

# Childcare Disruptions and Parental Stress During the COVID-19 Pandemic

Chuyun Xu, MPH,\* Eliza Loren Purdue, BA,† Robert Sege, MD, PhD,† Benjamin Sweigart, MA,‡ Dina Burstein, MD, MPH†

**ABSTRACT: Objective:** Families in the United States experienced tremendous disruptions during the COVID-19 pandemic. This study evaluated the relationship of parental stress during the pandemic with interruptions in availability of services (childcare, after-school activities, and medical appointments) for children. **Methods:** We analyzed data from 2 waves of the Measuring the Impact of Violence Against Children and Women During a Pandemic survey<sup>1</sup> to develop a multivariable logistic regression model of the association between caregivers' stress and pandemic-related disruptions in children's lives. Caregivers' past experiences of childhood abuse, recommended stress-relieving activities, and responses to the statement "helping my child(ren) with their education, including remote schoolwork, has been very stressful and/or has resulted in increased tension at home" were included as covariates. Demographic and socioeconomic variables were examined as potential confounders. **Results:** In total, 3479 (73.3%) of 4659 respondents reported feeling stressed since the start of the pandemic. For every one-item increase in the number of COVID disruptions in children's lives, the odds of feeling stressed increased by 20% (OR 1.20;  $p$  value < 0.0001, 95% confidence interval [CI], 1.14–1.27). Compared with men, women had 60% higher odds of feeling stressed (odds ratio [OR] 1.60;  $p$  value < 0.0001, 95% CI, 1.32–1.93). The covariates listed earlier were all statistically significant. **Conclusion:** Pandemic-related disruptions in children's lives were significantly associated with caregiver stress. Women were more likely to feel stressed than men. Sex, education, marital status, and family income were also associated with parental stress. These results suggest that childcare continuity and parental support should be part of disaster planning.

(*J Dev Behav Pediatr* 00:1–10, 2023)

In response to the pandemic, US federal and local governments implemented quarantine policies in 2020.<sup>2</sup> To slow down the spread of COVID-19 infection, travel was discouraged, as were gatherings of family and friends. Larger gatherings were prohibited, and most schools transitioned from in-person to remote learning. These social-distancing practices may have negatively impacted adult mental health.<sup>3</sup> Women reported pandemic-related anxiety associated with factors such as body image

dissatisfaction<sup>4</sup> and psychological distress when their occupations still required them to work on-site.<sup>5</sup> Men reported experiencing higher rates of depressive symptoms and suicidal ideation than women in mid-2020.<sup>6</sup>

For parents and other caregivers, the loss of childcare services may increase stress. Previous studies, conducted before the COVID-19 pandemic, have shown that parental dissatisfaction with daycare is a significant predictor of parental stress.<sup>7</sup> A study that investigated the differences in stress and anxiety among women with and without children during the early pandemic revealed that anxiety level was higher in women with children at home.<sup>8</sup> Studies that examined childcare as a stressor for fathers displayed similar patterns to that of mothers.<sup>9,10</sup> Low family income was positively correlated with parental stress level.<sup>7</sup> Unemployment and workplace inflexibility were related to more parenting stress for fathers.<sup>11</sup>

Adverse childhood experiences (ACEs), including abuse, have been strongly linked to mental health problems in adulthood.<sup>12,13</sup> In addition, young adults with a history of ACEs were found to be more vulnerable to a deterioration in mental health because of COVID-19-associated stressors.<sup>14</sup>

We sought to examine parental stress during the pandemic. In particular, we wanted to understand (1) whether the level of stress due to the loss of childcare

From the \*Tufts University Graduate School of Biomedical Science, Boston, MA; †Center for Community-Engaged Medicine, Institute for Clinical Research and Health Policy Studies, Tufts Medical Center, Boston, MA; ‡Institute for Clinical Research and Health Policy Studies, Tufts Medical Center, Boston, MA.

Received June 2023; accepted October 2023.

The study was supported by a grant from the Centers for Disease Control and Prevention (Cooperative Agreement OT18-1802).

Disclosure: The authors declare no conflict of interest.

Address for reprints: Dina Burstein, MD, MPH, Center for Community-Engaged Medicine, Institute for Clinical Research and Health Policy Studies, Tufts Medical Center, 800 Washington Street, Boston, MA 02111; e-mail: dburstein@tuftsmedicalcenter.org.

Written work prepared by employees of the Federal Government as part of their official duties is, under the U.S. Copyright Act, a "work of the United States Government" for which copyright protection under Title 17 of the United States Code is not available. As such, copyright does not extend to the contributions of employees of the Federal Government.

resources and disruptions in children's lives was different by demographic or socioeconomic factors; (2) whether the level of stress was different between men and women; and (3) whether caregivers' own experience of childhood abuse, stress-relieving activities during the pandemic, and perception of helping their children with schoolwork were costressors. This report describes the results from these analyses.

## METHODS

### Data Source

The Measuring the Impact of Violence Against Children and Women During a Pandemic survey was a nationwide multiwave, internet panel survey conducted for the American Academy of Pediatrics (AAP), in collaboration with the Centers for Disease Control and Prevention (CDC), Prevent Child Abuse America (PCAA America), and the Healthy Outcomes from Positive Experiences (HOPE) National Resource Center at Tufts Medicine.<sup>1</sup> This report used the results of survey responses from 2 waves of 3000 US caregivers of children younger than 18 years each, conducted in November 2020 and February 2021. Data collected included respondent demographics, socioeconomic characteristics, and effects of the pandemic on family life.

Individual questions were drawn from previously published survey instruments, including the Behavioral Risk Factor Surveillance System survey,<sup>15,16</sup> the US Bureau of Labor Statistics Population Survey,<sup>17</sup> the RAPID-EC survey from the University of Oregon,<sup>18</sup> the National Institute of Health's Patient-Reported Outcomes Measurement Information System survey,<sup>19-21</sup> the Responses to Stress Questionnaire from the Stress and Coping Research Lab at Vanderbilt University,<sup>22</sup> the CDC's Violence Against Children and Youth survey,<sup>23,24</sup> the National Survey of Children's Health,<sup>25,26</sup> and a survey from the Parenting in Context Research Lab.<sup>27</sup> Survey design was a collaborative effort between the AAP, PCAA America, the HOPE National Resource Center at Tufts Medicine, and a national partner council that included pediatricians, parents, home visitors, and researchers.

The need to field a survey quickly during the pandemic necessitated an ad hoc process for constructing this survey. The items were selected with a rigorous multistep process. First, the authors reached consensus on the risk and protective factor domains related to child abuse and family violence, generally using the family stress model<sup>28</sup> for risk factors and the Strengthening Families approach for protective factors.<sup>29</sup> Then, together with expert consultants as needed, validated measures of these domains were identified. Owing to technical constraints, primarily the potential for respondent fatigue, the number of response items was limited, and, in most cases, only individual items, rather than complete measures, could be included. The study team convened an outside expert stakeholder panel to review these decisions. Two stakeholder groups were held. One group featured parent and community mem-

bers. The second group consisted of organizational leaders, including pediatricians.

The survey was administered by the market research and data analytics firm YouGov.<sup>30</sup> YouGov maintains an opt-in panel of 17 million respondents. Panelists are recruited through social media and other forms of advertising and are required to go through a multistep validation process before acceptance. Panelists who complete surveys are rewarded with points which they can exchange for a variety of prizes (e.g., Amazon gift cards). A randomly selected cross-section of panelists was contacted to complete the survey for this study. To ensure a diverse sample based on race and ethnicity, sex, age, income, education, marital status, and region of the country, as specific demographic quotas filled, those not filling available criteria still needed for this study were screened out. YouGov weights the responding sample to a nationally representative sampling frame or profile derived from census data.

Adults with children younger than 18 years living in their homes were eligible to participate in the survey. The survey was administered through email and was conducted in English. All responses were anonymous. Our Institutional Review Board determined that this survey was not human subjects research.

### Outcome Variable

The main outcome studied was based on responses to the survey item, "How often, if ever, have you felt nervous or stressed since the Coronavirus (COVID-19) outbreak occurred (i.e., since early March 2020)?" Responses were converted to a dichotomous variable: negative if the respondent never or rarely felt nervous or stressed and positive if the respondent felt nervous or stressed sometimes, most of the time, or always since the start of the pandemic. The variable was dichotomized because we believe that parents experiencing any level of stress is important and might warrant an intervention.

### Exposure Variables

The primary exposure variable was the number of COVID-19 disruptions child(ren) experienced since March 2020. The 10 possible disruptions involved school closure, inability to receive individualized education program services, child or daycare closure, sports or other after-school activities cancellation, summer camp or summer programs cancellation, playdate cancellation, inability to receive free or reduced cost meals at school, medical or dental appointment cancellation, vaccinations postponement, and inability to go outside to play or exercise. These variables were chosen based on their mapping to the HOPE framework, which describes the key types of experiences needed for optimal development.<sup>31</sup> This framework has been validated in multiple investigations.<sup>32-34</sup> These disruptions have the potential to block access to the types of positive childhood experiences described in the HOPE framework.<sup>35</sup> Total items selected were counted for each respondent.

**Table 1.** Survey Data Used in Analysis

Domain	Variable	Question Text	Response Options
Outcome	Feeling nervous or stressed <sup>a</sup>	How often, if ever, have you felt nervous or stressed since the Coronavirus (COVID-19) outbreak occurred (i.e., since early March 2020)? <i>Sometimes, most of the time, always</i> <sup>f</sup>	<ul style="list-style-type: none"> <li>a. Never</li> <li>b. Rarely</li> <li>c. Sometimes</li> <li>d. Most of the time</li> <li>e. Always</li> </ul>
Primary exposure variable	# of COVID-related childcare disruptions <sup>b</sup>	Which, if any, of the following disruptions have your child(ren) experienced since the Coronavirus (COVID-19) outbreak started (i.e., since March 2020)? Please select all that apply	<ul style="list-style-type: none"> <li>a. School closed</li> <li>b. Unable to receive IEP services</li> <li>c. Child or daycare closed</li> <li>d. Sports or other after-school activities cancelled</li> <li>e. Summer camp or summer programs cancelled</li> <li>f. Play dates or getting together with peers cancelled</li> <li>g. Unable to receive free or reduced cost meals at school</li> <li>h. Medical or dental appointment cancelled (e.g., well-child visits, follow-up visits)</li> <li>i. Vaccinations postponed</li> <li>j. Unable to go outside to play or exercise</li> <li>k. Other (fill in)</li> <li>l. No disruptions</li> </ul>
Covariates	Current employment status	Which, if any, of the following options best describes your current employment status?	<ul style="list-style-type: none"> <li>a. Working full-time</li> <li>b. Working part-time</li> <li>c. Temporarily unemployed (i.e. between jobs)</li> <li>d. Retired</li> <li>e. Permanently disabled</li> <li>f. Taking care of home or family</li> <li>g. Student</li> <li>h. Unemployed</li> <li>i. Other</li> </ul>
	Household financial situation	Which ONE of the following statements best describes your household's financial situation?	<ul style="list-style-type: none"> <li>a. It has been positively impacted</li> <li>b. It has stayed the same</li> <li>c. It has been negatively impacted</li> <li>d. Do not know</li> </ul>
	Helping children with education	Helping my child(ren) with their education, including remote schoolwork, has been very stressful, and/or has resulted in increased tension at home	<ul style="list-style-type: none"> <li>a. Strongly agree</li> <li>b. Somewhat agree</li> <li>c. Neither agree nor disagree</li> <li>d. Somewhat disagree</li> <li>e. Strongly disagree</li> <li>f. N/A</li> </ul>

*(Table continues)*

**Table 1.** Continued

Domain	Variable	Question Text	Response Options
	# of recommended stress relievers used	Which, if any, of the following activities have you performed to deal with stress within the past month? <sup>f</sup>	<ul style="list-style-type: none"> <li>a. Yoga</li> <li>b. Meditation</li> <li>c. Prayer</li> <li>d. Exercise</li> <li>e. Watching television or other screen time</li> <li>f. Reading</li> </ul>
	Parent ACEs <sup>c,d,e</sup>	Which, if any, of the following did you experience before your 18th birthday? Please select all that apply	<ul style="list-style-type: none"> <li>a. I lived with someone who was depressed, mentally ill, or attempted suicide</li> <li>b. I lived with someone who had a problem with drinking or using drugs, including prescription drugs</li> <li>c. I lived with someone who served time or was sentenced to serve time in a prison, jail, or other correctional facility</li> <li>d. My parents or guardians separated or divorced</li> <li>e. My parents or adults in my home slapped, hit, kicked, punched, or beat each other up</li> <li>f. I was hit, beat, kicked, or physically hurt by a parent or an adult in my home</li> <li>g. I was sworn at, insulted, or put down by a parent or an adult in my home</li> <li>h. I experienced unwanted sexual contact (such as fondling or oral/anal/vaginal intercourse/penetration) with someone at least 5 years older than me or an adult</li> <li>i. I did not have enough to eat, had to wear dirty clothes, or had no one to protect or take care of me</li> <li>j. I felt that no one in my family loved me or thought I was special</li> <li>k. None of these</li> <li>l. Prefer not to say</li> </ul>

<sup>a</sup>Question text adapted from <https://www.healthmeasures.net/explore-measurement-systems/promis/intro-to-promis/list-of-adult-measures>.<sup>20</sup> <sup>b</sup>Question text adapted from the Parenting in Context Research Lab.<sup>27</sup> <sup>c</sup>Question text adapted from the VACS.<sup>23</sup> <sup>d</sup>Question text adapted from NSCH.<sup>25</sup> <sup>e</sup>Question text adapted from Pediatric Early Adversity and Related Life Events Screen (PEARLS) <https://www.acesaware.org/learn-about-screening/screening-tools/>. <sup>f</sup>Responses considered positive. IEP, individualized education program; VACS, violence against children survey; NSCH, National Survey of Children's Health.

The number of parental ACEs and current stress-relieving activities served as covariates in the adjusted model. The positive stress-relieving activities included answer choices of yoga, meditation, prayer, exercise, watching television or other screen time, and reading. These items were selected based on the field experience of the organizations represented on the research team (the AAP and PCAA) and on the advice that these organizations offer to parents.

The categorical covariate chosen for this analysis is whether a participant agreed with the statement: "Helping my child(ren) with their education, including remote schoolwork, has been very stressful, and/or has resulted in increased tension at home." We investigated both helping my child with remote schoolwork and helping my child with medical care or therapeutic activities as costressors, but only schoolwork was significant and was therefore included as a covariate. Respondents who answered "strongly agree" or "somewhat agree" were considered as agreeing

with the statement, "neither agree nor disagree" were considered neutral, and "strongly disagree" or "somewhat disagree" were considered disagreeing with the statement.

Demographic and socioeconomic variables were considered potential confounders. The number of children younger than 18 years that the respondent have caregiving responsibilities for, age of the respondents, current employment status, household financial situation since the COVID-19 pandemic, sex, race, education, marital status, family income, residence (big city, smaller city, suburban area, small town, rural area), and survey wave were included in these analyses. All variables chosen for this analysis were identical in the 2 waves of the survey. A list of all questions used in this analysis and answer options are presented in Table 1.

### Statistical Analysis

Bivariate analysis was conducted using t tests and  $\chi^2$  tests to compare the differences in characteristics

between respondents who have experienced pandemic-related stress and who have not experienced such stress. Logistic regression was used to determine the relationship between pandemic-related stress and the number of childcare disruptions. We fit both an unadjusted model and a multivariable model. In addition to the 3 covariates previously mentioned, several potential confounders were included in the multivariable model: the number of children younger than 18 years that the respondent had caregiving responsibilities for, age of the caregiver, race, and residence. All analyses accounted for the survey weights.

To address the issue of missing data, as a sensitivity analysis, we imputed 50 data sets using chained equations with 10 burn-in iterations incorporating all the variables included in the analysis. Categorical variables were imputed using logistic regression, and continuous variables were imputed using linear regression. We fit the unadjusted and multivariable logistic regression models for the outcome to the multiply imputed data using Rubin's rules to pool the estimates across the 50 data sets. Supplemental Digital Content 2, Table S2, <http://links.lww.com/JDBP/A448>, compares the descriptive statistics between those with missing data and those with complete data.

For all analyses, a 2-sided 0.05 level of significance was used. All analyses were conducted using SAS<sup>®</sup> 9.4 (SAS Institute Inc., Cary, NC).

## RESULTS

The responses from wave 1 (N = 3000) and wave 2 (N = 3000) were merged into a single file (N = 6000). After excluding participants who did not provide answers to the outcome variable and/or the exposure variables of interest, we yielded a sample size of 4659 participants. Multiple imputations yielded a sample size of 6000.

The mean (standard deviation) age of the respondents was 41.87 (10.94) years. A total of 2150 respondents (48.10%) were male, and 2509 respondents (51.90%) were female. A total of 2431 (50.61%) were employed full-time at the time of answering the survey, 616 (13.66%) were employed part-time, and 677 (14.18%) took care of their home and family. A total of 1186 participants (29.27%) were high-school graduates, 1053 (20.28%) had completed a 4-year college degree, and 906 (18.40%) had completed some college. The family income was fairly distributed, with only 669 respondents (17.18%) having an annual family income less than \$20,000. Most of the respondents lived in big cities, 1157 (24.91%), or suburban areas, 1482 (31.48%).

Descriptive characteristics of all study participants are presented in Table 2. Survey respondents reported a mean (SD) of 2.65 (1.83) disruptions in childcare arrangements, children's activities, or services. Of the 4659 respondents, 3479 (73.27%) said they ever felt nervous or stressed since the start of the COVID-19

**Table 2.** Characteristics of Participants With Complete Data in Measuring the Impact of Violence Against Children and Women During a Pandemic Survey, 2020 and 2021 (N = 4659)

Variable	Category	Mean/Total Number (SD/%) <sup>a</sup>
Age (yr)		41.87 <sup>b</sup> (SD ± 10.94) <sup>c</sup>
Sex	Male	2150 (48.10)
	Female	2509 (51.90)
Race/ethnicity	White	3015 (56.89)
	Black	508 (11.41)
	Hispanic	634 (21.82)
	Other	502 (9.88)
Marital status	Married	3524 (73.60)
	Single	1135 (26.40)
Education	No high school	176 (6.75)
	High-school graduate	1185 (29.27)
	Some college	906 (18.40)
	2-yr college graduate	626 (12.77)
	4-yr college graduate	1053 (20.28)
Current employment status	Postgraduate	713 (12.53)
	Full-time	2431 (50.61)
	Part-time	616 (13.66)
	Temporarily unemployed	162 (3.74)
	Taking care of home or family	677 (14.18)
	Unemployed	319 (7.71)
Financial income	Other	454 (10.09)
	Less than \$20,000/yr	669 (17.18)
	\$20,000 to \$49,999/yr	1122 (25.10)
	\$50,000 to \$99,999/yr	1513 (31.84)
Post-COVID change in financial situation	\$100,000 or more/year	1355 (25.88)
	Positively impacted	832 (17.85)
	Stayed the same	2130 (45.77)
Residence	Negatively impacted	1697 (36.38)
	Big city	1157 (24.91)
	Smaller city	790 (18.06)
Number of ACEs <sup>d</sup>	Suburban area	1482 (31.48)
	Small town	585 (11.79)
	Rural area	645 (13.76)
Number of children <18 yr	Disagree	1595 (33.57)
	Neutral	811 (18.85)
Number of COVID-related childcare disruptions	Agree	2253 (47.58)
	Helping my child(ren) with their education has been very stressful	

<sup>a</sup>Percentages incorporate survey weights. <sup>b</sup>Mean. <sup>c</sup>SD, standard deviation. <sup>d</sup>ACEs, adverse childhood experiences, score ranged from 0 to 10.

pandemic and 1595 (33.57%) disagreed with the statement, "Helping my child(ren) with their education, including remote schoolwork, has been very stressful, and/

**Table 3.** Bivariate Associations With Feeling Nervous or Stressed Since the COVID-19 Pandemic Among Survey Participants With Complete Data (N = 4659)

	<u>Felt Nervous/Stressed Since COVID</u>	<u>Did Not Feel Nervous/Stressed Since COVID</u>	<i>p</i>
	Mean (SD)	Mean (SD)	
COVID child disruptions	2.74 ± 1.82	1.90 ± 1.63	<0.0001 <sup>a</sup>
Number of children younger than 18 years	1.86 ± 1.07	1.82 ± 1.06	0.2619 <sup>a</sup>
Experiences of childhood abuse	1.88 ± 2.20	1.17 ± 1.73	<0.0001 <sup>a</sup>
Recommended stress relieving activities	2.04 ± 1.41	1.61 ± 1.47	<0.0001 <sup>a</sup>
Age, yr	41.46 ± 10.80	41.46 ± 12.78	0.9979 <sup>a</sup>
	No. (%)	No. (%)	
Current employment status	—	—	<0.0001 <sup>b</sup>
Full-time	1713 (47.69)	718 (58.63)	—
Part-time	453 (13.16)	163 (15.04)	—
Temporarily unemployed	135 (4.25)	27 (2.36)	—
Taking care of home or family	547 (15.28)	130 (11.17)	—
Unemployed	276 (9.17)	43 (3.71)	—
Other	355 (10.45)	99 (9.08)	—
Since COVID—household's financial situation	—	—	<0.0001 <sup>b</sup>
It has been positively impacted	496 (14.07)	336 (28.21)	—
It has stayed the same	1466 (41.90)	664 (56.36)	—
It has been negatively impacted	1517 (44.03)	180 (15.43)	—
Helping my child(ren) with their education has been very stressful	—	—	<0.0001 <sup>b</sup>
Disagree	1102 (30.93)	493 (40.83)	—
Neutral	600 (18.64)	211 (19.42)	—
Agree	1777 (50.44)	476 (39.75)	—
Sex	—	—	<0.0001 <sup>b</sup>
Male	1468 (43.64)	682 (60.32)	—
Female	2011 (56.36)	498 (39.68)	—
Race	—	—	0.8145 <sup>b</sup>
White	2243 (57.15)	772 (56.19)	—
Black	384 (11.64)	124 (10.79)	—
Hispanic	479 (21.55)	155 (22.56)	—
Other	373 (9.67)	129 (10.47)	—
Education	—	—	0.0261 <sup>b</sup>
No HS	120 (6.54)	56 (7.34)	—
High-school graduate	865 (27.98)	320 (32.80)	—
Some college	694 (18.94)	212 (16.90)	—
2 yr	469 (12.75)	157 (12.80)	—
4 yr	772 (20.23)	281 (20.43)	—
Post-grad	559 (13.55)	154 (9.73)	—
Marital status	—	—	<0.0001 <sup>b</sup>
Married	2567 (71.26)	957 (79.99)	—
Single	912 (28.74)	223 (20.01)	—
Family income	—	—	<0.0001 <sup>b</sup>
Less than \$20,000	548 (18.85)	121 (12.60)	—
\$20,000 to 49,999	865 (25.72)	257 (23.40)	—
\$50,000 to \$99,999	1104 (31.25)	409 (33.46)	—
\$100,000 or more	962 (24.18)	393 (30.54)	—

*(Table continues)*

**Table 3.** Continued

	Felt Nervous/Stressed Since COVID	Did Not Feel Nervous/Stressed Since COVID	<i>p</i>
	Mean (SD)	Mean (SD)	
Residence	—	—	0.6603 <sup>b</sup>
Big city	822 (24.21)	335 (26.83)	—
Smaller city	617 (18.37)	173 (17.21)	—
Suburban area	1134 (31.85)	348 (30.47)	—
Small town	426 (11.71)	159 (12.04)	—
Rural area	480 (13.87)	165 (13.46)	—
Wave			0.0022 <sup>b</sup>
Wave 1	1810 (51.76)	544 (45.28)	
Wave 2	1669 (48.24)	636 (54.72)	

Means, SDs, and percentages incorporate survey weights. <sup>a</sup>*p*-value obtained from a *t* test assuming equal variance. <sup>b</sup>*p*-value obtained from the Rao-Scott  $\chi^2$  test.

or has resulted in increased tension at home” while 2253 (47.58%) agreed. Respondents reported a mean (SD) of 1.75 (2.15) ACEs. The bivariate analysis (Table 3) indicates that COVID-19 related stress varied significantly by the number of disruptions in services for children, caregivers’ experiences of ACEs, and recommended stress-relieving activities. Stress also varied significantly with levels of current employment status, levels of changes in household financial situation since the start of the pandemic, levels of agreement to the statement “helping my child(ren) with their education, including remote schoolwork, has been very stressful and/or has resulted in increased tension at home,” sex, education, marital status, and family income. These results are reflective of the original sample excluding those with missing data.

Table 4 presents the results of the unadjusted and multivariable logistic models without imputation of missing data. These results were similar to those obtained using multiply imputed data (Supplemental Digital Content 1, Table S1, <http://links.lww.com/JDBP/A448>). The number of pandemic-related disruptions in children’s lives is significantly associated with the stress of caregivers during the pandemic. In the unadjusted model, for every 1-item increase in the number of COVID-19 disruptions in children’s lives, the odds of feeling nervous or stress is increased by 32% (OR 1.32, *p* value < 0.0001, 95% CI, 1.25–1.39). In the adjusted model, the increase in odds is 20% (OR 1.20, *p* value < 0.0001, 95% CI, 1.14–1.27), slightly lower than that of the unadjusted model.

In the adjusted model, a 1-item increase in the parental recall of experiences of ACEs is significantly associated with an increase in the odds of feeling nervous or stress (OR 1.12, *p* value < 0.0001, 95% CI, 1.07–1.18). One unit increase of the recommended stress-relieving activities is significantly associated with 13% increase in the odds of feeling nervous or stress (OR 1.13, *p* value = 0.0012, 95% CI, 1.05–1.21). Compared with people who said that their household financial situation stayed the same since the start of the pandemic, people who said that the household financial situation was positively impacted had a 39% decrease in the odds of feeling nervous

or stressed, and the result is significant (OR 0.61, *p* value < 0.0001, 95% CI, 0.49–0.77). By contrast, compared with people who said that their household financial situation stayed the same since the start of the pandemic, people who said their household financial situation was negatively impacted had 3.05 times higher odds of feeling nervous or stressed (OR 3.05, *p* value < 0.0001, 95% CI, 2.38–3.90). Compared with people with less than \$20,000 annual family income, those with \$100,000 or more annual family income had 45% lower odds of feeling nervous or stressed (OR 0.55, *p* value = 0.0024, 95% CI, 0.38–0.81).

Moreover, respondents who disagreed with the statement “helping my child(ren) with their education, including remote schoolwork, has been very stressful and/or has resulted in increased tension at home” had 35% significantly lower odds of feeling nervous or stressed compared with those who neither agreed nor disagreed with the statement (OR 0.65, *p* value = 0.0017, 95% CI, 0.50–0.85). In comparison with men, women had 60% higher odds of feeling nervous or stressed (OR 1.60, *p* value < 0.0001, 95% CI, 1.32–1.93). Compared with those with a high-school diploma, people who had postgraduate degrees had 93% higher odds of feeling nervous or stressed (OR 1.93, *p* value < 0.0001, 95% CI, 1.40–2.67) (Table 4).

## DISCUSSION

Our analyses reported here suggest that pandemic-related disruptions in children’s lives are associated with increased stress and anxiety among parents and caregivers. Sex, education, marital status, and family income are all significant demographic and socioeconomic factors associated with parents’ stress during the pandemic. Female respondents, in particular, had significantly higher odds of feeling nervous or stressed than male respondents. In addition, parental experience of ACEs, using recommended stress-relieving activities, and negatively impacted household financial situation during the pandemic are significantly associated with the increase in the odds of feeling nervous or stressed. Conversely, parents who disagreed

**Table 4.** Multivariable Model for Feeling Nervous or Stressed Since the COVID-19 Pandemic (N = 4659)<sup>a</sup>

Dependent Felt Nervous or Stressed since COVID vs Did Not Feel Nervous or Stressed Since COVID	Unadjusted Model		Adjusted Model	
	Odds Ratio (95% CI)	p	Odds Ratio (95% CI)	p
COVID child disruptions	1.32 (1.25–1.39)	<0.0001	1.20 (1.14–1.27)	<0.0001
Experiences of childhood abuse	—	—	1.12 (1.07–1.18)	<0.0001
Recommended stress-relieving activities	—	—	1.13 (1.05–1.21)	0.0012
Since COVID—household financial situation	—	—	—	<0.0001
It has been positively impacted	—	—	0.61 (0.49–0.77)	<0.0001
It has stayed the same	—	—	Reference	—
It has been negatively impacted	—	—	3.05 (2.38–3.90)	<0.0001
Helping my child(ren) with their education, including remote schoolwork, has been very stressful, and/or has resulted in increased tension at home	—	—	—	<0.0001
Disagree	—	—	0.65 (0.50–0.85)	0.0017
Neutral	—	—	Reference	—
Agree	—	—	1.14 (0.87–1.49)	0.3362
Sex	—	—	—	<0.0001
Male	—	—	Reference	—
Female	—	—	1.60 (1.32–1.93)	<0.0001
Education	—	—	—	0.0024
No HS	—	—	0.99 (0.59–1.67)	0.9622
High-school graduate	—	—	Reference	—
Some college	—	—	1.14 (0.88–1.49)	0.3225
2-yr	—	—	1.10 (0.82–1.47)	0.5182
4-yr	—	—	1.32 (1.01–1.73)	0.0459
Postgrad	—	—	1.93 (1.40–2.67)	<0.0001
Number of children younger than 18 years	—	—	0.95 (0.87–1.04)	0.2885
Age	—	—	1.00 (0.99–1.01)	0.4782
Current employment status	—	—	—	0.0690
Full-time	—	—	Reference	—
Part-time	—	—	0.80 (0.59–1.08)	0.1439
Temporarily unemployed	—	—	1.13 (0.66–1.96)	0.6570
Taking care of home or family	—	—	1.24 (0.92–1.67)	0.1549
Unemployed	—	—	1.65 (1.03–2.64)	0.0357
Other	—	—	1.25 (0.87–1.79)	0.2279
Race	—	—	—	0.6531
White	—	—	Reference	—
Black	—	—	0.98 (0.73–1.30)	0.8650
Hispanic	—	—	1.03 (0.77–1.38)	0.8238
Other	—	—	0.86 (0.67–1.10)	0.2285
Marital status	—	—	—	0.0466
Married	—	—	Reference	—
Single	—	—	1.29 (1.00–1.66)	0.0466
Family income	—	—	—	0.0101
Less than \$20,000	—	—	Reference	—
\$20,000 to 49,999	—	—	0.81 (0.56–1.16)	0.2487
\$50,000 to \$99,999	—	—	0.72 (0.51–1.03)	0.0696
\$100,000 or more	—	—	0.55 (0.38–0.81)	0.0024
Residence	—	—	—	0.7869

*(Table continues)*



**Table 4.** Continued

Dependent Felt Nervous or Stressed since COVID vs Did Not Feel Nervous or Stressed Since COVID	Unadjusted Model		Adjusted Model	
	Odds Ratio (95% CI)	p	Odds Ratio (95% CI)	p
Big city	—	—	Reference	—
Smaller city	—	—	1.04 (0.77–1.41)	0.7819
Suburban area	—	—	1.05 (0.82–1.35)	0.6902
Small town	—	—	0.90 (0.68–1.18)	0.4344
Rural area	—	—	0.95 (0.70–1.29)	0.7357
Wave				0.0905
Wave 1	—	—	Reference	—
Wave 2	—	—	0.86 (0.72–1.03)	0.0905

<sup>a</sup>One thousand three hundred forty-one observations were deleted due to missing values for the response or explanatory variables.

with the statement, “Helping my child(ren) with their education, including remote schoolwork, has been very stressful and/or has resulted in increased tension at home” were less likely to feel nervous or stressed compared with those who neither agreed nor disagreed with the statement.

These findings are consistent with a previous study that looked at parenting stress levels pre- and post-school closures across Asian countries, which not only indicated significant increases in participants’ current parenting stress levels but also demonstrated that ACEs are a risk factor of parenting stress.<sup>36</sup> In addition, female caregivers were previously reported to have higher COVID-19 stress.<sup>37</sup> A recently published study of New York City families during the pandemic showed that disruptions in children’s routines posed greater risk of poor mental health outcomes among parents.<sup>38</sup>

This study has several limitations. First, because the survey was conducted through a national opt-in panel, the results may not accurately reflect the experiences of the whole US population, although respondents were weighted to match US Census data for key population demographics.<sup>39</sup> It is unknown whether single parents were sole caregivers or whether there were additional caregiving adults living in the home. In addition, the survey was only available in English, potentially excluding many affected families. Causality cannot be directly inferred from cross-sectional survey data. Although the disruptions in children’s lives clearly resulted from the pandemic, it is not possible to know with certainty the factors that contributed to caregivers’ emotional status.

Another limitation comes from recoding categorical variables, such as race, family income, and marital status. Collapsing levels of categorical variables have restricted observation of nuances within the original levels and might introduce differentiated misclassification of the exposure, which could pull the results either toward or away from the null. We chose items from validated surveys, whenever possible, to promote construct validity and allow comparisons with other studies; however, simply choosing items from validated surveys results in unvalidated measures, and therefore, psychometric properties of this survey are unknown. Another limitation was that the sample included

only those with internet access and the ability to read and understand English.

## CONCLUSIONS

The results from this study suggest that US parents’ stress was significantly impacted by disruptions in children’s lives during the pandemic. The stress that adults, particularly mothers, experienced was associated with these disruptions. Demographic and socioeconomic factors, including sex, education, marital status, and family income, also seem to have a role in increasing or mitigating parental stress during the pandemic. These data suggest that preparation for widespread disasters should recognize the effects of disruptions on children’s lives on parental mental health. Special attention should be given to vulnerable populations, advocating for maximal support and resources during disruptive times during or after a disaster. This should include resources for alternative childcare options, supports and supplies needed for children to successfully attend school remotely, and accessible and quality mental health services. Further study is needed to see whether this disruption in mental health persists when conditions improve.

## REFERENCES

1. American Academy of Pediatrics. Development of the family snapshots survey. Available at: <https://www.aap.org/en/patient-care/family-snapshot-during-the-covid-19-pandemic/development-of-the-family-snapshots-survey/>. Accessed January 31, 2022.
2. Moreland A, Herlihy C, Tynan MA, et al. Timing of state and territorial COVID-19 stay-at-home orders and changes in population movement—United States, March 1–May 31, 2020. *MMWR Morb Mortal Wkly Rep.* 2020;69:1198–1203.
3. Galea S, Merchant RM, Lurie N. The mental health consequences of COVID-19 and physical distancing: the need for prevention and early intervention. *JAMA Intern Med.* 2020;180:817–818.
4. Swami V, Horne G, Furnham A. COVID-19-related stress and anxiety are associated with negative body image in adults from the United Kingdom. *Pers Individ Dif.* 2021;170:110426.
5. Xiong J, Lipsitz O, Nasri F, et al. Impact of COVID-19 pandemic on mental health in the general population: a systematic review. *J Affect Disord.* 2020;277:55–64.

6. Czeisler ME, Lane RI, Petrosky E, et al. Mental health, substance use, and suicidal ideation during the COVID-19 pandemic—United States, June 24–30, 2020. *MMWR Morb Mortal Wkly Rep.* 2020;69:1049–1057.
7. Bigras N, Lemay L, Brunson L. Parental stress and daycare attendance. Does daycare quality and parental satisfaction with daycare moderate the relation between family income and stress level among parents of four years old children?. *Proced—Soc Behav Sci.* 2012;55:894–901.
8. Avery AR, Tsang S, Seto EYW, et al. Differences in stress and anxiety among women with and without children in the household during the early months of the COVID-19 pandemic. *Front Public Healthb.* 2021;9:688462.
9. Halme N, Tarkka MT, Nummi T, et al. The effect of parenting stress on fathers' availability and engagement. *Child Care Pract.* 2006;12:13–26.
10. Fagan J, Bernd E, Whiteman V. Adolescent fathers' parenting stress, social support, and involvement with infants. *J Res Adolescence.* 2007;17:1–22.
11. Nomaguchi K, Johnson W. Parenting stress among low-income and working-class fathers: the role of employment. *J Fam Issues.* 2016;37:1535–1557.
12. Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *Am J Prev Med.* 1998;14:245–258.
13. Merrick MT, Ports KA, Ford DC, et al. Unpacking the impact of adverse childhood experiences on adult mental health. *Child Abuse Negl.* 2017;69:10–19.
14. Alradhi MA, Moore J, Patte KA, et al. Adverse childhood experiences and COVID-19 stress on changes in mental health among young adults. *Int J Environ Res Public Healthb.* 2022;19:12874.
15. Centers for Disease Control and Prevention. Behavioral risk factor surveillance system. Available at: <https://www.cdc.gov/brfss/index.html>. Accessed February 15, 2021.
16. Marks JS, Mokdad AH, Town M. The behavioral risk factor surveillance system: information, relationships, and influence. *Am J Prev Med.* 2020;59:773–775.
17. US Bureau of Labor Statistics. Measuring the effects of the coronavirus (COVID-19) pandemic using the Current Population Survey. Available at: <https://www.bls.gov/covid19/measuring-the-effects-of-the-coronavirus-covid-19-pandemic-using-the-current-population-survey.htm>. Accessed January 31, 2022.
18. University of Oregon Center for Translational Neuroscience. Rapid assessment of pandemic impact on development (RAPID)-early childhood. Available at: <https://ctn.uoregon.edu/projects/rapid-assessment-pandemic-impact-development-rapid-early-childhood>. Accessed January 31, 2022.
19. National Institutes of Health. Patient-reported outcomes measurement information system. Available at: <https://www.healthmeasures.net/explore-measurement-systems/promis>. Accessed January 31, 2022.
20. Cella D, Yount S, Rothrock N, et al. The Patient-Reported Outcomes Measurement Information System (PROMIS): progress of an NIH Roadmap cooperative group during its first two years. *Med Care.* 2007;45:S3–S11.
21. Bevans M, Ross A, Cella D. Patient-Reported Outcomes Measurement Information System (PROMIS): efficient, standardized tools to measure self-reported health and quality of life. *Nurs Outlook.* 2014;62:339–345.
22. Vanderbilt Peabody College. Responses to stress Questionnaire (RSQ). Available at: <https://my.vanderbilt.edu/stressandcoping/rsq/>. Accessed January 31, 2022.
23. Centers for Disease Control and Prevention. Violence against children and youth surveys. Available at: <https://www.cdc.gov/violenceprevention/childabuseandneglect/vacs/index.html>. Accessed January 31, 2022.
24. Nguyen KH, Kress H, Villaveces A, et al. Sampling design and methodology of the violence against children and youth surveys. *Inj Prev.* 2019;25:321–327.
25. Data Resource Center for Child & Adolescent Health. The national survey of children's health. Available at: <https://www.childhealthdata.org/learn-about-the-nsch/NSCH>. Accessed January 31, 2022.
26. Ghandour RM, Jones JR, Lebrun-Harris LA, et al. The design and implementation of the 2016 national survey of children's health. *Matern Child Healthb J.* 2018;22:1093–1102.
27. Lee SJ, Ward KP. Stress and parenting during the coronavirus pandemic. University of Michigan school of social work. Available at: <https://www.parentingincontext.org/stress-and-parenting-during-a-pandemic.html>. Accessed May 4, 2023.
28. Masarik AS, Conger RD. Stress and child development: a review of the family stress model. *Curr Opin Psychol.* 2017;13:85–90.
29. Harper Browne C. The strengthening families approach and protective factors framework: branching out and reaching deeper. Available at: <https://cssp.org/wp-content/uploads/2018/11/Branching-Out-and-Reaching-Deeper.pdf>. Accessed September 5, 2023.
30. YouGov. About YouGov. Available at: <https://today.yougov.com/about/>. Accessed January 31, 2022.
31. Sege R, Harper Browne C. Responding to ACEs with HOPE: health outcomes from positive experiences. *Acad Pediatr.* 2017;17:S79–S85.
32. Huang CX, Halfon N, Sastry N, et al. Positive childhood experiences and adult health outcomes. *Pediatrics.* 2023;152:e2022060951.
33. Guo S, O'Connor M, Mensah F, et al. Measuring positive childhood experiences: testing the structural and predictive validity of the health outcomes from positive experiences (HOPE) framework. *Acad Pediatr.* 2022;22:942–951.
34. Graupensperger S, Kilmer JR, Olson DCD, et al. Associations between positive childhood experiences and adult smoking and alcohol use behaviors in a large statewide sample. *J Community Healthb.* 2023;48:260–268.
35. HOPE. Healthy outcomes from positive experiences. Available at: <https://positiveexperience.org/>. Accessed June 4, 2020.
36. Kurata S, Hiraoka D, Ahmad Adlan AS, et al. Influence of the COVID-19 pandemic on parenting stress across asian countries: a cross-national study. *Front Psychol.* 2021;12:782298.
37. Wade M, Prime H, Johnson D, et al. The disparate impact of COVID-19 on the mental health of female and male caregivers. *Soc Sci Med.* 2021;275:113801.
38. Deeb S, Madden D, Ghebretinsae T, et al. Child disruptions, remote learning, and parent mental health during the COVID-19 pandemic. *Int J Environ Res Public Healthb.* 2022;19:6442.
39. United States Census Bureau. Measuring America's people, places, and economy. Available at: <https://www.census.gov/>. Accessed April 28, 2023.