious psychological distress.

where SPD was estimated at a greater percentage of 4%, 6%, and 9% respectively. More specifically, factors including female gender, lower level of education, inability to work, and living in semi-urban areas were associated with a higher prevalence of SPD (Nishi, Susukida, Usuda, Mojtabai, & Yamanouchi, 2018; Walker, Campbell, Dawson, & Egede, 2019; Islam, 2019).

This study's importance lies in the interaction of multiple socio-economic variables with SPD, which reflects the complexity and multidimensional nature of deprivation, as well as the various roles of these dimensions during the course of life, which in turn reflects the longest gestation period for SPD.

## CONCLUSIONS

This paper highlights that different socioeconomic variables are associated with different SPD risks, while deprivation (of financial comfort, education, husband, and work) proved to be the main prognostic risk factor for SPD. Moreover, individuals with SPD are more likely to be white females in the age group of 45-64.

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