Childcare Disruptions and Parental Stress During the COVID-19 Pandemic

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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 to interuptions in availability of services (childcare, after-school activities, medical appointments) for children.

Methods

We analyzed data from two waves of the Measuring the Impact of Against Children and Women During a Pandemic survey[1] 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 socio-economic variables were examined as potential confounders.

Results

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% CI: 1.14 - 1.27). Compared to men, women had a 60% higher odds of feeling stressed (OR 1.60: p-value < 0.0001, 95% CI: 1.32 – 1.93). The covariates listed above 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.

BACKGROUND

In response to the pandemic, United States (U.S.) federal and local governments implemented quarantine policies in 2020.[2] 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.[3] Women reported pandemic-related anxiety associated with factors such as body image dissatisfaction[4] and psychological distress when their occupations still required them to work on-site.[5] Men reported experiencing higher rates of depressive symptoms and suicidal ideation than women in mid-2020.[6]

For parents and other caregivers, the loss of childcare services may increase stress. Previous studies, conducted prior to the Covid-19 pandemic, have shown that parental dissatisfaction with daycare is a significant predictor of parental stress.[7] 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.[8] Studies that examined childcare as a stressor for fathers displayed similar patterns to that of mothers.[9, 10] Low family income was positively correlated with parental stress level.[7] Unemployment and workplace inflexibility were related to more parenting stress for fathers.[11]

Adverse childhood experiences (ACEs), including abuse, have been strongly linked to mental health problems in adulthood.[12, 13] Additionally, young adults with a history of ACEs were found to be more vulnerable to a deterioration in mental health as a result of COVID-19 associated stressors.[14]

We sought to examine parental stress during the pandemic. In particular, we wanted to understand (1) if the level of stress due to the loss of childcare resources and disruptions in children's lives was different by demographic or socioeconomic factors; (2) to understand if the level of stress was different between men and women; (3) to determine whether or not caregivers' own experience of childhood abuse, stress-relieving activities during the pandemic, and perception of helping their children with schoolwork were co-stressors. 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 multi-wave, 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 (PCA America), and the Healthy Outcomes from Positive Experiences (HOPE) National Resource Center at Tufts Medicine.[1] This report used the results of survey responses from two waves of 3000 US caregivers of children under the age of 18 each, conducted in November 2020 and February 2021. Data collected included respondent demographics, socio-economic 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,[15, 16] the U.S. Bureau of Labor Statistics Population Survey,[17] the RAPID-EC survey from the University of Oregon,[18] the National Institute of Health's Patient-Reported Outcomes Measurement Information System survey,[19-21] the Responses to Stress Questionnaire (RSQ) from the Stress and Coping Research Lab at Vanderbilt University,[22] the CDC's Violence Against Children and Youth survey,[23, 24] the National Survey of Children's Health,[25, 26] and a survey from the Parenting in Context Research Lab.[27] Survey design was a collaborative effort between

the AAP, PCA 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 multi-step process. First, the authors reached consensus on the risk and protective factor domains related to child abuse and familiy violence, generally using the family stress model[28] for risk factors and the Strengthening Families approach for protective factors.[29] Then, together with expert consultants as needed, validated measures of these domains were identified. Due 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 members. The second group consisted of organizational leaders, including pediatricians.

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

Adults with children under 18 years of age living in their homes were eligible to participate in the survey. The survey was administered via 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 disruptions child(ren) experienced since March 2020. The 10 possible disruptions involved school closure, inability to receive individualized education program (IEP) 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.[31] This framework has been validated in multiple investigations.[32-34] These disruptions have the potential to block access to the types of positive childhood experiences described in the HOPE framework.[35] Total items selected were counted for each respondent.

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 or not 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 co-stressors but only schoolwork was significant and therefor was 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 socio-economic variables were considered potential confounders. The number of children under the age of 18 that the respondent have caregiving responsibilities for, age of the respondents, current employment status, the 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 two waves of the survey. A list of all questions used in this analysis as well as answer options can be seen in Table 1.

Statistical Analysis

Bivariate analysis was conducted using t-tests and chi-square 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 distruptions. We fit both an unadjusted and multivariable model. In addition to the three covariates previously mentioned, several potential confounders were

included in the multivariable model: the number of children under the age of 18 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 datasets 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 datasets. Supplemental Table S2 compares the descriptive statistics between those with missing data and those with complete data.

For all analyses a two-sided 0.05 level of significance was used. All analyses were conducted using SAS® 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 that did not provide answers to the outcome variable and/or the exposure variables of interest we yielded a sample size of 4,659. Multiple imputation yielded a sample size of 6000.

The mean (SD) age of the respondents was 41.87 (10.94) years old. 2,150 (48.10%) of the respondents were male and 2,509 (51.90%) were female. A total of 2,431 (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. 1,186 (29.27%) of participants were high school graduates, 1,053 (20.28%) completed a 4-year college degree, and 906 (18.40%) completed some college. The family income was fairly distributed, with only 669 (17.18%) having an annual family income less than

$20,000. The majority of respondents lived in big cities 1,157 (24.91%) or suburban areas 1,482 (31.48%).

Descriptive characteristics of all study participants can be seen in Table 2. Survey respondents reported a mean (SD) of 2.65 (1.83) disruptions in childcare arrangements, children's activies or services. Out of the 4,659 respondents, 3,479 (73.27%) said they ever felt nervous or stressed since the start of the COVID-19 pandemic and 1,595 (33.57%) 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" while 2,253 (47.58%) agreed. Respondents reported a mean (SD) of 1.75 (2.15) adverse childhood experiences (ACEs). The bivariate analysis (Table 3) indicates that COVID-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, 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 displays 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 (supplementary Table S1). 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 one-item increase in the number of COVID 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 one-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 activies is significanty associated with 13% increase in the odds of feeling nervous or stressed (OR 1.13, p-value = 0.0012, 95% CI: 1.05 – 1.21). Compared to 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). In contrast, compared to 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 to 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 disagreeded 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 to those who neither agreed nor disagreed with the statement (OR 0.65, p-value = 0.0017, 95% CI: 0.50 - 0.85). In comparison to 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 to those with a high school diploma, people who had post-graduate 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 chidren'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. Females, in particular, had significantly higher odds of feeling nervous or stressed than males. In addition, parental experience of ACEs, using recommended stress-relieving activies, and negatively impacted household financial situation during the pandemic are significanty associated with the increase in the odds of feeling nervous or stressed. Conversely, parents who disagreeded 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 to 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 indicated not only significant increases in participants' current parenting stress levels but also demonstrated that ACEs are a risk factor for parenting stress.[36] Additionally, female caregivers were previously reported to have higher COVID-19 stress.[37] A recently published study of New York City families during the pandemic showed that disruptions in children's routines posed greater risk for poor mental health outcomes among parents.[38]

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 U.S. population, even though respondents were weighted to match U.S. Census data for key population demographics.[39] It is unknown if single parents were sole caregivers, or if there were additional caregiving adults living in the home. Additionally, 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 towards 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 therefor psychometric properties of this survey are unknown. Another limitation the sample included only those with internet access and the ability to read and understand English.

CONCLUSIONS

Results from this study suggest that U.S. parents' stress was significantly impacted by disruptions in children's lives during the pandemic. The stress that adults, mothers in particular, experienced, was associated with these disruptions. Demographic and socioeconomic factors including sex, education, marital status, and family income appear also 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 in 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 following a disaster. This should include resources for alternative childcare options, supports and supplies needed for children to successfully attend school remotely as well as accessible and quality mental health services. Further study is indicated to see whether this disruption in mental health persists when conditions improve.

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Table 1. Survey data used in analysis

Domain	Variable	Question Text	Response Options
Outcome	Feeling nervous or stressed[a]	How often, if ever, have you felt nervous or stressed since the Coronavirus (COVID-19) outbreak occurred (i.e., since early-March 2020)? *Sometimes, most of the time, always)*[f]	a. Never b. Rarely c. Sometimes d. Most of the time e. Always
Primary Exposure variable	# of Covid-related childcare disruptions[b]	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.	a. School closed b. Unable to receive IEP (individualized education program) services c. Child or daycare closed d. Sports or other after-school activities cancelled e. Summer camp or summer programs cancelled f. Play dates or getting together with peers cancelled g. Unable to receive free or reduced cost meals at school h. Medical or dental appointment cancelled (e.g., well-child visits, follow-up visits) i. Vaccinations postponed j. Unable to go outside to play or exercise k. Other (fill in) l. l. No disruptions
Covariates	Current employment status	Which, if any, of the following options best describes your current employment status?	a. Working full time b. Working part time c. Temporarily unemployed (i.e. between jobs) d. Retired e. Permanently disabled f. Taking care of home or family g. Student h. Unemployed i. Other
	Household financial situation	Which ONE of the following statements best describes your household's financial situation?	a. It has been positively impacted b. It has stayed the same c. It has been negatively impacted d. Don't know
	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.	a. Strongly agree b. Somewhat agree c. Neither agree nor disagree d. Somewhat disagree e. Strongly disagree f. N/A
	# of recommended stress relievers used	Which, if any, of the following activities have you done in order to deal with stress within the last month?[f]	a. Yoga b. Meditation c. Prayer d. Exercise e. f. Reading
	Parent ACEs[c,d,e]	Which, if any, of the following did you experience prior to your 18th birthday? Please select all that apply.	a. I lived with someone who was depressed, mentally ill or attempted suicide b. I lived with someone who had a problem with drinking or using drugs, including prescription drugs c. I lived with someone who served time or was sentenced to serve time in a prison, jail, or other correctional facility d. My parents or guardians separated or divorced e. My parents or adults in my home slapped, hit, kicked, punched or beat each other up

	f. I was hit, beat, kicked, or physically hurt by a parent or an adult in my home g. I was sworn at, insulted, or put down by a parent or an adult in my home 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 i. I didn't have enough to eat, had to wear dirty clothes, or had no one to protect or take care of me j. I felt that no one in my family loved me or thought I was special k. None of these l. l. Prefer not to say

[a]Question text adapted from https://www.healthmeasures.net/explore-measurement-systems/promis/intro-to-promis/list-of-adult-measures[20]
[b]Question text adapted from the Parenting in Context Research Lab[27]
[c]Question text adapted from the Violence Against Children Survey (VACS)[23]
[d]Question text adapted from National Survey of Children's Health (NSCH)[25]
[e]Question text adapted from Pediatric Early Adversity and Related Life Events Screen (PEARLS) https://www.acesaware.org/learn-about-screening/screening-tools/
[f]Responses considered positive.

Table 2. Characteristics of participants with complete data in the Measuring the Impact of Violence Against Children and Women During a Pandemic survey, 2020 and 2021 (N=4659)

Variable	Category	Mean/Total Number (SD/%[a])
Age (years)		41.87[b] (SD ± 10.94)[c]
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-year college graduate	626 (12.77)
	4-year college graduate	1053 (20.28)
	Post-graduate	713 (12.53)
Current employment status	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)
	Other	454 (10.09)
Financial income	Less than $20,000/year	669 (17.18)
	$20,000 - $49,999/year	1122 (25.10)
	$50,000 - $99,999/year	1513 (31.84)
	$100,000 or more/year	1355 (25.88)
Post-Covid change in financial situation	Positively impacted	832 (17.85)
	Stayed the same	2130 (45.77)
	Negatively impacted	1697 (36.38)
Residence	Big city	1157 (24.91)
	Smaller city	790 (18.06)
	Suburban area	1482 (31.48)
	Small town	585 (11.79)
	Rural area	645 (13.76)
Number of ACEs[d]		1.75[b] (SD ± 2.15)[c]
Number of children <18 years		1.83[b] (SD ± 1.05)[c]
Number Covid-related childcare disruptions		2.65[b] (SD ± 1.83)[c]
Helping my child(ren) with their education has been very stressful	Disagree	1595 (33.57)
	Neutral	811 (18.85)
	Agree	2253 (47.58)

[a]Percentages incorporate survey weights
[b]Mean
[c]SD=standard deviation

[d]ACEs=Adverse childhood experiences, score ranged from 0 – 10.

Table 3: Bivariate associations with feeling nervous or stressed since the COVID pandemic among survey participants with complete data (N = 4659)

	Felt nervous/stressed since Covid	Did not feel nervous/stressed since Covid	
	Mean (standard deviation)	Mean (standard deviation)	p-value
COVID child disruptions	2.74 ± 1.82	1.90 ± 1.63	<.0001*
Number of children under the age of 18	1.86 ± 1.07	1.82 ± 1.06	0.2619*
Experiences of childhood abuse	1.88 ± 2.20	1.17 ± 1.73	<.0001*
Recommended stress relieving activities	2.04 ± 1.41	1.61 ± 1.47	<.0001*
Age, years	41.46 ± 10.80	41.46 ± 12.78	0.9979*
	No. (%)	*No. (%)*	
Current employment status	-	-	<.0001**
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	-	-	<.0001**
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	-	-	<.0001**
Disagree	1102 (30.93)	493 (40.83)	-
Neutral	600 (18.64)	211 (19.42)	-
Agree	1777 (50.44)	476 (39.75)	-
Sex	-	-	<.0001**
Male	1468 (43.64)	682 (60.32)	-
Female	2011 (56.36)	498 (39.68)	-
Race	-	-	0.8145**
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**
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-year	469 (12.75)	157 (12.80)	-

4-year	772 (20.23)	281 (20.43)	-
Post-grad	559 (13.55)	154 (9.73)	-
Marital Status	-	-	<.0001**
Married	2567 (71.26)	957 (79.99)	-
Single	912 (28.74)	223 (20.01)	-
Family income	-	-	<.0001**
Less than $20,000	548 (18.85)	121 (12.60)	-
$20,000 - 49,999	865 (25.72)	257 (23.40)	-
$50,000 - $99,999	1104 (31.25)	409 (33.46)	-
$100,000 or more	962 (24.18)	393 (30.54)	-
Residence	-	-	0.6603**
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**
Wave 1	1810 (51.76)	544 (45.28)	
Wave 2	1669 (48.24)	636 (54.72)	

Means, standard deviations, and percentages incorporate survey weights
* P-value obtained from a t-test assuming equal variance
** P-value obtained from Rao-Scott Chi-Square Test

Table 4: Multivariable model for feeling nervous or stressed since the COVID pandemic (N = 4659)[a]

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*-value	*Odds Ratio* (95% CI)	*p*-value
COVID child disruptions	1.32 (1.25 - 1.39)	<.0001	1.20 (1.14 - 1.27)	<.0001
Experiences of childhood abuse	-	-	1.12 (1.07 - 1.18)	<.0001
Recommended stress relieving activities	-	-	1.13 (1.05 - 1.21)	0.0012
Since COVID - Household's financial situation	-	-	-	<.0001
It has been positively impacted	-	-	0.61 (0.49 - 0.77)	<.0001
It has stayed the same	-	-	Reference	-
It has been negatively impacted	-	-	3.05 (2.38 - 3.90)	<.0001
Helping my child(ren) with their education, including remote schoolwork, has been very stressful, and/or has resulted in increased tension at home	-	-	-	<.0001
Disagree	-	-	0.65 (0.50 - 0.85)	0.0017
Neutral	-	-	Reference	-
Agree	-	-	1.14 (0.87 - 1.49)	0.3362
Sex	-	-	-	<.0001
Male	-	-	Reference	-
Female	-	-	1.60 (1.32 - 1.93)	<.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-year			1.10 (0.82 - 1.47)	0.5182
4-year	-	-	1.32 (1.01 - 1.73)	0.0459
Post-grad	-	-	1.93 (1.40 - 2.67)	<.0001
Number of children under the age of 18	-	-	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 - 49,999	-	-	0.81 (0.56 - 1.16)	0.2487
	$50,000 - $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
	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

[a]1341 observations were deleted due to missing values for the response or explanatory variables.

Supplemental Table S1: Multivariable model for feeling nervous or stressed since the COVID pandemic, with multiple imputation (N = 6000)

Dependent: Felt nervous or stressed since COVID vs. Did not feel nervous or stressed since COVID	Unadjusted model *Odds Ratio* (95% CI)	*p*-value	Adjusted model *Odds Ratio* (95% CI)	*p*-value
COVID child disruptions	1.29 (1.23 – 1.34)	<.0001	1.19 (1.13 - 1.25)	<.0001
Experiences of childhood abuse	-	-	1.10 (1.06 - 1.15)	<.0001
Recommended stress relieving activities	-	-	1.16 (1.09 - 1.23)	<.0001
Since COVID - Household's financial situation	-	-	-	<.0001
It has been positively impacted	-	-	0.65 (0.53 - 0.80)	<.0001
It has stayed the same	-	-	Reference	-
It has been negatively impacted	-	-	2.78 (2.22 - 3.47)	<.0001
Helping my child(ren) with their education, including remote schoolwork, has been very stressful, and/or has resulted in increased tension at home	-	-	-	<.0001
Disagree	-	-	0.65 (0.51 - 0.84)	0.0010
Neutral	-	-	Reference	-
Agree	-	-	1.13 (0.88 - 1.46)	0.3314
Sex	-	-	-	<.0001
Male	-	-	Reference	-
Female	-	-	1.77 (1.50 – 2.10)	<.0001
Education	-	-	-	0.0007
No HS	-	-	0.98 (0.64 - 1.51)	0.9301
High school graduate	-	-	Reference	-
Some college	-	-	1.09 (0.87 - 1.37)	0.4519
2-year			1.07 (0.83 - 1.38)	0.5878
4-year	-	-	1.23 (0.97 - 1.56)	0.0931
Post-grad	-	-	1.83 (1.38 - 2.44)	<.0001
Number of children under the age of 18	-	-	0.94 (0.86 - 1.02)	0.1362
Age	-	-	0.99 (0.99 - 1.00)	0.1491
Current employment status	-	-	-	0.0670
Full-time	-	-	Reference	-
Part-time	-	-	0.86 (0.65 - 1.14)	0.2902
Temporarily unemployed	-	-	1.34 (0.80 – 2.22)	0.2665

	Taking care of home or family	-	-	1.10 (0.86 - 1.41)	0.4595
	Unemployed	-	-	1.37 (0.92 – 2.02)	0.1175
	Other	-	-	1.41 (1.02 – 1.96)	0.0390
Race		-	-	-	0.5273
	White	-	-	Reference	-
	Black	-	-	0.89 (0.70 - 1.14)	0.3542
	Hispanic	-	-	0.95 (0.74 - 1.22)	0.6855
	Other	-	-	0.87 (0.70 - 1.08)	0.1981
Marital Status		-	-	-	0.0743
	Married	-	-	Reference	-
	Single	-	-	1.22 (0.98 - 1.52)	0.0743
Family income		-	-	-	0.0172
	Less than $20,000	-	-	Reference	-
	$20,000 - 49,999	-	-	0.83 (0.61 - 1.15)	0.2612
	$50,000 - $99,999	-	-	0.78 (0.57 - 1.07)	0.1169
	$100,000 or more	-	-	0.61 (0.43 - 0.86)	0.0051
Residence		-	-	-	0.3765
	Big city	-	-	Reference	-
	Smaller city	-	-	1.07 (0.82 - 1.40)	0.6362
	Suburban area	-	-	1.06 (0.85 - 1.32)	0.6217
	Small town	-	-	0.83 (0.63 - 1.08)	0.1674
	Rural area	-	-	1.01 (0.77 - 1.33)	0.9528
Wave		-	-	-	0.0267
	Wave 1	-	-	Reference	-
	Wave 2	-	-	0.83 (0.71 - 0.98)	0.0267

Supplemental Table S2: Difference in descriptive statistics between the missing data and included data

	Mean (standard deviation)	Mean (standard deviation)	p-value
COVID child disruptions	1.58 ± 1.7	2.65 ± 1.83	<.0001
Number of children under the age of 18	1.63 ± 1.05	1.83 ± 1.05	<.0001
Experiences of childhood abuse	1.39 ± 2.03	1.75 ± 2.15	<.0001
Recommended stress relieving activities	1.76 ± 1.47	2.04 ± 1.45	<.0001
Age, years	38.07 ± 10.74	41.87 ± 10.94	<.0001
	%[a] (95% CI)	%[a] (95% CI)	
Whether or not felt nervous or stressed since COVID			0.8631
No	27.04 (23.85, 30.24)	26.73 (25.09, 28.36)	
Yes	72.96 (69.76, 76.15)	73.27 (71.64, 74.91)	
Current employment status			<.0001
Full-time	42.53 (39.1, 45.97)	50.61 (48.84, 52.39)	
Part-time	12.29 (9.84, 14.73)	13.66 (12.35, 14.97)	
Temporarily unemployed	2.70 (1.67, 3.74)	3.74 (3.03, 4.46)	
Taking care of home or family	21.85 (19.17, 24.54)	14.18 (13, 15.36)	
Unemployed	12.8 (10.37, 15.23)	7.71 (6.67, 8.75)	
Other	7.83 (5.91, 9.74)	10.09 (8.97, 11.21)	
Since COVID - Household's financial situation			0.0536
It has been positively impacted	14.29 (12.11, 16.47)	17.85 (16.5, 19.2)	
It has stayed the same	48.16 (44.58, 51.73)	45.77 (44, 47.54)	
It has been negatively impacted	37.56 (33.98, 41.14)	36.38 (34.68, 38.09)	
Helping my child(ren) with their education, including remote schoolwork,			<.0001

has been very stressful, and/or has resulted in increased tension at home			
Disagree	28.91 (24.06, 33.77)	33.57 (31.92, 35.23)	
Neutral	30.5 (24.86, 36.15)	18.85 (17.37, 20.32)	
Agree	40.58 (34.89, 46.28)	47.58 (45.81, 49.35)	
Gender			<.0001
Male	37 (33.47, 40.54)	48.1 (46.31, 49.89)	
Female	63 (59.46, 66.53)	51.9 (50.11, 53.69)	
Race			0.0006
White	48.97 (45.56, 52.38)	56.89 (55.04, 58.75)	
Black	12.65 (10.67, 14.63)	11.41 (10.36, 12.45)	
Hispanic	27.27 (23.31, 31.24)	21.82 (19.85, 23.79)	
Other	11.11 (9.46, 12.77)	9.88 (8.97, 10.79)	
Education			<.0001
No HS	12.47 (9.26, 15.67)	6.75 (5.45, 8.06)	
High school graduate	33.66 (30.18, 37.13)	29.27 (27.45, 31.1)	
Some college	15.21 (13.23, 17.19)	18.4 (17.2, 19.59)	
2-year	10 (8.42, 11.59)	12.77 (11.75, 13.79)	
4-year	17.13 (15.07, 19.18)	20.28 (19.07, 21.49)	
Post-grad	11.54 (9.79, 13.29)	12.53 (11.57, 13.49)	
Marital Status			0.3580
married	71.97 (68.87, 75.07)	73.6 (71.96, 75.24)	
single	28.03 (24.93, 31.13)	26.4 (24.76, 28.04)	
Family income			<.0001
Less than $20,000	21.63 (18.17, 25.09)	17.18 (15.61, 18.75)	
$20,000 - 49,999	33.68 (29.52, 37.84)	25.1 (23.52, 26.67)	
$50,000 - $99,999	26.9 (23.55, 30.26)	31.84 (30.23, 33.45)	
$100,000 or more	17.78 (15.29, 20.28)	25.88 (24.47, 27.3)	
Residence			0.0240
Big city	22.36 (19.1, 25.62)	24.91 (23.34, 26.47)	
Smaller city	18.91 (16.27, 21.55)	18.06 (16.62, 19.49)	
Suburban area	29.84 (26.97, 32.71)	31.48 (29.86, 33.1)	
Small town	15.93 (13.33, 18.52)	11.79 (10.77, 12.82)	
Rural area	12.97 (10.7, 15.23)	13.76 (12.5, 15.02)	

[a] percentage adjusted for weight