

The Pandemic Experience for People with Depressive Symptoms: Substance Use, Finances, Access to Treatment, and Trusted Sources of Information

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ABSTRACT

BACKGROUND: Mental health impacts of the COVID-19 pandemic are well recognized, but little is known about the pandemic experience among people experiencing mental health symptoms.

METHODS: In June 2020, a national sample of 5023 U.S. adults, including 785 scoring ≥ 10 on the PHQ-8 for symptoms of depression, completed survey measures related to their pandemic experience.

RESULTS: After adjusting for sociodemographic characteristics, aspects of the COVID-19 pandemic experience for which participants scoring PHQ-8 ≥ 10 had the greatest increase in odds of reporting moderate/severe negative impacts included: mental health treatment access (odds ratio [OR], 95% confidence interval [CI] = 8.81, 6.70-11.57), family stress/discord (OR, 95% CI = 5.21, 4.24-6.42), food access (OR, 95% CI = 3.76, 2.97-4.77), and income/employment (OR, 95% CI = 3.19, 2.66-3.83). They were also significantly more likely to report increased use of prescription painkillers (OR, 95% CI = 8.46, 4.50-15.92) and other drugs (OR, 95% CI = 4.43, 2.85-6.89), and less trust in healthcare authorities/providers, family/friends, and employers, and more trust in websites/blogs/social media, for COVID-19 information (P -values $< .05$).

CONCLUSIONS: The interplay among depressive symptoms, substance use, lack of trust in healthcare authorities, and negative impact of the pandemic on family, finances, and access to mental health treatment and food indicate the need for robust social and behavioral health safety nets to buffer communities from the shadow epidemics of depression, family violence, and overdose deaths during public health disasters.

KEYWORDS: Depression, substance use, pandemic, trusted sources, access to treatment

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Introduction

The literature is replete with studies identifying sociodemographic risk factors for poor mental health during the early months of the COVID-19 pandemic. Common risk factors identified by systematic reviews and meta-analyses, include female sex, younger age, working as a nurse, low socioeconomic status, social isolation, pre-existing mental health conditions, and being high risk for contracting COVID-19 or developing severe disease if infected.^{1,2} Economic hardship, job insecurity, and financial worries suffered as a result of the pandemic have also been consistently associated with worse mental health outcomes.³⁻⁷ Less is known, however, about the experience of the COVID-19 pandemic among people experiencing mental health symptoms in terms of impact on daily routines, access to treatment, how time was spent, and where information about COVID-19 was obtained.

Some studies have examined aspects of this experience. For example, a survey of Spanish adults found that maintaining a

healthy diet, following a routine, taking the opportunity to pursue hobbies, not reading news/updates about COVID-19 often, and spending time outdoors or looking outdoors were all associated with decreased risk for symptoms of depression.⁸ A German study found that greater trust in government response to COVID-19 and greater knowledge about COVID-19 were both associated with a lower mental health burden,⁹ while an international study found that symptoms of depression were associated with conspiracy beliefs and misinformation, which were in turn associated with greater exposure to politicians, digital media, and personal contacts, negatively associated with trust in health experts, and positively associated with trust in digital media.¹⁰ Given the potential for contextual factors to impact experience of the COVID-19 pandemic, generalizability of findings across countries, or even regions within countries with substantially different responses to the pandemic, may be limited. We sought to examine the early COVID-19 experience in a national sample of U.S. adults who reported



depressive symptoms in an online survey about the impact of the pandemic on their daily lives, their trusted sources of COVID-19 information, and the amount of time spent interacting with different media.

Methods

Study Design: This was a cross-sectional observational nationwide survey-based study. The study was approved by the Institutional Review Board (IRB) at Baylor Scott and White Research Institute (#020-139) with a waiver of the requirement for written informed consent.

Study Sample and Data Collection: Data were obtained from an online questionnaire administered via the Qualtrics™ survey platform (Qualtrics, Inc.; Seattle, WA) across all regions of the U.S. Prospective participants were adults aged 18 years and older with sufficient mastery of English to complete the survey questionnaire. The current study focused on data collected from a nationwide sample of 5023 participants who were enrolled in June 2020.¹¹ “Speed check” validation criteria were incorporated into the Qualtrics™ platform so that responses from participants filling out questionnaires at implausible speeds were automatically deleted from data collection. The survey was distributed from June 22, 2020 to July 5, 2020.

The PHQ-8¹² is a brief, 8-item self-report measure of major depressive disorder, the validity/reliability of which is established in both the general and clinical populations.¹³ Participants reported frequency of symptoms over the previous 2 weeks, on a 4-point Likert-style rating scale ranging from 0 to 3 (0 = “not at all”, 1 = “several days”, 2 = “more than half of the days”, 3 = “nearly every day”). Since a cutoff score of ≥ 10 shows 88% sensitivity and 88% specificity in discriminating “probable” depression¹² we utilized this threshold to dichotomize our sample into respondents with “depressive symptoms” versus “no depressive symptoms.”

Study Measures: Demographic information collected included age, height, and weight calculated into BMI, sex, race, ethnicity, marital status, education, current work status, occupation, number of people supported by household income, employment status before COVID-19, current living situation, current smoking status, and current diagnosis of a comorbid condition (chronic lung disease, diabetes, cardiovascular disease, chronic renal disease, liver disease, immunocompromised condition, cancer, neurologic/neurodevelopmental disability, traumatic brain injury, spinal cord injury, other chronic condition).

COVID Experience Measures: Fear of COVID-19 Scale (FCV-19S) is a 7-item scale that measures perceived fear of COVID-19 among the general population. The scale uses a 5-item bi-polar Likert-style agreement response format that ranges from “strongly disagree” to “strongly agree.” Total scores range from 7 to 35.¹⁴ The FCV-19S has been found to be both reliable and valid in measuring the fear of COVID-19 in

different populations.¹⁵⁻²¹ Additionally, the FCV-19S has been shown to be fully invariant across gender and age.²² The internal consistency of FCV-19S in our sample was excellent (Cronbach’s $\alpha = .92$).

The Coronavirus Impact Scale²³ measures the impact of the COVID-19 pandemic on dimensions of life. A validated composite score for this measure has not been peer-reviewed, thus selected items were assessed individually in this study. The current analysis focused on daily routines, family income/employment, food access, medical care access, mental health care access, access to extended family and non-family social supports, experiences of stress related to the pandemic, and family stress/discord. These items have a Likert-style severity response format that includes “no change,” “mild,” “moderate,” and “severe,” and were further classified into moderate/severe versus mild/no change. The internal consistency of these items in our sample was good (Cronbach’s $\alpha = .80$).

The COVID experience also included COVID-19 testing (test/none), testing positive (yes/no), and knowing someone who tested positive (yes/no), self-isolating (yes, no, prefer not answer), and reason for self-isolation (mandatory, social pressure, health concern, other, prefer not to answer). Additionally, increases in use of alcohol, prescription painkillers (oxycontin, oxycodone, Percocet, codeine, Vicodin, fentanyl, Vicodin/hydrocodone, morphine, methadone), drugs other than painkillers, and smoking/vaping were included in the analysis.

Trusted Sources: Survey participants were asked to rate how trustworthy they considered the following sources during the COVID-19 outbreak: health authorities; newspapers, magazines, TV, or radio; a family member or a friend; doctor or other healthcare professional; employer; professor or instructor; and websites, blogs, and or social media. Responses included “A lot,” “A little,” and “Not at all.”

Participants rated how fearful media coverage of the pandemic has made them. Responses included “Not fearful at all,” “A little fearful,” “Somewhat fearful,” “Really fearful,” and “Extremely fearful.” Additionally, participants answered questions on how much time they spent on media sources. Time spent on television, the internet, and social media were included in this analysis. Responses included “Less than an hour,” “1 to 2 hours,” “3 to 4 hours,” “4 to 5 hours,” and “More than 5 hours”.

Statistical Analysis: Continuous variables are summarized with means and standard deviations and categorical variables with counts and percentages. Significant differences in means and counts/percentages were assessed using *t*-tests and chi-square tests, respectively. To adjust for differing demographic profiles, a propensity score for PHQ-8 ≥ 10 was calculated using all the demographic variables in Table 1 and was included in the multivariable models. Associations with depression symptoms (PHQ-8 ≥ 10 vs PHQ-8 < 10) were evaluated in multiple ways. Multivariable logistic regression was performed to determine whether PHQ-8 ≥ 10 was significantly associated with COVID experience measures. Ordinal logistic

Table 1. Demographic summary by depression status, n=4939.

CHARACTERISTIC	DEPRESSION (PHQ8 \geq 10)	NO DEPRESSION (PHQ8 < 10)	P-VALUE
	N = 785	N = 4154	
Age	42.1 \pm 13.5	51.5 \pm 13.9	<.0001
18 to 29	155 (19.7%)	297 (7.1%)	<.0001
30 to 39	218 (27.8%)	688 (16.6%)	
40 to 49	163 (20.8%)	729 (17.5%)	
50 to 59	151 (19.2%)	1056 (25.4%)	
60 to 69	87 (11.1%)	1063 (25.6%)	
70+	11 (1.4%)	321 (7.7%)	
BMI	30.0 \pm 9.1	28.0 \pm 7.5	<.0001
Sex			
Male	312 (39.7%)	1693 (40.8%)	.346
Female	468 (59.6%)	2448 (58.9%)	
Prefer not to answer	5 (0.6%)	13 (0.3%)	
Race			
White	552 (70.3%)	3122 (75.2%)	.005
Black	69 (8.8%)	313 (7.5%)	
Hispanic	82 (10.4%)	286 (6.9%)	
Asian	54 (6.9%)	300 (7.2%)	
Other	28 (3.6%)	133 (3.2%)	
Marital status			
Single	326 (41.5%)	1189 (28.6%)	<.0001
Married/Common law	355(45.2%)	2421 (58.3%)	
Divorced/Separated	101 (12.9%)	512 (12.3%)	
Unknown/Prefer not to answer	3 (0.4%)	32 (0.8%)	
Highest Education Level			
Under high school	13 (1.7%)	25 (0.6%)	<.0001
High school graduate/GED	149 (19.0%)	453 (10.9%)	
Vocational/Associates degree	225 (28.7%)	1149 (27.7%)	
Bachelor's degree	239 (30.4%)	1380 (33.2%)	
Advanced degree	155 (19.7%)	1133 (27.3%)	
Other	4 (0.5%)	10 (0.2%)	
Unknown/Prefer not to answer	0 (0.0%)	4 (0.1%)	
Current Work Status			
Working from home	199 (25.3%)	1036 (24.9%)	<.0001
Working at my normal location	322 (41.0%)	2182 (52.5%)	
Retired	30 (3.8%)	289 (7.0%)	

(Continued)

Table 1. (Continued)

CHARACTERISTIC	DEPRESSION (PHQ8 \geq 10)	NO DEPRESSION (PHQ8 < 10)	P-VALUE
	N = 785	N = 4154	
In school/Not working for other reasons	82 (10.4%)	208 (5.0%)	
Not working right now due to COVID-19	78 (9.9%)	274 (6.6%)	
Unemployed right now due to COVID-19	71 (9.0%)	152 (3.7%)	
Prefer not to answer	3 (0.4%)	13 (0.3%)	
Occupation Segment			
Essential workers	87 (11.1%)	407 (9.8%)	.0002
General population	522 (66.5%)	2518 (60.6%)	
Healthcare providers	176 (22.4%)	1229 (29.6%)	
Number of people supported by total household income	2.4 \pm 1.4	2.2 \pm 1.4	.006
Employment status before COVID-19			
Full-time (>35h/wk)	518 (66.0%)	2845 (68.5%)	<.0001
Part-time (<35h/wk)	145 (18.5%)	852 (20.5%)	
Other	22 (2.8%)	138 (3.3%)	
Unemployed	55 (7.0%)	237 (5.7%)	
Disabled	41 (5.2%)	69 (1.7%)	
Unknown/Prefer not to answer	4 (0.5%)	13 (0.3%)	
Current Living Situation			
Owens home or apartment	392 (49.9%)	2904 (69.9%)	<.0001
Rents home or apartment	256 (32.6%)	962 (23.2%)	
Lives in family household	110 (14.0%)	246 (5.9%)	
Lives in community housing/homeless	11 (1.4%)	7 (0.2%)	
Rehabilitation facility/hospital	3 (0.4%)	1 (0.1%)	
Other/unknown	13 (1.7%)	34 (0.8%)	
Current Smoker	117 (14.9%)	293 (7.0%)	<.0001
Any chronic condition	287 (36.6%)	1189 (28.6%)	<.0001

regression was utilized to determine the association between PHQ-8 \geq 10 and trusted sources, fear due to media, and time spent on media sources. A 5% alpha level was used to determine significance, and all analyses were performed using SAS version 9.4 (SAS Inc., Cary, NC).

Results

Table 1 displays the demographic characteristics of participants by PHQ-8 score. Of the 5023 participants who completed the survey, 15.6% (785) had a PHQ-8 score \geq 10, 82.7% (4154) had a PHQ-8 score < 10, and 1.7% (84) did not have PHQ-8 data. All demographic characteristics, except sex, were

statistically different between participants with PHQ-8 \geq 10 and those with PHQ-8 < 10. Compared to participants with PHQ-8 < 10, those with PHQ-8 \geq 10 were younger, had a higher BMI, were more likely to be single, and had lower education levels, higher frequencies of being in school or not working for reasons other than the pandemic, as well as being unemployed/not working due to COVID-19, and a higher prevalence of smoking and comorbid chronic conditions.

PHQ-8 Score and the COVID Experience: After adjusting for all demographic characteristics, participants with PHQ-8 \geq 10 had greater odds of reporting the COVID-19 pandemic had a moderately/severely negative impact on: daily routines

(OR = 1.80, 95% CI 1.46, 2.20), family income and employment (OR = 3.19, 95% CI 2.66, 3.83), access to food (OR = 3.76, 95% CI 2.97, 4.77), access to medical care (OR = 2.47, 95% CI 2.06, 2.97), access to mental health treatment (OR = 8.81, 95% CI 6.70, 11.57), access to extended family and non-family social supports (OR = 2.14, 95% CI 1.79, 2.55), experiences of stress related to the coronavirus pandemic (OR = 5.70, 95% CI 4.73, 5.88), and stress and discord in the family (OR = 5.21, 95% CI 4.24, 6.42), (Table 2). Those with PHQ-8 \geq 10 also had higher odds of receiving a COVID-19 test (OR = 1.32, 95% CI 1.05, 1.65), self-isolating (OR = 1.39, 95% CI 1.16, 1.66), especially due to social pressure (OR = 2.31, 95% CI 1.77, 3.01) and health concerns (OR = 1.41, 95% CI 1.18, 1.69), and increased use of alcohol (OR = 2.03, 95% CI 1.63, 2.53), prescription painkillers (OR = 8.46, 95% CI 4.50, 15.92), drugs other than prescription painkillers (OR = 4.43, 95% CI 2.85, 6.89), and smoking/vaping (OR = 2.44, 95% CI 1.77, 3.37), (Table 2).

PHQ-8 Score and Trusted Sources: Table 3 shows the results for the multivariable adjusted analysis for PHQ-8 score and trusted sources. There were significant differences in trust in health authorities, a family member or friend, a doctor or other health care professional, employers, and websites, blogs, or social media between participants with PHQ-8 \geq 10 compared to those with PHQ-8 < 10. A higher percentage of participants with lesser depressive symptoms (PHQ-8 < 10) rated “A lot” of trust in health authorities (50.9% vs 39.8%), doctors or health care professionals (64.2% vs 51.3%), and employers (29.0% vs 18.3%) compared to those with greater depressive symptoms (PHQ-8 \geq 10). A higher proportion of those with greater depressive symptoms did not have any trust in a family member or friend (21.7% vs 15.8%), had a lot of trust in websites, blogs, or social media (7.0% vs 2.9%), and indicated that media coverage of the pandemic made them “extremely fearful” (16.9% vs 4.6%). Additionally, more participants scoring \geq 10 on the PHQ-8 spent more than 5 hours on television (29.1% vs 27.4%), internet (38.5% vs 29.6%), and social media (19.7% vs 10.1%) compared to those scoring < 10 (Figure 1).

Discussion

In this nationwide sample, adults with clinically meaningful symptoms of depression were more likely to report negative impact from COVID-19 on access to mental health services, family income/employment, and stress and discord in the family. Compared to their nondepressed counterparts, participants scoring above the PHQ-8 threshold for frequent symptoms of depression demonstrated important differences in their trusted sources for pandemic-related information, such as less trust in health professionals or friends or family members for information about COVID-19, and more trust in websites, blogs, or social media. Substantially more of this group also reported spending more than 5 hours in the previous week watching

television, on the internet, and on social media, suggesting greater overall media consumption.

Perhaps most concerning, was the strong association between adults with depressive symptoms and their reports of increased substance use, particularly of prescription painkillers and other drugs. Our findings add important context to a recent data brief from the National Center for Health Statistics which concluded the overdose epidemic has reached unprecedented levels during the COVID-19 pandemic, with the numbers continuing to rise.²⁴ In 2020, deaths due to drug overdose topped 1 million for the first time since the Centers for Disease Control and Prevention began collecting data more than 2 decades ago, with a further 100 000 fatal overdoses predicted for 2021.²⁵

Previous research has demonstrated that both psychological and social supports provide important protection against symptoms of depression in the context of COVID-19,²⁶ and that worries associated with mental health outcomes such as anxiety and depression tend to cluster into categories of “hardship” and “fear of infection.”²⁷ Our results align with both those patterns. Factors previously shown to be protective against adverse mental health outcomes, such as access to sufficient medical treatment and having accurate and up-to-date information about the pandemic,¹ also align with our findings regarding access to health care and mental health treatment, and regarding trust in health authorities and health professionals as sources for COVID-19 information. Likewise, given the preponderance of COVID-19 related content in all forms of media at the time of this survey, the greater media consumption reported by our survey participants with depressive symptoms aligns with previous findings that individuals who spent more than 2 hours per day thinking about COVID-19 had increased symptoms of anxiety and depression.²⁸

Importantly, our findings provide detail regarding the relative associations between the various aspects of the COVID-19 experience and symptoms of depression, which can inform prioritization of strategies to combat the negative impacts. Ensuring access to mental health treatment appears to be an essential aspect to any such efforts, followed by interventions for dealing with stress and discord in the family, and financial stress related to the pandemic. Public health measures to slow the spread of the virus such as social-distancing, sheltering-in-place, restricted travel, and closures of key community social service agencies increased the risk for family violence around the globe.²⁹⁻³³

Two other high priority areas identified through the survey responses, food access, and income/employment, also lie within the purview of social services, indicating the broad need for both interdisciplinary cooperation and public policies that enable all-encompassing or flexible mechanisms of support rather than narrowly targeted interventions. Observations from the United States and other countries

Table 2. COVID experience by PHQ-8.

	DEPRESSION (PHQ8 ≥ 10) N = 785	NO DEPRESSION (PHQ8 < 10) N = 4154	UNADJUSTED P-VALUE	ADJUSTED OR	95% CI	ADJUSTED P-VALUE
COVID fear, Mean ± SD	22.2 ± 7.0	16.3 ± 6.2	<.0001	5.31	4.77, 5.85	<.0001
COVID Impact ranked as moderate/severe						
Routines	599 (76.3%)	2718 (65.4%)	<.0001	1.80	1.46, 2.20	<.0001
Family income/Employment	401 (51.1%)	822 (19.8%)	<.0001	3.19	2.66, 3.83	<.0001
Food access	223 (28.4%)	285 (6.9%)	<.0001	3.76	2.97, 4.77	<.0001
Medical health care access	330 (42.0%)	891 (21.4%)	<.0001	2.47	2.06, 2.97	<.0001
Mental health treatment	216 (27.5%)	141 (3.4%)	<.0001	8.81	6.70, 11.57	<.0001
Access to extended family and non-family social supports	383 (48.8%)	1371 (33.0%)	<.0001	2.14	1.79, 2.55	<.0001
Experiences of stress related to coronavirus pandemic	536 (68.3%)	1037 (25.0%)	<.0001	5.70	4.73, 6.88	<.0001
Stress and discord in the family	296 (37.7%)	368 (8.9%)	<.0001	5.21	4.24, 6.42	<.0001
COVID-19 testing						
Test	160 (20.4%)	617 (14.8%)	<.0001	1.32	1.05, 1.65	.016
None	625 (79.6%)	3537 (85.2%)				
Tested positive	27 (11.8%)	40 (4.3%)	<.0001	1.54	0.77, 3.06	.221
Know someone who tested positive	343 (43.7%)	1766 (42.5%)	.099	1.11	0.93, 1.33	.240
Have you been self-isolating?						
No	261 (33.3%)	1754 (42.3%)	<.0001	1.39	1.16, 1.66	.0004
Yes	515 (65.7%)	2345 (56.5%)				
Prefer not to answer	8 (1.0%)	50 (1.2%)				
Reason for self-isolation						
Mandatory	170 (21.7%)	775 (18.7%)	.050	1.16	0.93, 1.43	.181
Social pressure	126 (16.0%)	269 (6.5%)	<.0001	2.31	1.77, 3.01	<.0001
Health concern	303 (38.6%)	1200 (28.9%)	<.0001	1.41	1.18, 1.69	.0002
Other	95 (12.1%)	539 (13.0%)	.502	0.98	0.76, 1.27	.911
Prefer not to answer	13 (1.7%)	70 (1.7%)	.954	0.79	0.39, 1.61	.514
Use of alcohol increased since the COVID-19 outbreak	189 (24.1%)	508 (12.3%)	<.0001	2.03	1.63, 2.53	<.0001
Use of prescription painkillers increased since the COVID-19 outbreak (oxycontin, oxycodone, Percocet, codeine, Vicodin, fentanyl, Vicodin/hydrocodone, morphine, methadone)	41 (5.3%)	18 (0.4%)	<.0001	8.46	4.50, 15.92	<.0001
Use of drugs other than prescription painkillers increased since the COVID-19 outbreak	69 (8.9%)	52 (1.2%)	<.0001	4.43	2.85, 6.89	<.0001
Use of smoking/vaping increased since the COVID-19 outbreak	123 (15.8%)	137 (3.3%)	<.0001	2.44	1.77, 3.37	<.0001

Table 3. Trusted sources by PHQ-8 (at baseline).

RATE TRUSTWORTHY YOU CONSIDER THE FOLLOWING SOURCES DURING THE COVID-19 OUTBREAK.	DEPRESSION (PHQ8 ≥ 10)	NO DEPRESSION (PHQ8 < 10)	UNADJUSTED P-VALUE	ADJUSTED P-VALUE
Health authorities				
A lot	310 (39.8%)	2101 (50.9%)	<.0001	<.0001
A little	368 (47.3%)	1696 (41.1%)		
Not at all	328 (7.9%)	100 (12.8%)		
Newspapers, magazines, TV, or radio				
A lot	103 (13.3%)	577 (14.0%)	.097	.239
A little	388 (50.0%)	2200 (53.3%)		
Not at all	285 (36.7%)	1352 (32.7%)		
A family member or friend				
A lot	174 (22.7%)	937 (22.8%)	.0002	.023
A little	427 (55.6%)	2518 (61.3%)		
Not at all	167 (21.7%)	649 (15.8%)		
Your doctor or other health care professional				
A lot	398 (51.3%)	2635 (64.2%)	<.0001	<.0001
A little	307 (39.6%)	1318 (32.1%)		
Not at all	70 (9.0%)	153 (3.7%)		
Your employer				
A lot	134 (18.3%)	1120 (29.0%)	<.0001	<.0001
A little	341 (46.5%)	1896 (49.1%)		
Not at all	258 (35.2%)	845 (21.9%)		
Your professor or instructor				
A lot	97 (15.5%)	400 (13.4%)	.283	.460
A little	262 (41.9%)	1330 (44.5%)		
Not at all	266 (42.6%)	1257 (42.1%)		
Websites, blogs, or social media				
A lot	53 (7.0%)	117 (2.9%)	<.0001	.007
A little	313 (41.2%)	1558 (38.8%)		
Not at all	394 (51.8%)	2340 (58.3%)		
How fearful has media coverage of the pandemic made you?				
Not fearful at all	81 (10.4%)	972 (23.6%)	<.0001	<.0001
A little fearful	169 (21.6%)	1450 (35.1%)		
Somewhat fearful	251 (32.1%)	1153 (27.9%)		
Really fearful	149 (19.0%)	361 (8.7%)		
Extremely fearful	132 (16.9%)	189 (4.6%)		

(Continued)

Table 3. (Continued)

RATE TRUSTWORTHY YOU CONSIDER THE FOLLOWING SOURCES DURING THE COVID-19 OUTBREAK.	DEPRESSION (PHQ8 ≥ 10)	NO DEPRESSION (PHQ8 < 10)	UNADJUSTED P-VALUE	ADJUSTED P-VALUE
Time spent on the following media sources every day, past 7 d:				
Television				
Less than an hour	135 (17.3%)	865 (20.9%)	.016	.010
1 to 2 h	171 (21.9%)	1010 (24.4%)		
3 to 4 h	158 (20.2%)	750 (18.1%)		
4 to 5 h	90 (11.5%)	378 (9.1%)		
More than 5 h	227 (29.1%)	1132 (27.4%)		
Internet				
Less than an hour	64 (8.2%)	537 (13.0%)	<.0001	<.0001
1 to 2 h	146 (18.7%)	1083 (26.2%)		
3 to 4 h	141 (18.1%)	808 (19.5%)		
4 to 5 h	128 (16.4%)	483 (11.7%)		
More than 5 h	300 (38.5%)	1225 (29.6%)		
Social media				
Less than an hour	198 (25.6%)	1880 (46.1%)	<.0001	<.0001
1 to 2 h	167 (21.6%)	1088 (26.7%)		
3 to 4 h	157 (20.3%)	464 (11.4%)		
4 to 5 h	99 (12.8%)	233 (5.7%)		
More than 5 h	152 (19.7%)	412 (10.1%)		

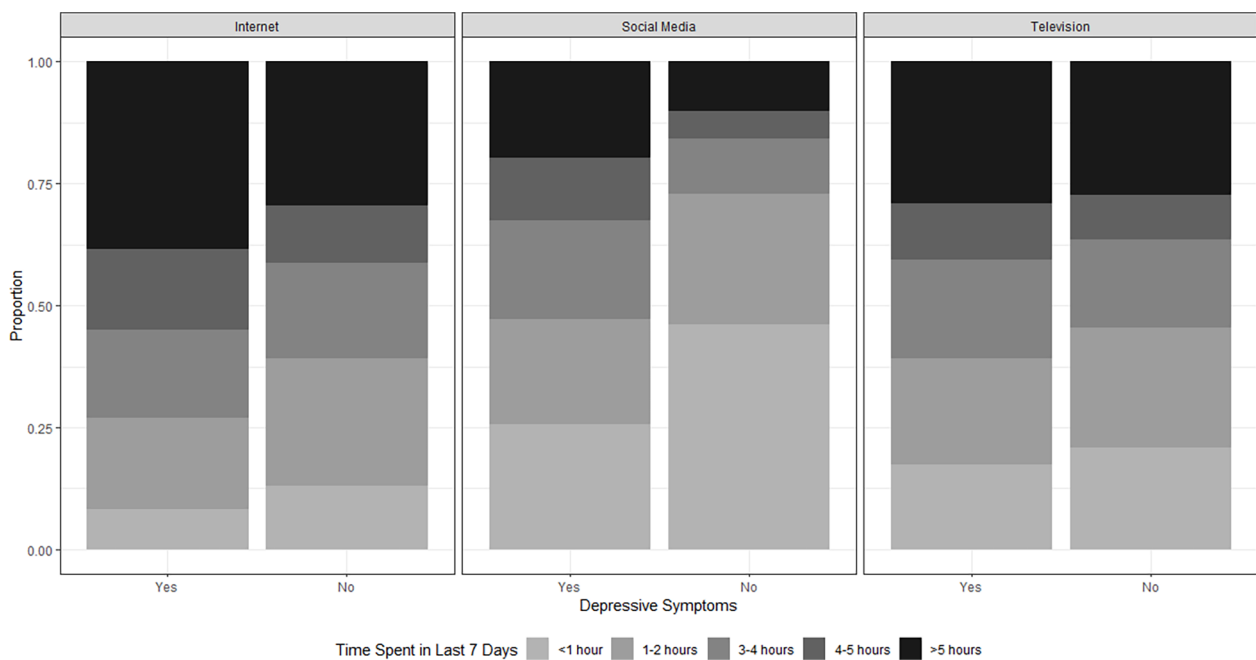


Figure 1. Time spent on the internet, social media, and watching television according to depressive symptom status (PHQ-8 ≥ 10 vs PHQ-8 < 10).

during the COVID-19 pandemic suggest the burden of behavioral health is falling disproportionately on the economically vulnerable.^{2,34-42} Since low income is a known risk factor for poor mental health, even outside the pandemic context, COVID-19 has made the disparities more glaring.^{6,34}

Our finding of the strong association between depressive symptoms and increased use of prescription painkillers or other drugs in the early months of the pandemic goes some way toward explaining research that indicates the COVID-19 pandemic exacerbated the increasing trajectory of overdose-related deaths in the United States in 2020.⁴³ The authors of that research concluded that a multi-pronged approach, including expanded access to substance use disorder treatment, access to harm reduction services, emphasis on risk reduction strategies, provision of a safe drug supply, and decriminalization of drug use, is needed to address the situation.⁴³ Our results suggest that a multipronged approach should also include screening individuals who score above the threshold on the PHQ-8 (or other depression screening instruments) for increased substance use, providing the opportunity for early detection, intervention, and prevention of overdose. Although such screening should already be in place, given the well-described comorbidity of substance abuse with serious medical and mental health conditions,⁴⁴ many health care settings fail to systematically screen for unhealthy substance use, or do not use best evidence interventions.⁴⁵

As with any survey, self-selection bias is a potential concern, and, since this was an online survey administered only in English, people with limited internet access and/or computer skills, and non-English speakers are likely under-represented. Additionally, the respondents included a disproportionate number of healthcare workers, an employment category which may have influenced participants' experience of and reactions to the pandemic. Particularly with respect to the questions about increased substance use, trusted sources, and time spent on different media, it is possible that responses were influenced by social desirability bias, which we would expect to result in overestimates of trust in health authorities and health professionals, and underestimates of increased substance use and trust in (and time spent on) websites, blogs, and social media. If that is the case, then our results represent conservative estimates of the relationship these factors have with symptoms of depression.

Conclusion

The significant associations we demonstrated among clinically relevant symptoms of depression, increased substance use, lack of trust in health authorities and health care providers, and negative impact of the COVID-19 pandemic on access to mental health treatment, family stress and discord, and income/employment clearly demonstrate the need for a robust safety net of social and behavioral health services to buffer communities and individuals against the "shadow epidemics" of depression, family

violence, and overdose deaths that have exacerbated the catastrophic effects of the COVID-19 pandemic and will hamper recovery. Investment in these services is just as important in preparing for future pandemics and other natural disasters as implementing monitoring systems and stockpiling personal protective equipment. Furthermore, unlike those latter investments, improving access to behavioral health treatment and improving social determinants of health will provide health benefits related to the prevention and management of many chronic diseases even when life "returns to normal" between catastrophes.

Author contributions

KS drafted the article with technical writing from BG. LRH and MMB performed the data analysis and interpretation of the results. AMW and MBP are responsible for the original design of the overall study and KS, LRH, and MMB, and BG are responsible for the design specific to this paper. AMW, MBP, and MMB were part of reviewing survey questions and coordinating with Qualtrics for review and receipt of survey responses. All authors were responsible for critical review, revision, and final approval of the article to be published.

Data availability

The data underlying in this article will be shared upon reasonable request to the corresponding author.

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