Post-lockdown depression and anxiety in the USA during the COVID-19 pandemic

Jagdish Khubchandani[1], Sushil Sharma[2], Fern J. Webb[3], Michael J. Wiblishauser[4], Sharon L. Bowman[5]

[1]Department of Public Health Sciences, New Mexico State University, NM 88003, USA
[2]Miller College of Business, Ball State University, IN 47306, USA
[3]Department of Community Health and Family Medicine, University of Florida, FL 32209, USA
[4]Department of Health Studies, University of Houston, TX 77901, USA
[5]Department of Counseling Psychology, Social Psychology and Counseling, Ball State University, IN 47306, USA
Address correspondence to Jagdish Khubchandani, E-mail: jagdish@nmsu.edu.

ABSTRACT

Background The mental health impact of the pandemic after the initial lockdowns has not been well studied in the USA. Thus, the purpose of this study was to conduct a comprehensive and systematic national assessment of the prevalence of depression and anxiety in the adult US population.

Methods A multi-item, valid and reliable questionnaire was deployed online via mTurk and social media sites to recruit adult US participants in the general population across the USA. A total of 1978 individuals participated in the study, where the majority were: females (51%), whites (74%), non-Hispanic (81%), married (56%), employed full time (68%) and with a bachelor's degree or higher (78%).

Results The prevalence of depression (39%), anxiety (42%) and psychological distress (39%) were computed from the PHQ-4 scale. In multiple regression analyses, depression, anxiety and psychological distress burden (assessed by PHQ-4 scale) was predicted significantly based on race, ethnicity, age, having children at home, employment as a healthcare worker, annual household income and area of residence. Males were more likely to have depression, and females were more likely to have anxiety symptoms.

Conclusions Given the high prevalence of depression and anxiety, interdisciplinary and multisectoral approaches are recommended in the USA along with population-based interventions on mental health improvement.

Keywords mental health, social determinants, stress

Introduction

The social, economic and health tolls of COVID-19 in the USA were among the highest in the world. By November 2020, more than 10 million people had been infected by, and more than a quarter million succumbed to COVID-19 in the USA.[1–3] The number of unemployment claims filed every week reached record highs, with workers and businesses experiencing profound economic struggles or permanent business closures and job losses. As a national emergency was declared on 13 March 2020, states across the nation announced a shutdown of services and community lockdowns, leaving millions of people isolated and confined.[1–5] Given these circumstances and their associations with psychological distress, a variety of popular media polls and reports indicated the burden of the pandemic on the mental health of Americans.[5–9] For example, the Kaiser Family Foundation conducted two polls in March and July, where participants across the nation indicated that their mental health was negatively impacted due to worry and stress over the coronavirus (32% in March and 53% in July).[6] Similarly, an international survey of more than 8000 individuals conducted from March to May by the Commonwealth Fund found that a third of Americans

Jagdish Khubchandani, MBBS, PhD, Professor of Public Health

Sushil Sharma, PhD, Professor of Information Systems

Fern J. Webb, PhD, Associate Professor of Family Medicine and Community Health

Michael J. Wiblishauser, PhD, Assistant Professor of Health Studies

Sharon L. Bowman, PhD, Professor and Chair of Counseling Psychology, Social Psychology, and Counseling

reported experiencing stress, sadness and anxiety which were difficult to cope with (significantly higher than other countries included in the survey).[7] A national survey of more than 5000 US adults in June 2020 by the Centers for Disease Prevention and Control (CDC) found that more than a third (40.9%) of the respondents reported at least one adverse mental health condition, such as depression and anxiety.[8] While few other such polls and reports exist, there are certain limitations of these estimates.[5–10] First, the preponderance of the evidence on the mental health burden of the pandemic comes from the early stages of the pandemic (i.e. March–June) and countries other than the USA. Also, these estimates are from the time when lockdowns were being implemented, precluding the estimation of the mental health impact of sustained isolation and loneliness. Furthermore, most of these polls and reports depend on single-item measures of stress without using valid and reliable measures for disorders, such as depression and anxiety. Finally, the existing polls and reports do not elucidate in detail the mental health impact of the COVID-19 pandemic across the sociodemographic characteristics of the adult US population. Thus, the purpose of this study was to conduct a national assessment of the prevalence of depression, anxiety and psychological distress using a valid and reliable screening tool.

Methods and procedures

A multi-item online questionnaire was deployed using Amazon mTurk and social media sites and networks (e.g. Facebook and Twitter) in July 2020. The questionnaire could be taken on computers and mobile phones where all anonymity and privacy conditions for data and personal information were provided to the study participants. The study protocol and procedures were approved by the Institutional Review Board before the survey was developed. To estimate the required sample size, an *a priori* power analysis was conducted. Based on the total population of adults in the USA ($n = \approx 250$ million), 99% confidence levels and a conservative 3% margin of error, a total of 1383 participants were needed for the study (1978 adults participated in this study, exceeding the required sample size).[4,11]

The first set of questions on the survey assessed the sociodemographic characteristics of the study participants. Closed format questions with predetermined options assessed the participants' sex, age, race, ethnicity, education, employment type and status, marital status, annual household income, the region of residence in the USA and whether or not the participants had children at home. Next, we used the PHQ-4, a valid and reliable scale, to assess the prevalence of depression and anxiety.[12] The PHQ-4 consists of four

questions (two questions to assess depression via PHQ-2, and two questions to assess anxiety via GAD-2) with a common stem: 'over the last 2 weeks, how often have you been bothered by the following problems'. The response options for these four questions are: 'not at all' (score = 0), 'several days' (score = 1), 'more than half of the days' (score = 2) and 'almost every day' (score = 3). The composite scores of PHQ-2 and GAD-2 are computed by adding the scores on two questions for each subscale (score range = 0–6), while the composite score on PHQ-4 is computed by adding the score on the four items (score range = 0–12). Those who score ≥ 3 on PHQ-2 or GAD-2 should be further evaluated for depression and anxiety as these cutoffs are considered positive on screening. For the PHQ-4, the score ranges for psychological distress are: normal (0–2), mild,[3–5] moderate[6–8] and severe[9–12] (Table 1). To assess the internal consistency reliability of the PHQ-4 scale, a Cronbach α was computed, and the reliability of the scale was found to be high ($\alpha = 0.90$).[12]

Data were analyzed using SPSS 22 (IBM Corp). We computed descriptive statistics to describe the demographic characteristics of the study participants. Next, PHQ-2, GAD-2 and PHQ-4 scores were computed and compared across the demographic characteristics using *t*-tests and ANOVA. Subsequently, using the cutoff score for depression (PHQ-2), anxiety (GAD-2) and moderate-to-severe psychological distress (PHQ-4 indicating both depression and anxiety symptoms), group differences for the prevalence of these outcomes were compared using Chi-square tests. Multiple logistic regression analyses were conducted with depression, anxiety and moderate-to-severe psychological distress as the outcomes and sociodemographic characteristics as the predictor variables to compute the adjusted odds ratios (AOR) for these outcomes. Statistical significance was established at an alpha of $P < 0.05$.

Results

The population distribution of PHQ-2, GAD-2 and PHQ-4 scores are shown in Table 1. The majority of the study participants were: females (51%), whites (74%), non-Hispanic (81%), married (56%), employed full time (68%) and non-healthcare workers (74%) (Table 2). Depression scores (from PHQ-2), anxiety scores (from GAD-2) and psychological distress (from PHQ-4) were statistically significantly different among sociodemographic groups (Table 2).

Prevalence of depression (PHQ-2), anxiety (GAD-2) and moderate-to-severe psychological distress (PHQ-4) were computed based on cutoff scores described above (Table 3). The overall prevalence of depression, anxiety

Table 1 Distribution of scores on the PHQ-4 scale for study participants (*N* = 1978)

Over the last 2 weeks, how often have you been bothered by the following problems	Population average score, M (±SE)	Not at all (Score 0), N (%)	Several days (Score 1), N (%)	More than half of the days (Score 2), N (%)	Almost every day (Score 3), N (%)
(a) Feeling nervous, anxious or on edge	1.17 (0.02)	570 (29)	737 (38)	438 (22)	233 (11)
(b) Not being able to stop or control worrying/worries	1.11 (0.02)	732 (37)	573 (29)	415 (21)	258 (13)
GAD-2 anxiety score (Item a + Item b)	2.10 (0.04)				
(c) Feeling down, depressed or hopeless	1.05 (0.02)	730 (37)	639 (32)	394 (20)	215 (11)
(d) Little interest or pleasure in doing things	1.06 (0.02)	750 (38)	601 (30)	403 (20)	224 (11)
PHQ-2 depression score (Item c + Item d)	2.27 (0.05)				
PHQ-4 psychological distress score (Items a + b + c + d)	4.36 (0.08)				

M (±SE) indicates average scores for each item and subscale for the total population.

N (%) indicates the frequency and percentage of individuals who selected an option on the items and subscales.

and moderate/severe psychological distress in the total study population was 39, 42 and 39%, respectively. The prevalence of depression was statistically significantly higher for those who were: males, Hispanics, married individuals, with children at home, bachelor's degree holders, worked full time, healthcare workers, earning <$60 000, from rural areas or the western USA and in the age group of 18–25 years. The prevalence of anxiety was statistically significantly higher for those who were: African-Americans, Hispanics, married, with children at home, bachelor's degree holders, full-time and healthcare workers, earning <$60 000, urban dwellers, from the western USA and in the age group of 18–25 years. The prevalence of moderate-to-severe psychological distress was significantly higher in those who were: males, Hispanics, married, with children at home, bachelor's degree holders or employed full time, healthcare workers, earning <$60 000, urban or rural dwellers, living in the western USA and in the age group of 18–40 years of age.

Multiple logistic regression analyses were conducted to estimate the probability of the outcomes in various groups after simultaneously adjusting for other sociodemographic characteristics (AOR shown Table 3). In the final regression model, the following groups had statistically significantly higher odds for depression compared to their counterparts: males (1.42 times higher), Hispanics (2.52 times higher), having children at home (1.42 times higher), healthcare workers (2.40 times higher) and those who had annual household income less than $60 000 (1.43 times higher). Compared to suburban residents, individuals in rural (1.54 times higher) and urban (1.81 times higher) areas had significantly higher odds of depression. Similarly, compared to those older than 60 years

of age, individuals who were 18–25 years (3.83 times higher), 26–40 years (3 times) and 41–60 years (1.86 times) had significantly higher odds of depression. Factors such as race, marital status, education, employment status and living region in the USA were not significant predictors of odds for having depression (Table 3).

In the final regression model, the following groups had statistically significantly higher odds for anxiety compared to their counterparts: females (1.27 times higher), Hispanics (2.92 times), having children at home (1.59 times), healthcare workers (2.02 times) and annual household income less than $60 000 (1.41 times). Compared to suburban residents, individuals in rural (1.36 times) and urban (1.86 times) areas had higher odds of anxiety. Similarly, compared to those older than 60 years of age, individuals who were 18–25 years (2.89 times), 26–40 years (2.45 times) and 41–60 years (1.70 times) had higher odds of anxiety. Also, among racial groups, Asians (0.63 times lower), and among marital status groups, divorced/widowed/separated (0.43 times lower) had lower odds of anxiety compared to their counterparts. Factors such as education, employment status and living region in the USA were not significant predictors of odds for having anxiety (Table 3).

The odds for moderate-to-severe psychological distress were significantly higher compared to their counterparts in: Hispanics (2.77 times higher), those with children at home (1.46 times higher), healthcare workers (2.39 times higher) and those with income lower than $60 000 (1.51 times). Compared to suburban residents, individuals in rural (1.49 times) and urban (1.83 times) areas had higher odds of moderate or severe psychological distress. Similarly, compared to those

Table 2 Sociodemographic characteristics and PHQ-4 scores for study participants (N = 1978)

Variable	N (%)	PHQ-2 scores, M (±SE)	P-value	GAD-2 scores, M (±SE)	P-value	PHQ-4 scores, M (±SE)	P-value
Sex							
Male	970 (49)	2.29 (0.06)	<0.001	2.23 (0.05)	0.37	4.52 (0.12)	0.05
Female	1008 (51)	1.91 (0.05)		2.31 (0.06)		4.22 (0.11)	
Race							
White	1455 (74)	2.11 (0.05	0.09	2.30 (0.05)	0.02	4.40 (0.10)	0.03
Black	218 (11)	2.35 (0.13)		2.51 (0.14)		4.85 (0.25)	
Asian	194 (10)	1.84 (0.12)		1.93 (0.13)		3.76 (0.24)	
Multiracial	46 (2)	2.01 (0.25)		2.11 (0.18)		4.11 (0.50)	
Other	65 (3)	2.07 (0.23)		2.13 (0.20)		4.19 (0.38)	
Ethnicity							
Hispanic	379 (19)	3.08 (0.09)	<0.001	3.13 (0.10)	< 0001	6.21 (0.16)	<0.001
Non-Hispanic	1599 (81)	1.87 (0.04)		2.07 (0.05)		3.94 (0.09)	
Marital status							
Single/never married	649 (33)	2.12 (0.07)	<0.001	2.25 (0.07)	<0.001	4.36 (0.13)	<0.001
Married	1104 (56)	2.20 (0.06)		2.36 (0.06)		4.56 (0.11)	
Engaged/living with a partner	101 (5)	2.05 (0.18)		2.53 (0.18)		4.58 (0.33)	
Divorced/separated/widow	124 (6)	1.24 (0.15)		1.38 (0.15)		2.62 (0.27)	
Children at home							
Yes	931 (47)	2.35 (0.06)	<0.001	2.50 (0.06)	<0.001	4.85 (0.11)	<0.001
No	1047 (53)	1.88 (0.04)		2.06 (0.05)		3.94 (0.09)	
Education							
≤High school	111 (6)	2.00 (0.18)	<0.001	2.07 (0.19)	0.002	4.08 (0.36)	<0.001
Some college education	332 (17)	1.98 (0.11)		2.01 (0.10)		3.99 (0.18)	
Bachelor's degree	961 (49)	2.27(0.06)		2.43 (0.06)		4.70 (0.11)	
≥Master's degree	574 (29)	1.89 (0.08)		2.20 (0.08)		4.08 (0.14)	
Current employment status							
Full time	1351 (68)	2.15 (0.05)	0.04	2.30 (0.05)	0.08	4.45 (0.09)	0.04
Part time	312 (16)	2.12 (0.10)		2.35 (0.09)		4.47 (0.19)	
Not employed	315 (16)	1.86 (0.11)		2.07 (0.11)		3.92 (0.21)	
Healthcare worker							
Yes	509 (26)	2.90 (0.08)	<0.001	3.00 (0.08)	<0.001	5.89 (0.15)	< 0001
No	1469 (74)	1.82 (0.05)		2.02 (0.05)		3.85 (0.09)	
Annual household income							
<60 000	998 (51)	2.39 (0.06)	<0.001	2.51 (0.06)	<0.001	4.90 (0.11)	<0.001
≥60 000	980 (49)	1.80 (0.05)		2.04 (0.05)		3.83(0.10)	
Area of residence							
Rural	424 (21)	2.42 (0.09)	<0.001	2.49 (0.09)	<0.001	4.90 (0.18)	<0.001
Urban	818 (41)	2.36 (0.06)		2.54 (0.06)		4.91 (0.12)	
Suburban	736 (37)	1.62 (0.05)		1.85 (0.06)		3.46 (0.11)	
Region in USA							
Northeast	251 (13)	2.16 (0.11)	<0.001	2.24 (0.12)	<0.001	4.41 (0.22)	<0.001
Midwest	664 (34)	1.86 (0.07)		2.16 (0.08)		4.02 (0.13)	
South	589 (30)	1.96 (0.08)		2.12 (0.07)		4.07 (0.14)	
West	462 (23)	2.55 (0.09)		2.63 (0.09)		5.19 (0.16)	

Table 2 Continued

Variable	N (%)	PHQ-2 scores, M (±SE)	P-value	GAD-2 scores, M (±SE)	P-value	PHQ-4 scores, M (±SE)	P-value
Age group							
18–25 years	376 (19)	2.43 (0.09)	<0.001	2.59 (0.09)	<0.001	5.01 (0.16)	<0.001
26–40 years	877 (44)	2.32 (0.06)		2.44 (0.06)		4.75 (0.11)	
41–60 years	542 (27)	1.82 (0.07)		2.08 (0.07)		3.90 (0.14)	
≥61 years	183 (9)	1.21 (0.12)		1.39 (0.12)		2.69 (0.24)	

N (%) indicates the frequency and percentages. M (±SE) indicates average scores for each item and subscale for the total population. PHQ-2, GAD-2 and PHQ-4 scores indicate the levels of depression, anxiety and psychological distress (both anxiety and depression symptoms). P indicates the alpha value for statistical significance.

older than 60 years of age, individuals who were 18–25 years (3.16 times), 26–40 years (2.89 times) and 41–60 years (1.82 times) had higher odds of moderate or severe psychological distress. Also, Asians (0.70 times lower), other racial groups (0.38 times lower) and those who were divorced/widowed/separated (0.39 times lower) had lower odds of psychological distress compared to their counterparts. Factors such as education, employment status and living region in the USA were not significant predictors of odds for having moderate-to-severe psychological distress (Table 3).

Discussion

In this large national study, we identified the prevalence of depression (39%), anxiety (42%) and psychological distress (39%) after initial lockdowns during the pandemic in the USA. Two key pieces of evidence warrant a special mention in this context.[6,8,9,13,14] First, our study results indicate that the rate of serious mental health issues such as depression and anxiety have more than doubled in the USA during the pandemic (i.e. compared to the rates before the pandemic in the year 2019). Second, as the pandemic has progressed, the prevalence of depression and anxiety may have increased. This could account for the slightly higher prevalence of psychological distress in this study compared to other studies that were mostly conducted in the early stages of the pandemic in the USA. For example, a study of 5065 US adults in March indicated that among the states with more than 50 COVID-19 cases, each additional day was associated with a 11% increase in the odds of moving up a category of psychological distress.[5] Another March 2020 study of 9687 Americans with no prior history of a mental health condition asked about psychological distress within the past week (compared to this

study of past 2 weeks experience) and found that the major symptoms of psychological distress experienced for at least 3 days in the past week were feeling nervous, anxious or on edge (39%) and feelings of depression (19%).[13] Despite the variation in scales/measures and study period, across most studies, anxiety was more common than depression in the US population (a finding that is confirmed in this study).[9,13,14] A myriad of reasons has been suggested for such high levels of anxiety and depression (e.g. job loss, fear of getting infected, worries about national sociopolitical climate and media exposure).[8,9,14,15]

Stress, worries and fear in the early stages of the pandemic may have been the precursors of clinical levels of depression and anxiety as found in this study. Mentally ill individuals have higher rates of multimorbidity and premature mortality.[16] Longitudinal studies should assess the impact of the COVID-19 pandemic on the population mental health and long-term consequences, such as substance abuse, disability and suicides to design mental health interventions based on real-life evidence.

Additional key findings from this study that warrant further discussion are the major differences in mental health outcomes based on the sociodemographic characteristics of Americans. Healthcare workers had very high rates of depression, anxiety and psychological distress. Reports of burnout, exhaustion and psychological distress in healthcare workers during the pandemic emerged from around the world and are not uncommon, given the greater burden of work and the exposure to dire patient outcomes.[17] Ethnic and racial minorities (e.g. Hispanics and African-Americans), those with children at home, individuals living in rural and urban areas, people with annual household income <$60 000 and in the age group of 18–25 years had the highest rates of all mental health problems explored in this study. These findings illustrate the continuing and sustained nature of

Table 3 Proportion and probability of depression, anxiety and psychological distress in study participants (*N* = 1978)

Demographic characteristics	Depression (PHQ-2)		Anxiety (GAD-2)		Moderate/severe psychological distress (PHQ-4)	
	Prevalence, *N* (%)	AOR (95% CI)	Prevalence, *N* (%)	AOR (95% CI)	Prevalence, *N* (%)	AOR (95% CI)
Sex						
Female	333 (32)	Ref	419 (42)	1.27 (1.04–1.56)*	355 (35)*	Ref
Male	445 (45)*	1.42 (1.15–1.74)*	408 (42)	Ref	413 (43)	1.08 (0.88–1.33)
Race						
White	570 (39)	Ref	622 (43)*	Ref	572 (39)	Ref
Black	96 (44)	1.02 (0.72–1.31)	100 (46)	0.89 (0.65–1.21)	97 (45)	0.97 (0.72–1.33)
Asian	68 (35)	0.86 (0.63–1.26)	63 (33)	0.63 (0.45–0.89)*	60 (31)	0.70 (0.49–0.99)*
Multiracial	19 (37)	0.72 (0.39–1.45)	16 (35)	0.53 (0.27–1.03)	16 (35)	0.66 (0.34–1.30)
Other	27 (42)	0.63 (0.36–1.17)	26 (40)	0.45 (0.27–1.00)	23 (35)	0.38 (0.21–0.72)*
Ethnicity						
Non-Hispanic	522 (33)*	Ref	569 (36)*	Ref	516 (32)	Ref
Hispanic	256 (68)	2.52 (1.92–3.33)*	258 (68)	2.92 (2.21–3.85)*	252 (67)*	2.77 (2.10–3.65)*
Marital status						
Single/ never married	245 (38)*	Ref	246 (38)*	Ref	236(36)*	Ref
Married	476 (43)	1.14 (0.83–1.54)	511 (46)	1.07 (0.80–1.44)	475 (43)	1.04 (0.78–1.42)
Engaged/living with a partner	38 (38)	1.03 (0.65–0.163)	48 (48)	1.40 (0.89–2.18)	40 (40)	1.10 (0.69–1.71)
Divorced/separat-ed/widow	19 (15)	0.57 (0.33–1.04)	22 (18)	0.43 (0.24–0.74)*	17 (14)	0.39 (0.22–0.72)*
Children at home						
No	343 (33)*	Ref	360 (35)*	Ref	335(32)*	Ref
Yes	435 (47)	1.42 (1.15–1.78)*	467 (50)	1.59 (1.28–1.97)*	433 (47)	1.46 (1.17–1.82)*
Education						
≤High school	38 (34)*	Ref	42 (38)*	Ref	36 (32)*	Ref
Some college education	117 (35)	1.21 (0.74–1.97)	102 (31)	0.76 (0.47–1.23)	105 (32)	1.07 (0.66–1.76)
Bachelor's degree	431 (45)	1.46 (0.90–2.30)	457 (48)	1.35 (0.87–2.09)	424 (44)	1.47 (0.93–2.31)
≥Master's degree	192 (33)	1.25 (0.77–2.03)	226 (39)	1.27 (0.80–2.03)	203 (35)	1.41 (0.86–2.27)
Current employment status						
Full time	568 (42)*	Ref	591 (44)*	Ref	563 (42)*	Ref
Part time	116 (37)	0.85 (0.63–1.14)	127 (41)	0.92 (0.70–1.20)	118 (38)	0.88 (0.66–1.17)
Not employed	94 (30)	1.11 (0.81–1.49)	109 (35)	1.17 (0.87–1.56)	87 (28)	0.93 (0.69–1.27)
Healthcare worker						
No	462 (31)*	Ref	506 (34)*	Ref	451 (31)*	Ref
Yes	316 (62)	2.40 (1.88–3.06)*	321 (63)	2.02(1.59–2.56)*	317 (62)	2.39 (1.88–3.06)*
Annual household income						
≥60 000	318 (32)*	Ref	353 (36)*	Ref	316 (32)*	Ref
<60 000	460 (46)	1.43 (1.15–1.76)*	474 (48)	1.41 (1.14–1.73)*	452 (45)	1.51 (1.22–1.87)*
Area of residence						
Rural	198 (47)*	1.54 (1.16–2.04)*	197 (47)*	1.36 (1.04–1.79)*	193 (46)*	1.49 (1.12–1.97)*
Urban	387 (47)	1.81 (1.43–2.29)	412 (50)	1.86 (1.48–2.34)	383 (47)	1.83 (1.45–2.32)
Suburban	193 (26)	Ref	218 (30)	Ref	192(26)	Ref
Region in USA						
Midwest	209 (32)*	0.78 (0.54–1.08)	242 (36)	0.81 (0.59–1.12)	212 (32)*	0.70 (0.51–0.99)
South	222 (38)	0.77 (0.53–1.07)	229 (39)	0.75 (0.54–1.04)	214 (36)	0.68 (0.49–.94)
West	237 (51)	1.21 (0.86–1.70)	244 (53)	1.24 (0.89–1.75)	232 (50)	1.11 (0.78–1.55)
Northeast	101 (40)	Ref	105 (42)*	Ref	103(41)	Ref

Table 3 Continued

Demographic characteristics	Depression (PHQ-2)		Anxiety (GAD-2)		Moderate/severe psychological distress (PHQ-4)	
	Prevalence, N (%)	AOR (95% CI)	Prevalence, N (%)	AOR (95% CI)	Prevalence, N (%)	AOR (95% CI)
Age group						
18–25 years	176 (47)*	3.83 (2.30–6.39)*	175 (47)*	2.89 (1.81–4.62)*	167 (44)*	3.16 (1.91–5.22)*
26–40 years	396 (45)	3.00 (1.87–4.82)	406 (46)	2.45 (1.59–3.76)	387 (44)	2.89 (1.69–4.28)
41–60 years	177 (33)	1.86 (1.15–3.01)	207 (38)	1.70 (1.10–2.63)	184 (34)	1.82 (1.13–2.91)
≥61 years	29 (16)	Ref	39 (21)	Ref	30 (16)	Ref

N (%) indicates the frequency and percentages. AOR indicates adjusted odds ratios computed by adjusting for all the variables in the table with 95% confidence intervals. PHQ-2, GAD-2 and PHQ-4 indicate the levels of severe depression, severe anxiety and moderate-to-severe psychological distress.
*P-values < 0.05.

deprivation for certain groups in the USA even before the pandemic, making them more likely to have serious mental health issues during the pandemic. Reasons postulated are lower education, precarious jobs and lower household and intergenerational wealth accumulation.[6,8,10,18–22] Younger age may play a special role as individuals are just starting with their career and adult lives. A March 2020 study of 6666 US adults found that younger age was associated with perceiving a higher risk of getting quarantined, running out of money and depression and anxiety.[19] Concerning race and ethnicity, Hispanics and blacks have been shown to have higher anxiety-, depression- and COVID-19-related mortality rates since the beginning of the pandemic.[20,21] Families with children and lower incomes are susceptible to greater stress leading to depression and anxiety due to multiple social and economic stressors that have been accentuated by the pandemic.[18–22] Sociocultural factors from before the pandemic, along with the vulnerability to COVID-19, have rendered catastrophic consequences for several such groups (young, urban, minorities and families with low incomes).[18–21] Unfortunately, these are the groups that traditionally had the lowest access to quality mental healthcare even before the pandemic. Population-level, evidence-based mental health interventions and culturally competent mental health services will have to utilize greater technology-based resources, given the continued shutdown of many in-person services.[13,16,22] A wide range of text message-based interventions, mass media campaigns, telehealth services and computer-based interventions are broadly available. Also, faith-based and traditional healing practices can play a key role in alleviating psychological distress. Above all, fiscal and material support from the government can play a key role in reducing distress and deprivation in vulnerable groups.[13,16,22,23]

Several limitations may have affected the results of this study. The results are restricted by all threats to the validity and reliability inherent to survey study designs (e.g. reliance on self-reported behaviors, recall bias in participants, socially desirable responses and the inability to establish cause-and-effect relationships). Moreover, there are many other characteristics of individuals (e.g. pre-existing mental illnesses) that could have played a role in whether or not an individual reported depression and anxiety symptoms. Finally, a threat to the external validity is that the sample is limited in nature and extent (e.g. limited to those with computers or mobile phones and understanding of the online survey environment). Despite these limitations, our study is one of the largest studies in the USA, using valid and reliable measures for population-based assessment of anxiety and depression. Also, the majority (>50%) of our sample consisted of adult Americans who were whites, females, non-Hispanic, married, employed full time, urban or suburban residents, 26–60 years old and with an annual household income of less than $60 000. These numbers closely resemble the US population distribution as per the census and labor statistics, making our study sample representative of the US population to a great extent.[4,5,24]

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Conflict of Interest

Authors have no conflicts of interests to declare.

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