

## RESEARCH ARTICLE

# Stressors associated with the COVID-19 pandemic, disability, and mental health: Considerations from the Intermountain West

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**Abstract**

The deleterious mental health effects associated with the COVID-19 pandemic are increasingly apparent, however, questions remain about the extent to which pandemic-related stressor exposure has contributed to increased psychological distress among an already disadvantaged group, individuals with disabilities. The first aim of the study was to examine the distribution of pandemic-related stressors across multiple dimensions—employment, personal and family finances, personal relationships, and quality of social life—among individuals with and without disabilities. The second aim of the study was to examine the association between a composite COVID-19 stressor score and two mental health outcomes—depressive and anxiety symptoms—among the two subsamples. The study used quota-based online survey data ( $N = 2043$ ) collected in the summer of 2020 from adults (18 and older) residing in the Intermountain West, half of whom had a self-reported disability. Study results demonstrated that individuals with disabilities experienced pandemic-related stressors at significantly higher rates relative to their non-disabled counterparts. Further, pandemic stressor exposure was associated with greater negative effects on their psychological well-being. We argue that the COVID-19 pandemic is generating a secondary mental illness pandemic, and that individuals with disabilities are affected by it at significantly higher proportions.

**KEYWORDS**

COVID-19, disability, mental health, social stress

## 1 | INTRODUCTION

The COVID-19 outbreak began in late December of 2019 in the Wuhan city in China, and was identified as a pandemic following its rapid spread throughout countries in Europe, North and South America, the Middle East, and North Africa (Wang et al., 2020). Since the first confirmed case in the U.S. of January 2020, the virus itself in conjunction with policies focused on mitigation efforts (i.e., stay-at-home or shelter-in-place orders, limited social gatherings, travel restrictions, school and business closures, etc.) have

disrupted and drastically altered most people's lives (Kickbusch et al., 2020). While mitigation efforts have been instrumental in slowing down the spread of infection and preventing health care systems from becoming overwhelmed, they have also had profound social, economic, and health consequences (Altig et al., 2020; Gostin & Wiley, 2020; Usher et al., 2020).

Indeed, because of the extent to which the COVID-19 pandemic has continued to threaten the social welfare of affected populations, it has the characteristics of a shared trauma with important mental health consequences (Pfefferbaum & North, 2020; Rajkumar, 2020;

Usher et al., 2020; Vindegaard & Benros, 2020). Deleterious mental health effects associated with the COVID-19 pandemic, including depressive and anxiety symptoms, insomnia and sleep problems, and disordered eating symptomatology, have already been widely documented among COVID-19 patients (Bo et al., 2020; Zhang et al., 2020), health care workers (Chen et al., 2020; S. Li et al., 2020; X. Li et al., 2020; Liang et al., 2020), and the general public (Ettman et al., 2020; S. Li et al., 2020; Rossi et al., 2020; Sønderkov et al., 2020; Xiong et al., 2020; Zhu et al., 2020). While most of these studies were conducted in China or European countries, Ettman et al. (2020) documented a three-fold increase in the prevalence of depression during the pandemic in the general U.S. population. Thus, by all counts, the COVID-19 pandemic is the most recent large-scale traumatic event that, like other shared traumas such as the September 11 attack, the Great Recession, Hurricane Katrina, or the Ebola outbreak, is associated with an increased mental health burden in affected populations (Brown et al., 2017; Galea et al., 2002, 2008; Jalloh et al., 2018). As prior research on macro-level stressors makes clear, however, a critical next step is to document to *how* the pandemic has changed the landscape of everyday life.

Within this context, a crucial consideration is that the COVID-19 pandemic has become a mass disabling event resulting in millions of people adjusting to new and long-term impairment conditions. Disability is one of the key features that distinguishes the pandemic from other macro-level stressors. And yet, disability is framed in most COVID-19 research as burdensome or problematic without considering the multiple domains that are disadvantaging people with disabilities. This is an important oversight because people with disabilities experience health disparities that are not functions of their impairment conditions but, rather, derive from exposure to social stressors that often goes unrecognized (Brown, 2017; Turner et al., 2006). For this reason, it is hardly a stretch to anticipate that the lives of people with disabilities have been profoundly affected by the pandemic.

To appreciate this possibility—and, notably, to evaluate it—requires a categorical understanding of disability that is not yet well-integrated into stress and health disparities research (for a discussion, see Mauldin & Brown, 2021). It is now widely accepted in the stress and health literature that the disablement process is iterative and importantly influenced by 'extra-individual factors' including stressor exposure (Verbrugge & Jette, 1994, p. 4). Extending this consideration, sociology of disability or disability studies scholarship conceptualizes disability as an axis of inequality, thus directing attention to the role of power structures and positionality in shaping the social disadvantages associated with disability (Frederick & Shifrer, 2019; Mauldin & Brown, 2021; Naples et al., 2019). From this perspective, people with disabilities constitute a socially marginalized or oppressed group because of norms and ideologies regarding people's bodies and minds (Shakespeare, 2006) that disproportionately expose them to trauma and other negative life events (Brown, 2017). Here, we assess the utility of this perspective for understanding categorical differences associated with the pandemic's psychological impact.

## 1.1 | COVID-19 and the stress process

We draw on the stress process model (Pearlin, 1989; Pearlin et al., 1981) to address these considerations. According to this theory, positionality within the social structure predicts how much stressor exposure individuals experience and that in turn affects their health outcomes (Pearlin, 1989; Pearlin et al., 1981). Hence, individuals with disadvantaged social statuses are exposed to harsher life conditions, have less resources to cope, and are more vulnerable to illness than individuals with higher social status (Pearlin, 1989; Aneshensel, 1992). This paper considers disability as one such disadvantaged social category, as an axis of stratification (Shifrer & Frederick, 2019).

Although the COVID-19 pandemic is a stressor in itself due to the risk of severe illness and death to oneself and loved ones, it has also highlighted the long-lasting stressful conditions in people's lives (Pearlin, 1989). The propensity for an initial stressor to create other stressors within and between life domains is referred to as stress proliferation (Pearlin, 1999; Pearlin et al., 2005; Umberson et al., 1992). Brown et al. (2017) introduced the term macro-level stress proliferation to describe the tendency for shared traumatic events to spur a number of individual-level stressors, which in turn can make one's ability to respond to other macro-level events more difficult. Such a process makes intuitive sense in the context of COVID-19: Individuals who have lost their source of income during the economic downturn that followed the pandemic have also lost health insurance coverage, might be unable to pay for housing and other basic needs, among other stressors. The pandemic has also altered the many social roles individuals juggle. People are experiencing role overload as working from home arrangements have blurred professional and family boundaries. The potential for interpersonal conflict within role sets increases as families spend most of their time indoors, in isolation. There is inter-role conflict as parents face incompatible demands such as facilitating their children's schooling while working. Many individuals are unable to participate in their social roles due to stay-at-home mandates and experience social isolation (Pearlin, 1989). While the COVID-19 pandemic has affected the majority of people in some way, we anticipate that pandemic-related stressors, including employment, personal and family finances, personal relationships, and quality of social life, will be more salient to, and their negative mental health effects will be magnified for individuals with disabilities because of their already systemically marginalized, devalued and underserved status, which is further elaborated in the following section.

## 1.2 | COVID-19 and disability

First, the COVID-19 pandemic is likely to disproportionately affect individuals with disabilities because of their increased risk for morbidity and mortality if they were to contract the COVID-19 virus because of pre-existing comorbidities, congregate living settings,

and disrupted access to health care during the pandemic (UN News, 2020). According to the CDC, while in general, 'adults with disabilities are not more likely to get infected or have severe illness from COVID-19', some individuals with disabilities indeed are at increased risk. Based on the same report from the CDC, individuals with disabilities 'are three times more likely than adults without disabilities to have heart disease, diabetes, cancer, or a stroke', which may put them at risk for more severe health complications (Centers for Disease Control and Prevention, 2021). For instance, emerging research suggests that individuals with intellectual and developmental disabilities have contracted and died of COVID-19 at higher rates relative to their non-disabled counterparts and individuals with other disabilities (Landes et al., 2020; Turk et al., 2020). In addition, individuals with disabilities who require routine medical care for conditions that may not be well managed via telehealth and social distancing-compliant means may face challenges that could inadvertently exacerbate ongoing health issues or increase risk for secondary health conditions due to skipped appointments or going without medications (Drum et al., 2020). For instance, in a survey conducted in the spring of 2020 among 2469 individuals with disabilities, 44% reported experiencing new challenges in obtaining health care, and of the 64% who reported receiving regular health care, 56% noted disruptions in access (Drum et al., 2020). Disruptions in medication or device supply as an outcome of lockdown policies might make maintaining standards of daily life challenging, especially if individuals with disability rely on outside assistance. Individuals who provide care may be sick or in need of self-isolation, leaving this marginalized group without substitute support or reliant on volunteers (O'Connell et al., 2020). Similarly, following social distancing guidelines may be challenging for individuals who rely on daily care (Kuper et al., 2020). As an illustration, Drum et al. (2020) found that maintaining safe distance was impossible for 54% of their sample. For some people with disabilities, such as those hard of hearing or the blind, navigating public spaces in accordance to proper hygiene guidelines (e.g., not touching surfaces, keeping a 6-foot distance), may pose additional difficulties and result in social exclusion (Goggin & Ellis, 2020).

Furthermore, individuals with disabilities are more likely to be economically disadvantaged and have lower levels of social connectedness relative to their non-disabled counterparts, which may be exacerbated by the pandemic. Research suggests that material hardship is generally more prevalent among individuals with disabilities and they are at higher risk for experiencing income poverty relative to their non-disabled counterparts (She & Livermore, 2007, 2009). Specifically, people with disabilities and chronic health issues are less likely to be employed, and those who are employed, tend to be concentrated in more precarious jobs with lower wages (e.g., food-related services and retail) (Drew, 2015; Maroto & Pettinicchio, 2014). People with disabilities also have higher health-related expenses, and may incur additional costs due to the need to purchase assistive or adaptive equipment or pay for services they cannot perform themselves (Batavia & Beaulaurier, 2001; Mitra et al., 2009).

Lower household income, limited opportunities for accruing wealth, and higher health care expenditures put individuals with disabilities at a greater risk for economic insecurity relative to their non-disabled counterparts, and these disparities may have been exaggerated as an outcome of the COVID-19 pandemic. For instance, food-related service and retail sectors were the most heavily impacted by the pandemic and its mitigation efforts: a number of business were forced to either temporarily or permanently shut down, or they remained open with limited service provision. Those sectors were also less flexible in providing opportunities for remote work, increasing the potential risk for being infected, preventing individuals with disabilities from maintaining employment. The COVID-19 mitigation measures may have also indirectly affected individuals with disabilities by preventing non-disabled family or household members from working due to job loss or furloughs, increasing the stress associated with access to basic essentials, such as housing, food and medications.

Compounding these difficulties, people with disabilities are also more socially isolated, have smaller social networks, report lower levels of social support, and experience loneliness at higher proportions when compared to the general public (Emerson et al., 2021; Mithen et al., 2015). Due to stigma perceptions and prejudice, individuals with disabilities are also less likely to marry compared to individuals without disabilities (Andrews & Dunn, 2019; Clarke & McKay, 2014) or they tend to marry or partner with other individuals with disabilities (Andrews & Dunn, 2019). Marriage inequality in the U.S. on the axis of disability has also been well established, such that in many states individuals with disabilities cannot maintain their social safety net resources if they marry (Belt, 2015; Stasio, 2020). While research on coupled individuals with disabilities is relatively scarce, a recently published study has documented that personally experienced stigma is associated with increased psychological distress in couples where at least one partner has a self-reported disability (Brown & Ciciurkaite, 2021). In the context of the pandemic and increased fear of contracting the virus, social interactions in informal and formal social networks likely have become even more limited, augmenting the feelings of social isolation and loneliness among this already oppressed group. Previous research has demonstrated that marginalized populations, such as individuals with lower socioeconomic status and poorer support systems tend to fare worse in terms of mental health outcomes, following disasters and large-scale stressful events (Goldmann & Galea, 2014). Moreover, the additional stress and worry about health, reduced access to financial opportunities, longer hours spent together as well as changes in childcare, education, and work responsibilities may have led to increased potential for conflict and relationship strain among individuals who are coupled, and especially in the context of disability.

In summary, the pandemic has generated and underscored a wide array of stressors, however, their effect on mental has not yet been systematically examined, and questions remain about the extent to which pandemic-related stressor exposure has contributed to increased mental health burden among an already

disadvantaged group, individuals with disabilities. To address these limitations, in the present study we first assessed the multiple dimensions of pandemic-related stressors, focussing on employment, personal and family finances, personal relationships, and quality of social life, and examined their distribution by disability status. Second, anticipating that individuals with disabilities would be particularly vulnerable to increased psychological distress in the context of the pandemic-related stressor exposure, we examined the association between a composite COVID-19 stress score and two mental health outcomes—depressive and anxiety symptoms—among a community sample of adults residing in the Intermountain West region of the U.S.

## 2 | METHODS

### 2.1 | Study sample

This study is part of a larger community survey project designed to examine the health outcomes associated with food insecurity among individuals with and without self-reported disabilities in the context of the COVID-19 pandemic in the Intermountain West region of the U.S. The study was approved by the Utah State University's Institutional Review Board. Respondent selection, recruitment, and data collection was conducted by the Qualtrics—an internet-based survey research company, which uses paid panels of respondents. The survey included an informed consent statement, and all participants were recruited on a voluntary basis.

To qualify for the survey, respondents had to be 18 years old or older and currently reside in the Intermountain West region (Colorado, Utah, Idaho, or Wyoming). In addition, a quota sampling technique was used to recruit two subsamples roughly equivalent in size of individuals with and without disabilities. The disability screening question asked individuals if they presently have or have ever been diagnosed with the following health conditions: autism; developmental disability; psychiatric or emotional disability; intellectual disability; learning disability; speech/language disability; hard of hearing; blindness or low vision; physical disability requiring a mobility assistive device; chronic/long-term illness; or traumatic brain injury. Individuals who agreed to participate in the study completed an online survey of mostly close-ended multiple-choice questions, which lasted an average of 20 min. All data collection took place in July of 2020. The complete study sample includes 2043 individuals, half of whom ( $N = 1020$ ) have a self-reported disability.

### 2.2 | Measures

Summary statistics for all study variables for the full sample as well as by disability status are presented in Table 1. Two outcomes are

considered: depressive symptoms and anxiety symptoms. The main predictor variable is the COVID-19 pandemic-related stressor score. Models control for age, gender, race/ethnicity, marital status, education, and household income.

#### 2.2.1 | Depressive symptoms

The Patient Health Questionnaire (PHQ-9), a nine-item screening instrument asking questions about the frequency of symptoms of depression (i.e., feeling down, having trouble sleeping, feeling tired, etc.) over the past two weeks, is used to measure depressive symptomology. Response categories for the nine-item instrument range from (0) not at all to (3) nearly every day. The total depression score is based on the sum of responses, ranging from 0 to 27 ( $\alpha = 0.93$ ).

#### 2.2.2 | Anxiety symptoms

Anxiety symptoms are measured using a five-item scale asking respondents about how they felt in the past month (i.e., 'I feel anxious') with response categories for each symptom of (0) not at all, (1) occasionally, (2) frequently, and (3) almost all the time. The summated measure ranges between 0 and 15, and has high reliability ( $\alpha = 0.90$ ).

#### 2.2.3 | COVID-19 pandemic-related stressor score

The measure of stressors related to the COVID-19 pandemic was informed by previous research on natural disasters, for example, Hurricane Katrina (Galea et al., 2008) and the Great Recession (Brown et al., 2017). These macro-level stressors were relevant because they threatened multiple dimensions of everyday lives that were also affected by the COVID-19 pandemic, including fear of death and injury, financial loss, difficulty finding employment or receiving government aid, shortage of food or water, social role constraints, undesirable living situations, etc. After careful review of natural disaster- and economy-related stressors, we modified and included 20 items considering pandemic-related strain in the domains of employment, personal and family finances, personal relationships, and quality of social life. As is common practice, the total pandemic-related stressor score was calculated by adding the reported count of stressors (Brown, 2017; Turner & Avison, 2003). The total stressor score ranged from 0 to 20 ( $\alpha = 0.91$ ). In regression analyses, the composite score measure was categorized into low (0–2 stressors), moderate (3–5 stressors), moderately severe (6–8 stressors), and severe (9 and more stressors) levels of pandemic-related stress exposure (Ettman et al., 2020).

TABLE 1 Descriptive statistics of the study sample by disability status

	Full sample (2043)	People with disabilities (N = 1020)	People without disabilities (N = 1023)	p-value
Depressive symptoms (PHQ-9)	8.88 (7.30)	11.33 (7.17)	6.44 (6.56)	<0.001
Anxiety symptoms	6.39 (4.54)	7.84 (4.39)	4.93 (4.22)	<0.001
COVID-19 pandemic-related stressor score	6.05 (5.30)	7.17 (5.40)	4.94 (4.95)	<0.001
Low (0–2)	34.07%	24.71%	43.40%	<0.001
Moderate (3–5)	19.87%	20.20%	19.55%	
Moderately severe (6–8)	16.10%	18.43%	13.78%	
Severe (9 or more)	29.96%	36.67%	23.26%	
Age	39.85 (16.04)	37.86 (15.61)	41.84 (16.23)	<0.001
Gender				
Male	26.68%	25.88%	27.47%	<0.01
Female	71.81%	71.67%	71.95%	
Non-binary	1.52%	2.45%	0.59%	
Race/ethnicity				
Non-Hispanic white	77.68%	77.65%	77.71%	<0.05
Non-Hispanic black	3.67%	3.14%	4.20%	
Hispanic	9.20%	9.31%	9.09%	
Non-Hispanic Asian	1.81%	1.18%	2.44%	
Other	7.64%	8.73%	6.55%	
Marital status				
Married/living together	46.70%	42.06%	51.32%	<0.001
Separated, divorced, widowed	18.40%	18.33%	18.48%	
Never married	34.90%	42.06%	30.21%	
Education				
Less than high school	3.18%	4.31%	2.05%	<0.001
High school or GED	22.12%	21.86%	22.39%	
Some college	37.10%	42.25%	31.96%	
College or more	37.59%	31.57%	43.60%	
Household income				
Less than \$25,000	26.68%	31.96%	21.41%	<0.001
\$25,000–\$44,999	20.95%	22.75%	19.16%	
\$45,000–\$64,999	14.54%	14.71%	14.37%	
\$65,000–\$84,000	11.70%	10.69%	12.71%	
More than \$85,000	21.24%	15.69%	26.78%	
Missing	4.89%	4.22%	5.57%	

Notes: Mean values reported with standard deviations in parentheses. p-values established based on Chi-Square test for categorical variables and two-sample t-test for continuous variables.

Abbreviations: GED, general educational development; PHQ-9, Patient Health Questionnaire.

## 2.2.4 | Age

Age of respondent is measured as a continuous variable ranging from 18 to 80.

## 2.2.5 | Gender

Gender is measured as a categorical variable, and includes females, non-binary individuals, and males (reference category).

## 2.2.6 | Race/ethnicity

The race/ethnicity is measured as categorical variable, including non-Hispanic whites (reference category), non-Hispanic blacks, Hispanics, non-Hispanic Asians, and other.

## 2.2.7 | Marital status

Marital status is measured as a categorical variable with three response categories married or living with a partner, divorced, widowed or separated, and never married (reference category).

## 2.2.8 | Education

Highest educational achievement is measured as a categorical variable with four categories: less than high school (reference category), high school or general educational development, some college, and college or more.

## 2.2.9 | Household income

Household income is measured as a categorical variable with five categories: less than \$25,000 (reference category), \$25,000–\$44,999, \$45,000–\$64,999, \$65,000–\$85,000, and more than \$85,000.

## 2.3 | Statistical analyses

First, we examined the sample characteristics for the full sample as well as the two subsamples—individuals with disabilities and individuals without disabilities. Second, we conducted bivariate Chi-Square analysis to assess the distribution of COVID-19 pandemic stressors across the two study subsamples. To consider differences in mental health outcomes by disability status in the context of COVID-19 pandemic-related stressors, we first conducted a Chow test of model equivalence to test for significant differences in how predictor variables affect depressive and anxiety symptoms (Chow, 1960). The Chow test was significant for both outcomes considered in the analysis ( $F = 17.04$ ,  $p < 0.001$  for depressive symptoms and  $F = 15.23$ ,  $p < 0.001$  for anxiety symptoms). The significant Chow test statistics observed suggest that systematic differences exist between individuals with and without disabilities in how pandemic-related stressors affect their mental health outcomes, which supports modelling regression equations separately by disability status.

We ran a series of ordinary least squares regression analyses to examine the association between the categorical COVID-19 pandemic-related stress exposure measure and depression and anxiety symptoms, controlling for covariates. We did not consider the

effects of multiple stressor domains in the regression analyses because our focus was on the combined effect of the pandemic-related stressors on mental health. Model 1 (unadjusted model) regressed the dependent variable on pandemic-related stressors only, and Model 2 (adjusted model) included sociodemographic and socioeconomic control variables.  $p$ -values were two-sided, and statistical significance was set at  $p = 0.05$ . Tables 4 and 5 present these analyses among individuals with disabilities and without disabilities, respectively.

## 3 | RESULTS

### 3.1 | Sample characteristics

Table 1 presents descriptive statistics of all study variables for the full sample and subsamples by disability status. Distribution of impairment conditions in the disability sample are listed in Table 2. Individuals with disabilities experienced significantly more depressive symptoms, relative to their non-disabled counterparts (11.33 vs. 6.44,  $p < 0.001$ ). Similarly, individuals with disabilities experienced significantly more anxiety symptoms, relative to their non-disabled counterparts (7.84 vs. 4.93,  $p < 0.001$ ). The mean COVID-19 stressor score was also significantly higher among individuals with disabilities underscoring the greater salience of stress exposure for this marginalized group (7.17 vs. 4.94,  $p < 0.001$ ). Notably, based on the categorical COVID-19 pandemic-related stress measure, significantly higher proportion of individuals with disabilities reported moderately severe (6–8 stressors) or severe (9 or more stressors) stress exposure, while a significantly higher proportion of individuals without disabilities reported low stress exposure (0–2 stressors) ( $p < 0.001$ ) (Table 1).

TABLE 2 Distribution of impairment conditions in the disability sample

	N	%
Autism	59	5.78
Developmental disability	52	5.10
Psychiatric or emotional disability	454	44.51
Hard of hearing/deaf	135	13.24
Intellectual disability	34	3.33
Physical disability	95	9.31
Chronic illness	217	21.27
Learning disability	283	27.75
Speech or language disability	39	3.82
Traumatic brain injury	60	5.88
Blind/low vision	81	7.94
Other disability	98	9.61

Note: Distribution may add up to over a 100% because individuals could check more than one impairment condition.

### 3.2 | Distribution of the multiple dimensions of COVID-19 pandemic-related stressors

Table 3 presents the distribution of the COVID-19 pandemic-related stressors in the domains of employment, personal and family finances, personal relationships, and quality of social life. The three most prevalent pandemic-related stressors among individuals with disabilities were increased social isolation (73.53%), decreased ability to maintain the same lifestyle as before due to financial constraints (51.18%), and lack of raises or bonuses (50.69%). The three most prevalent pandemic-related stressors among individuals without disabilities were increased social isolation (58.06%), lack of raises or bonuses (39.69%), and not knowing if employment will continue (38.71%). Notably, individuals with disabilities experienced

19 out of 20 investigated COVID-19 stressors at statistically significantly higher proportions relative to individuals without disabilities ( $p < 0.001$ ), with the exception of ending a marital/significant other relationship due to quarantine or 'shelter-in-place' orders.

### 3.3 | Association between COVID-19 pandemic-related stressors and depressive and anxiety symptoms among people with and without disabilities

Tables 4 and 5 present results of regression analyses considering the significance of the composite COVID-19 pandemic-related stressor measure for depressive and anxiety symptoms, net of the

TABLE 3 Distribution of COVID-19 pandemic-related stressors by disability status

Stressor	Disability sample (N = 1020)	Non-disability sample (N = 1023)
<b>Employment</b>		
Furlough days	27.16%**	20.23%
Salary/pay cut, or hours cut or job demotion	44.31%**	36.17%
Lack of raises or bonuses	50.69%**	39.69%
Not knowing if your employment situation will continue	50.00%**	38.71%
Increased job responsibilities linked with cuts in the workforce	33.63%**	24.54%
Loss of job/unemployment	30.39%**	22.48%
Problems with your own business or self-employment	20.59%*	15.93%
Having to work because of the risk of losing your job permanently	34.12%**	21.51%
Having to work despite being afraid of getting sick at the workplace	38.53%**	25.22%
<b>Personal and family finances</b>		
Problems paying rent or mortgage	38.24%**	22.68%
Problems paying gas, electricity, or heat	34.41%**	20.33%
Delays/difficulties when applying for government financial assistance programs	33.63%**	19.75%
Inadequate amount of food consumption due to lack of financial resources	32.25%**	16.23%
Inadequate amount of food consumption due to restricted access to regular food sources (grocery stores, food banks)	32.55%**	17.50%
Having to work despite poor health since family depends on your salary	27.25%**	13.20%
<b>Personal relationships</b>		
Ended marital/significant other relationship due to quarantine/'shelter-in-place' orders	9.22%	7.33%
Staying in an unwanted relationship due to quarantine/'shelter-in-place' order	13.24%**	8.11%
<b>Quality of social life</b>		
Increased social isolation due to quarantine/'shelter-in-place' order	73.53%**	58.06%
Decreased ability to maintain the same lifestyle as before due to financial constraints	51.18%**	34.12%
Decreased work/life balance due to work and home-schooling responsibilities	42.25%**	32.06%

Note:  $p$ -values established based on a Chi-Square test.

\*\* $p < 0.001$ , \* $p < 0.01$ .



sociodemographic and socioeconomic characteristics, separately for individuals with and without disabilities. As illustrated in Table 4, Model 1 revealed that experiencing more pandemic-related stressors was associated with greater depressive symptoms across all levels of stress exposure severity among individuals with disabilities. As an illustration, experiencing nine or more pandemic-related stressors (severe stress exposure) was associated with a 8.75-unit increase in depressive symptoms ( $p < 0.001$ ). The inclusion of sociodemographic and socioeconomic variables in Model 2 decreased the effect size of the pandemic stressors on depressive symptoms, however, the association remained statistically significant across all levels of stress

exposure severity. As an illustration, experience of nine or more pandemic-related stressors was associated with a 7.53-unit increase in depressive symptoms, net of control variables ( $p < 0.001$ ). Similarly, experience of pandemic-related stressors was associated with greater anxiety symptoms across all levels of stress exposure severity among individuals with disabilities in unadjusted (Model 1) and adjusted (Model 2) models. However, the effect size of stress exposure on anxiety symptoms was reduced with the inclusion of control variables.

Results for analyses examining the effect of COVID-19 stressors on depressive and anxiety symptoms among adults

**TABLE 4** OLS regression of depressive and anxiety symptoms on COVID-19 pandemic-related stressors, sociodemographic and socioeconomic characteristics, adults with disabilities

	Depressive symptoms				Anxiety symptoms			
	Model 1		Model 2		Model 1		Model 2	
	<i>b</i>	SE	<i>b</i>	SE	<i>b</i>	SE	<i>b</i>	SE
COVID-19 stressor score								
Moderate (3–5)	4.21***	0.61	3.67***	0.60	2.52***	0.38	2.01***	0.36
Moderately severe (6–8)	5.94***	0.63	4.93***	0.63	3.74***	0.39	2.77***	0.38
Severe (9 and more)	8.75***	0.53	7.53***	0.56	5.05***	0.33	3.94***	0.33
Age			−0.06***	0.02			−0.07***	0.01
Gender								
Female			0.76	0.46			1.18***	0.28
Non-binary			3.89**	1.42			2.15**	0.85
Race/ethnicity								
Non-Hispanic black			−0.12	1.14			−0.57	0.68
Hispanic			0.06	0.70			−0.72*	0.42
Non-Hispanic Asian			0.72	0.72			−0.40	1.08
Other			0.34	0.72			−0.47	0.43
Marital status								
Married/living together			−1.06**	0.51			−0.47	0.31
Separated, divorced, widowed			0.71	0.64			0.19	0.39
Education								
High school or GED			−0.82	1.04			−0.89	0.62
Some college			−1.79*	1.00			−1.09*	0.60
College or more			−2.38**	1.05			−1.62**	0.63
Household income								
\$25,000–\$44,999			−0.82	0.54			−0.54*	0.33
\$45,000–\$64,999			0.27	0.65			0.03	0.39
\$65,000–\$84,000			−0.19	0.73			−0.39	0.44
More than \$85,000			−0.01	0.68			−0.42	0.41
$R^2$	0.22		0.27		0.20		0.29	

Note: Reference categories: Male; non-Hispanic white; never married; less than high school; less than \$25,000.

Abbreviations: GED, general educational development; OLS, ordinary least squares.

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .



	Depressive symptoms				Anxiety symptoms			
	Model 1		Model 2		Model 1		Model 2	
	<i>b</i>	SE	<i>b</i>	SE	<i>b</i>	SE	<i>b</i>	SE
COVID-19 stressor score								
Moderate (3–5)	1.73**	0.51	0.97	0.52	1.99**	0.32	1.23**	0.32
Moderately severe (6–8)	3.93**	0.57	3.11**	0.58	3.70**	0.36	2.93**	0.35
Severe (9 and more)	7.56**	0.48	6.68**	0.51	5.53**	0.30	4.71**	0.31
Age								
			−0.06**	0.01			−0.06**	0.01
Gender								
Female			0.50	0.42			1.05**	0.26
Non-binary			5.33*	2.39			2.89*	2.45
Race/ethnicity								
Non-Hispanic black			−0.16	0.94			−0.06	0.57
Hispanic			0.89	0.67			−0.07	0.41
Non-Hispanic Asian			0.62	1.22			0.31	0.74
Other			0.18	0.78			−0.14	0.47
Marital status								
Married/living together			−0.64	0.50			−0.04	0.30
Separated, divorced, widowed			−0.66	0.64			−0.35	0.39
Education								
High school or GED			−0.23	1.35			0.88	0.74
Some college			0.09	1.34			0.74	0.81
College or more			0.16	1.35			0.60	0.82
Household income								
\$25,000–\$44,999			−0.52	0.58			−0.05	0.35
\$45,000–\$64,999			0.57	0.64			0.67*	0.39
\$65,000–\$84,000			−0.44	0.68			−0.09	0.42
More than \$85,000			0.51	0.61			0.62*	0.37
<i>R</i> <sup>2</sup>	0.21		0.24		0.28		0.34	

Note: Reference categories: Male; non-Hispanic white; never married; less than high school; less than \$25,000.

Abbreviations: GED, general educational development; OLS, ordinary least squares.

\*\*\* $p < 0.01$ , \* $p < 0.1$ .

TABLE 5 OLS regression of depressive and anxiety symptoms on COVID-19 pandemic-related stressors, sociodemographic and socioeconomic characteristics, adults without disabilities

without disabilities are presented in Table 5. Model 1 revealed that experiencing more pandemic-related stressors was statistically significantly associated with more depressive symptoms across all levels of stress exposure severity ( $p < 0.001$ ). For instance, experiencing nine or more pandemic-related stressors was associated with a 7.56-unit increase in depressive symptoms, net of control variables ( $p < 0.001$ ). Inclusion of control variables in Model 2 reduced the effect size of stress exposure on depressive symptoms, and moderate pandemic-related stress exposure was no longer significantly associated with greater depressive symptomology. Interestingly, the effect of pandemic-related stress exposure on

depressive symptoms was stronger among individuals with disabilities, with the exception of severe stress exposure. The significant difference in effect size across the two subsamples was confirmed by a Chi-Square test (analyses not shown). Further, experiencing pandemic-related stressors was associated with greater anxiety symptoms across all levels of stress exposure severity among individuals without disabilities in unadjusted (Model 1) and adjusted (Model 2) models, but the effect of stress exposure on anxiety symptoms was reduced with the inclusion of control variables. Notably, the effect size of pandemic-related stress exposure on anxiety symptoms did not differ statistically

significantly across the two subsamples of individuals with and without disabilities as confirmed by a Chi-Square test (analyses not shown).

## 4 | DISCUSSION

The deleterious mental health effects associated with the COVID-19 pandemic have been well documented (Vindegaard & Benros, 2020; Xiong et al., 2020). Within this context, the present study sought to extend the current research by first, considering the distribution of pandemic-related stressors across multiple dimensions—namely, employment, personal and family finances, personal relationships, and quality of social life—and second, examining the association between a composite COVID-19 stress score and two mental health outcomes—depressive and anxiety symptoms—among a sample of adults with and without disabilities.

With respect to the first research question, our study results demonstrate that individuals with disabilities have experienced pandemic-related stressors across nearly all of the dimensions considered at significantly higher rates relative to their non-disabled counterparts. The only notable exception was ending a marital or significant other relationship as an outcome of the quarantine or 'shelter-in-place' orders, which was reported at relatively similar rates in both subsamples. These findings support the contention that the collectively lived trauma of the COVID-19 pandemic may be particularly salient for individuals with disabilities because of their increased risk for morbidity and mortality as an outcome of contracting COVID-19 and, more generally, because social norms concerning people's bodies and minds are linked with experiences of disadvantage at the micro-, meso- and macro-levels (Armitage & Nellums, 2020; Friedman & Owen, 2017; Wolbring, 2008). The findings we present are corroborated by other scholarship in this emerging area. Elsewhere in the literature, for instance, disability-focused online survey results have demonstrated disruption in day-to-day lives of individuals with disabilities, including access to health care and routine check-ups due to limited availability of services and fear of exposure to COVID-19 (Drum et al., 2020; Jeste et al., 2020). Negative impacts of employment associated with the pandemic have also been reported by individuals with disabilities (Okyere et al., 2021). Specifically, out of 318 respondents who were employed before the pandemic, 50.3% began to work from home, 23.6% noted a decrease in work hours and income, 22.6% were laid off, and 19.5% chose not to work due to personal or health reasons. Respondents also mentioned feeling worried about their finances due to reduced work hours and loss of employment. While some scholars have noted that the increased flexibility associated with remote work opportunities during the pandemic may have been a 'silver lining' for adults with disabilities, they also acknowledge that most are not concentrated in high-potential occupations relative to their non-disabled counterparts (Schur et al., 2020). Further, Friedman (2021) found that individuals with intellectual and development disabilities experience a significant reduction in quality of life across multiple

indicators between 2019 and 2020. Specifically, there has been a decrease in continuity and security, community participation, and likelihood to maintain intimate relationships.

While a number of issues referenced above were omnipresent in the disability community before the pandemic, in many ways they were intensified by the threats posed by the COVID-19 virus as well as the pandemic mitigation strategies. This is a critical point because disability is not often conceptualized as an axis of inequality in health disparities research, as we have noted. We are reminded of Blumer's (1971) adage that 'a social problem does not exist for a society unless it is recognized by that society to exist. In not being aware of a social problem, a society does not perceive it, address it, discuss it, or do anything about it. The problem is just not there' (Blumer, 1971, p. 301–302). This work further supports the need to treat the marginalization of people with disabilities as a social problem with health consequences requiring further and sustained attention (Frederick & Shifrer, 2019; Mauldin & Brown, 2021). That is, efforts to meaningfully address pandemic-related stressors, and the constraints they pose for the life experiences and opportunities of people with disabilities, must confront enduring forms of marginalization and the feelings of personal devaluation or distress they engender.

To this latter point, we additionally considered the effects of the composite COVID-19 pandemic-related stressor score on two mental health outcomes—depressive symptoms and anxiety symptoms—separately among individuals with and without disabilities. Results from regression analyses demonstrated that greater exposure to COVID-19 pandemic-related stressors was statistically significantly associated with increased depressive symptoms among adults with disabilities and without disabilities, and the effect of stress exposure on depressive symptoms was significantly stronger for adults with disabilities. Pandemic-related stressors were also significantly associated with anxiety symptoms in both subsamples, and the effect sizes did not differ significantly between individuals with and without disabilities.

This finding lends further support to the stress process theory by documenting the negative mental health effects associated with exposure to a shared traumatic event—the COVID-19 pandemic in this case—as well as underscoring that positionality within the social structure predicts the extent of stressor exposure and in turn influences individual mental health outcomes (Aneshensel, 1992; Pearlin, 1989).

Taken together our study findings support the need for further research on the circumstances in which pandemic-related stressors are more or less relevant to individuals with disabilities and chronic health conditions. We are encouraged by emerging work in this area. For instance, in a recent study on Canadian adults with disabilities, Pettinicchio et al. (2021) found that individuals whose financial outcomes were affected by the COVID-19 pandemic, who were concerned about contracting COVID-19, or who reported increased loneliness were more likely to also report increased anxiety, stress, and despair. However, protective measures taken to combat COVID-19 (e.g., avoiding public places, frequent hand washing, avoiding

outdoor recreation), were not associated with increased psychological distress. Additional research considering the relative efficacy of different coping strategies or assistance programs may be particularly useful in efforts to meaningfully address pandemic-related disadvantages. As well, we encourage further acknowledgement that pandemic-related stressors did not occur in isolation, and that they will substantially alter the ways in which many people are able to respond to future macro-level stressors (Brown et al., 2017).

Several study limitations merit comment. First, because our data are cross-sectional, we were unable to assess causality in the association between stressor exposure and depressive and anxiety symptoms. Future researchers are encouraged to gather longitudinal data to document the causality between pandemic-related stressor exposure and mental health outcomes more clearly. It is also reasonable to suspect that individuals with mental illness would experience COVID-19 pandemic-related stressors at higher rates, therefore, the potential for a bi-directional association should also be considered. In addition, many people with disabilities already suffer from greater social isolation and their social participation is limited due to difficulties in accessibility, lack of accommodation, and disability stigma. Enforcement of varied state lockdown measures may have exacerbated their sense of isolation and negatively impacted their stress levels. Due to limitations in our data, we were not able to examine the direct effects of state lockdown policy variation on psychological distress among individuals with and without disabilities, but we urge future scholars to take that into consideration in their research. We were also not able to evaluate the effect of residence type and living arrangement factors on loneliness, social isolation and increased negative mental health effects among individuals with disabilities during the COVID-19 pandemic. For instance, research suggests that residents of long-term care homes were at particularly heightened risk for viral transmission and psychological distress (Fisman et al., 2020; McArthur et al., 2021). Future research should further investigate the role of residence type in the stress process among individuals with disabilities. Another potential limitation concerns our online quota-based sample. Because we oversampled individuals with disabilities, our sample is not reflective of a random sample of the population. Our sub-sample of non-disabled individuals does not mirror the demographic characteristics (e.g., the racial/ethnic profile) of this population either. Further, all the data were collected in the Intermountain West region (Utah, Colorado, Idaho and Wyoming), therefore our results are not generalizable to the remainder of the United States. Finally, individuals with severe visual and cognitive disabilities as well as individuals without access to the Internet were excluded from this survey. While this exclusion has important implications with respect to generalizability of our results to the community of individuals with disabilities, we were restricted in participant recruitment efforts due to the parameters of online survey research. However, we would argue that this exclusion does not make our findings less valuable or important. In fact, the effects of the pandemic-related stressors on mental health among people with disabilities may be underestimated in our survey. That being said, we are aware that a larger and more inclusive

sample matched on to the demographic characteristics of the population of interest would facilitate a more robust comparison across individuals with and without disabilities, and we hope that scholars will consider building on our research in the future.

These limitations notwithstanding, our study extends previous scholarship with a more holistic approach that considered multiple domains of life that have been negatively affected by the COVID-19 pandemic and its mitigation efforts, and examined the effects of pandemic-related stress exposure on two mental health outcomes among individuals with and without disabilities. Our results suggest that although all respondents are experiencing hardships during the pandemic, pandemic-related stressors are more salient among individuals with disabilities, which is associated with greater negative effects on their psychological well-being. We would argue that the COVID-19 pandemic is generating a secondary mental illness pandemic as documented here and elsewhere, and that individuals with disabilities are affected by it at significantly higher proportions (Bo et al., 2020; Chen et al., 2020; Choi et al., 2020; Ettman et al., 2020; S. Li et al., 2020; X. Li et al., 2020; Z. Li et al., 2020; Liang et al., 2020; Rossi et al., 2020; Sønderskov et al., 2020; Xiong et al., 2020; Zhang et al., 2020; Zhu et al., 2020). The United States was already facing a mental health crisis before the pandemic. As an illustration, a fifth of American adults reported having a mental illness (McCance-Katz, 2019), suicides had increased by about 30% since the 1990s (Centers for Disease Control and Prevention, 2018), and mental health care providers were in shortage (Covino, 2019). Given these considerations, we recommend that efforts to ameliorate pandemic-related hardships, like providing economic stimulus funds and increasing public assistance, as well as vaccination efforts, prioritize those under harder duress and most vulnerable health status. Now, and after the pandemic has subsided, it is imperative that government officials and health care systems devote enough resources to combat the surge of mental illness as it has the potential to cost more lives in addition to the over 600,000 already lost to COVID-19 in the U.S.

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#### CONFLICT OF INTEREST

The authors have declared that they have no conflict of interest.

#### DATA AVAILABILITY STATEMENT

The dataset analyzed during the current study are available from the corresponding author on reasonable request.

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