

Parental mental health and child anxiety during the COVID-19 pandemic in Latin America

Anis Ben Brik¹ | Natalie Williams² | Rosario Esteinou³ |
Iván Darío Moreno Acero⁴ | Belén Mesurado⁵ |
Patricia Debeliuh⁶ | Jose Eduardo Storopoli⁷ |
Olivia Nuñez Orellana⁸ | Spencer L. James⁹

¹College of Public Policy, Hamad Bin, Khalifa University, Doha, Qatar

²College of Education and Human Sciences, University of Nebraska–Lincoln, Lincoln, Nebraska, USA

³Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS), Mexico City, Mexico

⁴Universidad de La Sabana, Chia, Colombia

⁵Instituto de Filosofía, Universidad Austral, Buenos Aires, Argentina

⁶IAE Business School, Universidad Austral, Buenos Aires, Argentina

⁷Universidade Nove de Julho, São Paulo, Brazil

⁸Observatorio Regional de América Latina y el Caribe, Mexico City, Mexico

⁹School of Family Life, Brigham Young University, Provo, Utah, USA

Correspondence

Anis Ben Brik, Education City, College of Public Policy, Hamad Bin Khalifa University, Ar-Rayyan, Qatar.
Email: abrik@hbku.edu.qa

Abstract

This study examined parents' ($N = 10,141$, 64% women) reports of their and their children's depression, anxiety, and stress in Brazil, Mexico, Colombia and Argentina. The data come from the COVID-19 Family Life Study (Ben Brik, 2020) and cohort recruited between April and December 2020. Participants completed online surveys that included the DASS-21 and the Revised Children's Manifest Anxiety Scale. Our findings indicate that socio-economically disadvantaged families fared worse in mental health during the early phases of the COVID-19 pandemic compared with families with more social and economic resources. Mothers reported higher anxiety, depression, and stress compared with fathers. Parents of adolescents and adolescents fared worse than did families with younger children. Parental physical activity was associated with better parent and child mental health of anxiety symptoms. We discuss the need to address the adverse impacts of the COVID-19 pandemic on mental health in families in Latin America via coordinated mental health and psychosocial support services that are inte-

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2022 The Authors. *Journal of Social Issues* published by Wiley Periodicals LLC on behalf of Society for the Psychological Study of Social Issues.

grated into the pandemic response currently and after the pandemic subsides.

INTRODUCTION

The COVID-19 pandemic has created extraordinary challenges for individuals, families, and communities around the world. In the early stages of the pandemic, scientific and public health efforts focused primarily on understanding the biological aspects of the virus to inform containment strategies, treatment approaches, and vaccine development (ElHawary et al., 2020). As the pandemic progressed, however, research and clinical efforts increasingly called attention to the direct and indirect mental health sequelae of this disease (Choi et al., 2020; Golberstein et al., 2020; Holmes et al., 2020). Emerging evidence suggests that COVID-19 infection may have a direct effect on mental health via the impact of the virus on brain and neurological function (Kumar et al., 2020; Paterson et al., 2020), with both acute psychological disturbances (Taquet et al., 2021; Varatharaj et al., 2020) and enduring mental health concerns (Liu et al., 2021; Moradi et al., 2020) reported in COVID-19 patients. However, the mental health risks of COVID-19 are not limited only to individuals who have been infected by the virus. Factors unique to this pandemic such as high levels of uncertainty, rapidly changing and conflicting messages, the prolonged duration of the crisis, economic disruption and financial strain, and measures such as social distancing and quarantine that reduce virus transmission but increase social isolation and loneliness, are pervasive and pose a serious risk to mental health (Brooks et al., 2020; Pedrosa et al., 2020).

Children and youth represent a uniquely vulnerable group for pandemic-related mental health concerns (Fegert et al., 2020). Epidemiological data reveal a high and increasing prevalence of mental health issues in childhood and adolescence globally (Perou et al., 2022; Polanczyk et al., 2015). This is concerning given evidence that the COVID-19 pandemic exacerbates pre-existing mental health conditions (Gobbi et al., 2020; Vindegaard & Benros, 2020). Moreover, children with a higher baseline risk for mental health difficulties (e.g., those from under-resourced communities) may be especially vulnerable to adverse psychological effects during the pandemic. For these children and their families, interruptions in critical support and service systems, including child care, schools, physical and mental healthcare services, and community-based supports, pose a serious threat to psychological well-being (Haleemunnissa et al., 2021; Patrick et al., 2020).

Appropriate support from sensitive and caring adults and supportive peers is a protective factor against heightened stress and anxiety in children and youth experiencing adversity (Labella et al., 2017; Marsac et al., 2011; Pfefferbaum et al., 2016). Unfortunately, the COVID-19 pandemic has created new challenges and exacerbated pre-existing ones that diminish the availability of support from both caregiver and peers. For example, many parents are struggling to balance taking care of their elderly parents while maintaining employment and attending to the physical, emotional, and academic needs of their children (Marchetti et al., 2020; Spinelli et al., 2020). This increased caregiving burden is experienced in the context of parents' own negative emotional reactions to the pandemic, economic strain, and relationship stress, with greatly reduced access to social support networks that in normal circumstances support coping and resilience (Feeney & Collins, 2015). The confluence of these factors heightens parenting stress and increase the risk for parental burnout (Davidson et al., 2020). Parental stress/burnout and other mental health concerns, such as depression and anxiety, are detrimental to children's well-being because they contribute to low-quality parenting during the pandemic (Roos et al., 2020). This is problematic because high-quality parenting, marked by parental awareness of children's needs and the use of sensitive and responsive caregiving strategies, underlies optimal child development (Griffith, 2020; Maggi et al., 2010; World Health Organization and Department of Child and Adolescent Health and Development, 1999).

Opportunities for children and youth to obtain support outside the home have also been curtailed during the pandemic due to widespread implementation of restrictive measures necessary to slow transmission of COVID-19 (Viner et al., 2020). Especially for younger children who are less able to maintain meaningful connections with their friends using social media platforms, home confinement and the closure of schools and public places deprived children of opportunities to interact with peers and other supportive adults (Iqbal & Tayyab, 2020). Inadequate social connection and loneliness are well-established risk factors for poorer mental health outcomes in pediatric populations (Rubin & Mills, 1988) and there is evidence from previous epidemics that children who experienced isolation measures were five times as likely to seek mental health services and were more inclined to experience PTSD than children who did not experience isolation (Loades et al., 2020).

Growing evidence from around the world suggests that concerns about potential for adverse mental health impacts of the pandemic on children and youth are well-founded (Marques de Miranda et al., 2020; Racine, Cooke, et al., 2020). Illustratively, an early study conducted in China documented a range of emotional and behavior concerns, with clinging, inattention, and irritability observed as the most severe psychological conditions demonstrated by the children in all age groups (Jiao et al., 2020). In a recent U.S.-based study, more than one-third (34.7%) of parents said their child's behavior had changed since the pandemic, including being more sad, depressed, and lonely (Lee et al., 2021). In a survey of parents in India about their children's behaviors during lockdown, 73.2% reported increased irritation, 51.3% reported increased anger, 18.7% reported symptoms of depression, and 17.6% reported symptoms of anxiety (Sama et al., 2020). Similarly concerning findings have been reported in European countries (Cowie & Myers, 2020; Francisco et al., 2020; Rajabi, 2020). For example, in a survey of parents in Italy and Spain, 85.7% perceived changes in their children's emotional state and behaviors during the quarantine (Orgilés et al., 2020). The most frequently reported symptoms were difficulty concentrating (76.6%), boredom (52%), irritability (39%), restlessness (38.8%), nervousness (38%), feelings of loneliness (31.3%), uneasiness (30.4%), and worries (30.1%).

The deterioration of children's mental health appears to be occurring concurrently with declines in parents' mental well-being. In a nationwide survey conducted in the United States, nearly 1 in 10 parents reported worsening of mental health for themselves as well as their children (Patrick et al., 2020). In another U.S.-based study, 40.0% of parents met criteria for major depression or severe major depression and 39.9% met criteria for moderate or severe anxiety (Lee et al., 2021). In this study, higher parenting stress and moderate-to-severe parental anxiety were both associated with higher child anxiety scores. Moreover, there is evidence that higher child internalizing behavior, externalizing behavior, and peer difficulties all contribute to increased caregiver experience of mental health symptoms (Davidson et al., 2020). Consistent with the transactional model of development which posits that child's internalizing and externalizing problems can be attributed to the reciprocal associations between the child's and his or her parent's psychological symptoms (Sameroff, 2009), pandemic stress, caregiver mental health, and child mental health likely influence one another over time. Thus, parents' mental health is an important factor in child well-being during the pandemic, and vice versa.

Research gaps

Recent studies (Llibre-Guerra et al., 2020; Poudel & Subedi, 2020) and a scoping review of lower-middle-income countries (LMICs) in Africa and Asia highlight enormous mental health

challenges for individuals living in countries with fragile health systems and low socioeconomic status (Kar et al., 2020). Two studies in particular highlight the need to better understand the mental health impacts of the pandemic on Latin American families. First, Olff and colleagues (2021) conducted a survey of mental health symptoms in their *Global Psychotrauma Screen – Cross-Cultural responses to COVID-19 study (GPS-CCC)*. Overall, they found that globally the COVID-19 pandemic was associated with a wide range of mental health symptoms but that individuals living in countries with higher rates of infections were more vulnerable to mental health sequelae. Moreover, they found region-specific differences in mental health responses to the pandemic such that more mental health symptoms were reported in Latin America for COVID-19 related events versus other stressful events, whereas the opposite relation was found in North America. Second, a recent meta-analysis of mental health impacts across six regions and four countries showed that Latin America ranked third in terms of worse mental health symptoms, behind only African and South Asia (Zhang & Chen, 2021). These findings are consistent with both theory (e.g., social vulnerability, social determinants of health) and empirical evidence showing that individuals with pre-existing social and economic inequities bear a disproportionate burden of adverse outcomes in the context of disaster or traumatic events (Rocha et al., 2021; Thomas et al., 2020).

Despite accumulating evidence on the impact of the pandemic on child and adolescent mental health, a recent review revealed that children make up approximately 8% of research being conducted on the mental health impacts of COVID-19, despite accounting for 25% of the world's population (Racine, Korczak, et al., 2020). Moreover, the preponderance of published studies reporting adverse mental health impacts of the COVID-19 pandemic on children has come from economically developed countries or industrialized nations (Gul et al., 2020). Studies documenting mental health impacts in LMICs are comparatively fewer in number, and most available evidence is not specific to the experiences of children and youth. At the time of this writing, we identified only one study describing mental health impacts for children or adolescents residing in Latin America. In this research, the prevalence of anxiety in Brazilian children ages 6–12 years was 19.4% (Garcia de Avila et al., 2020), mirroring concerns of elevated internalizing symptoms in children reported in other countries (Racine, Cooke, et al., 2020).

Present study

COVID-19 in Latin America has been called a “humanitarian crisis” that requires focused attention from the global health community to support a sustainable recovery that benefits all citizens, including those affected by existing inequalities in income, education, and health care (Lancet, 2020). The overarching objective of the current study was to generate much needed data to inform these efforts by documenting the presence of mental health concerns among children and their parents residing in Brazil, Colombia, Argentina, and Mexico. These four Latin American countries have had the highest numbers of cumulative confirmed COVID-19 cases in Latin America as well as some of the highest mortality rates in the world (Dong et al., 2020). As of January 8, 2021, the World Health Organization reported the following: 7,873,830 confirmed cases and 198,974 deaths in Brazil; 1,719,771 confirmed cases and 44,723 deaths in Colombia; 1,676,171 confirmed cases and 43,976 deaths in Argentina; and 1,479,835 confirmed cases and 129,987 deaths in Mexico (ranking 1st in the world for observed case fatality) (World Health Organization Coronavirus Disease [COVID-19] Dashboard, 2021).

The research questions in this investigation were guided by a social determinants theoretical framework that focuses on understanding how the circumstances in which people live shape their

mental health and risk for mental illness (Alegria et al., 2018). This framework posits that under-resourced populations are most affected by poor mental health and psychological disorders, and that cumulative stress and physical health are important processes through which the adverse impacts of social determinants intensify across development (Allen et al., 2014). The construct of social determinants in relation to individuals' mental health encompasses a wide range of factors, including societal influences such as economic opportunities, individual characteristics such as age and gender, and malleable factors such as educational attainment, financial strain, living conditions, and health behaviors (Braveman et al., 2011). The social determinants of mental health model has particular relevance for understanding mental health responses in disaster contexts. Extant research in this area demonstrates that individuals with economic and social vulnerabilities (e.g., low socioeconomic status, unreliable employment, inadequate social support) fare worse both during and in the aftermath of disasters while those with protective social determinants demonstrate resiliency (Mao & Agyapong, 2021).

The overarching objective of the present study was to investigate mental health among families living in Latin America during the Covid-19 pandemic through the lens of a social determinants of mental health model. Our specific focus was on identifying proximal, or "downstream," social determinants associated with family members' psychological well-being in the context of the Covid-19 disaster (Braveman et al., 2011). Consistent with this model and prior research, we conceptualized downstream factors to include both individual characteristics (e.g., parent educational attainment, parent marital status, parent gender, child age, healthy lifestyle habits) as well as the home environment (e.g., family income, size of the home, presence of extended family) (Cutter et al., 2003). Research suggests that the mental health conditions most susceptible to negative social determinants include anxiety, mood, and disorders related to trauma and stress (Whiteford et al., 2016). Thus, in the current study, the specific outcomes we examined were parents' stress, symptoms of anxiety and depression, and parent-reported child anxiety.

In general, we hypothesized that indices of social and economic risks would be associated with worse mental health outcomes, but protective social determinants would be associated with better mental health outcomes. For example, we anticipated that lower family income would be associated with higher stress, anxiety, and depression scores, whereas more physical activity would be associated with have lower stress, anxiety, and depression scores. Given evidence of gender-specific stress vulnerability (Boettcher et al., 2021; Mao & Agyapong, 2021) and recent studies suggesting that mothers have been especially impacted by pandemic-related challenges (Davenport et al., 2020; Martucci, 2021), we specifically hypothesized that mothers would fare worse than fathers with respect to stress, anxiety, and depression. In addition, consistent with the social determinants model suggesting that the cumulative effects of social risks increase across the lifespan, we hypothesized that there would be stronger relationships between social determinants and anxiety for adolescents compared with younger children.

METHOD

Participants

The data for this study come from the COVID-19 Family Life Study (Ben Brik, 2020), which sought to explore the effects of the coronavirus pandemic on family life across cultures by collecting pertinent data that can inform social support services design and delivery for parents and families, assess parental mental health risks and vulnerabilities, document people's experiences during the

pandemic, and understand health, social, and psychological needs of families in times of crisis. In all, data collection occurred in 72 countries from every inhabited continent, representing more than 75% of the world's population. We report data from Brazil ($n = 2762$), Mexico ($n = 4674$), Colombia ($n = 1758$), and Argentina ($n = 1037$). Inclusion criteria were parent or guardian of a child younger than 18 years old, and citizens of Mexico, Brazil, Argentina and Colombia.

Table 1 displays the descriptive statistics of the sample. On average, across the four countries, slightly fewer than half of participants were parents between 30 and 44 years old, more than half were women, and most had educational qualifications. A little more than half were married and employed, and about two-thirds lived in a home with two to three rooms. Most participants were parents of two to three children and reported being in fairly good health.

Procedure

Participants were recruited via a convenience sampling procedure. In April/December 2020 participants were sent an invitation to participate in a self-administered survey in Mexico, Brazil, Argentina and Colombia. The survey was distributed via different channels such as social media (e.g., Twitter, Facebook, Instagram); and emails using databases of the Center for Research and Higher Studies in Social Anthropology (CIESAS) in Mexico; University of La Sabana in Columbia; University of Austral and the Association for the Promotion of Educational and Social Sports (APDES) in Argentina; and Nove de Julho University in Brazil. Participants completed the questionnaires through an online survey platform (SurveyMonkey). Data were collected for approximately 4–5 weeks in each country.

Measures

We analyzed measures of perceived parental depression, anxiety, and stress and child anxiety as outcome variables. Perceived parental depression, anxiety, and stress were assessed using the validated Spanish version (Antúnez & Vinet, 2012; Daza et al., 2002) of the Depression, Anxiety, and Stress Scale–21 (DASS-21, Norton, 2007) in Mexico, Argentina, and Colombia and a validated Brazilian Portuguese version of the DASS-21 (Vignola & Tucci, 2014) in Brazil. The DASS-21 is a widely used instrument for assessing depression, anxiety, and stress symptoms worldwide (Scholten et al., 2017) and is a condensed version of the DASS-42 (Lovibond & Lovibond, 1995), which has been translated into 45 languages to date. The DASS-21 has been validated in clinical samples (Antony et al., 1998; Clara et al., 2001; Lovibond & Lovibond, 1995; Sinclair et al., 2011).

The depression subscale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. The anxiety subscale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress subscale is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive, and impatient. Following Norton (2007), we employed the full 21-item, with a response scale of 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time), instead of breaking the scale into its constituent parts. Example items included, “*I found it hard to wind down,*” “*I felt depressed and had no motivation,*” and “*I felt I had no desire for anything.*” Responses were summed across items to create an additive score. Scores for Depression, Anxiety and Stress are calculated by summing the scores for the relevant items per scale; then, the DASS-21 subscale total was multiplied

TABLE 1 Descriptive statistics (N = 10,141)

Baseline characteristic	Full sample	
	n	%
<i>Parents age</i>		
<29	750	7.4
30–44	5507	54.3
45–64	2190	21.6
+65	1694	16.7
<i>Gender</i>		
Female	6490	64
Male	3651	36
<i>Income</i>		
<99	1567	15.45
100–249	2160	21.30
250–499	2180	21.50
500–999	3357	33.11
+1000	877	8.64
<i>Educational attainment</i>		
No qualifications	1339	13.2
General Education Development Certificate or equivalent (School till aged 16)	1795	17.7
High School Diploma or equivalent (school till aged 18)	2495	24.6
University degree or more	4513	44.5
<i>Marital status</i>		
Divorced	2099	20.7
Married/Cohabiting	5314	52.4
Never Married	974	9.6
Widowed	1754	17.3
<i>Labor Force Participation</i>		
Not Employed, Not in Labor Force	3894	38.4
Self-Employed	821	8.1
Employed	5425	53.5
<i>Living arrangement: No. of rooms in household</i>		
1	2089	20.6
2–3	7514	74.1
4+	537	5.3
<i>Family size: No. of adults in household</i>		
1	3975	39.2
2–4	4269	42.1
5+	1896	18.7

(Continues)

TABLE 1 (Continued)

Baseline characteristic	Full sample	
	<i>n</i>	%
<i># Children in HH</i>		
1	2525	24.9
2–3	6926	68.3
4+	690	6.8
<i>Age of children in HH</i>		
# Young Children in HH (0/6)	2859	28.2
# School Children in HH (7/11)	4198	41.4
# Adolescents in HH (12/18)	3084	30.4
<i>Parental smoke habits</i>		
Non-Smoker	3397	33.5
Ex-Smoker	2657	26.2
Current Smoker	4087	40.3
<i># days of physical activities/week</i>		
0	5588	55.1
1–3	2373	23.4
4–5	1592	15.7
6–7	588	5.8
<i>Parental health status</i>		
Unknown health conditions	5354	52.80
COVID 19	2312	22.80
Severe chronic health conditions(e.g., heart disease, lung disease, cancer, diabetes, high blood pressure)	2150	21.2
Clinically diagnosed depression/anxiety	4	.04
Clinically diagnosed chronic physical health condition	5	.05
Pregnancy	315	3.11

by two to give the final score for categorization into: normal (0–9 for depression, 0–7 for anxiety, and 0–14 for stress), mild/moderate (10–20 for depression, 8–14 for anxiety, and 15–25 for stress), severe/extremely severe (21+ for depression, 15+ for anxiety, and 26+ for stress (Lovibond & Lovibond, 1995).

Scores on the Spanish version of DASS-21 for the present sample had Cronbach alphas of .95, .88, and .90 for the depression, anxiety and stress subscales, respectively. Scores on the Brazilian-version of the DASS-21 had alphas of .94, .85, and .92 for the depression, anxiety and stress subscales, respectively. These findings are comparable with previous research on the original English-version of the DASS-21. Specifically, alphas of .94, .87, and .91 have been reported for depression, anxiety, and stress scores, respectively (Antony et al., 1998).

The Child Anxiety Scale (CAS) is a parent-report measure of child anxiety originally developed based on the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978). We used the validated Spanish and the Brazilian Portuguese versions of the RCMAS (Ferrando, 1994; Gorayeb & Gorayeb, 2008). The CAS consists of 11 items with a response scale of 1 (*Strongly*

disagree) to 5 (*Strongly agree*), which assess specific anxiety symptoms relating to six sub-scales, including health-related anxiety (e.g., My child is worried that he catch the virus and My child is worried that he might transmit the infection to someone else), playing and extra-curriculum anxiety (e.g., My child is worried about missing sports and other activities and My child is worried about missing leisure activities), family and friends anxiety (e.g., My child is worried that friends and family will catch the virus and My child is worried about missing their friends), and school anxiety (e.g., My child is worried about missing school and My child is worried about missing school exams).

Scores on the Spanish and the Brazilian versions of the CAS had acceptable Cronbach's alpha values ranging from .89 to .94. These findings are consistent with previous research on the original English and previous Spanish and Brazilian versions (Ferrando, 1994; Gorayeb & Gorayeb, 2008; Reynolds & Richmond, 2000; Varela et al., 2008).

We examined a battery of predictor variables in our models that constituted explanations for whom the pandemic might affect to a greater or lesser degree. These variables included the respondent's biological sex (0 = *male*, 1 = *female*), respondent's age (range 18–86 years), level of educational attainment (0 = *no qualifications*; 1 = *general education development certificate or equivalent*; 2 = *high school diploma or equivalent*); and 3 = *university degree or more*), logged household income (converted to constant 2020 U.S. dollars), marital status (0 = *divorced*, 1 = *married/cohabiting*, 2 = *never married*, and 3 = *widowed*), labor force participation (0 = *not employed, not in labor force*; 1 = *self-employed*; 2 = *employed, in labor force*), the number of rooms in the child's home (0 = 1 room, 1 = 2–3 rooms, and 2 = 4 or more rooms), the number of adults in the child's household (0 = 1 adult, 1 = 2–4 adults, and 2 = 5 or more adults), the number of children in the household (0 = 1, 1 = 2–3, and 3 = 4 or more), smoking habits, whether the respondent was a non, ex, or current smoker, parental physical activity routine, the number of days per week of physical activities (0 = *no physical activities*, 1 = 1–3 days/week, 2 = 4–5 days/week, and 3 = 6–7 days/week), and parental health status (0 = *no health conditions*, 1 = *COVID-19*, 2 = *High blood pressure*, 3 = *Diabetes*, 4 = *Heart disease*, 5 = *Lung disease (e.g., asthma)*, 6 = *Cancer*, 7 = *Clinically diagnosed depression/anxiety*, 8 = *Clinically diagnosed chronic physical health condition*, 10 = *Other clinically diagnosed chronic mental health condition*, 11 = *Autism*, and 12 = *Pregnancy*). Additionally, we explored how the child's age was related to the outcomes by creating dummy variables for whether the child's household contained young children (1 = *yes*; ages 0–6), school-age children (1 = *yes*; ages 7–11), or adolescents (1 = *yes*; ages 12–18). We also included country fixed-effects in all models to account for all time-invariant factors that differed between countries.

Statistical approach

Weighting

We created bespoke weights to ensure that sample totals in each country matched the weighted population totals from the most recent Demographic and Health Survey (DHS) for each country in terms of age, sex, marital status, and educational attainment. This was done in an effort to minimize bias from the convenience sampling approach taken in each country and should not be viewed as comparable to a survey sampling weighting approach, which is not possible with non-probability samples except under exceptional circumstances that do not apply here. To do this, we ensured these variables were coded similarly in both our sample and the country-specific DHS, then calculated the weighted percentage of each age by sex by marital status by educational

attainment combination in the DHS data. We then ensured the bespoke sampling weights for our sample adjusted the same age by sex by marital status by educational attainment combinations in our data to match those of the DHS data.

Missing data

We employed multiple imputation to model patterns of missingness in our data. Because missing data patterns can bias both coefficients and stand errors (Johnson & Young, 2011), we generated 50 sets of plausible values that were used to incorporate uncertainty due to missing data into the model. Although 50 is well beyond established recommendations, we did so because preliminary results suggested that the largest fraction of missing information (FMI) was relatively large (about .25). The rule of thumb is $100 * \text{the largest FMI}$ ($100 * .25$), so we doubled the recommendation to ensure model stability (Stata Corporation, n.d.). Three observations were missing on all variables and were dropped from the analysis.

Most data were complete except for information about respondent's age (1% missing data), educational attainment (2.1%), household income (4.3% missing data), labor force participation (3.1%), the number of rooms in the child's home (2.6%), smoking habits (1.7%), parental physical activity routine (2.4%), and parental health status (3.1% missing data). The extent of missing data due to item non-response was quite small— below 1% for depression, anxiety and stress and 1.4% for child anxiety.

Data analysis

Data were analyzed using SPSS (Version 26.0, SPSS Inc., Chicago). Analyses of variance (ANOVAs) were used to analyze differences in depression, anxiety and stress and child anxiety as a function of age, sex, education, parental, income, smoking habits, and parental health status and to explore the main factors influencing depression, anxiety, stress and child anxiety. Correlations assessed the associations among parent's depression, anxiety, and stress, and child anxiety.

In addition, linear multiple regression analysis was used to assess the associations between outcome variables (the reported level of depression, anxiety and stress and child anxiety symptoms) and potential predictors (e.g., age, sex, education, parental, income, smoking habits, and parental health status) while adjusting for other identified explanatory variables. In the process of running models, the forward stepwise selection algorithm was used, and variables in the model were screened based on significance levels of the Wald inclusion test statistic being less than .05.

RESULTS

Correlations among predictors and dependent variables

Bivariate associations among study variables are presented in Table 2. Overall, we found that female gender and higher income were associated with being married, being employed, and having a smaller family size and older children. Indicators of higher socio-economic status (higher income, education level, employment, being married, smaller family size) were also associated



TABLE 2 Correlations among study variables (N = 10,141)

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Parent depression	25.64	3.08	—																
2. Parental anxiety	22.11	2.47	.57**	—															
3. Parental stress	24.18	3.68	.53**	.55**	—														
4. Child anxiety	50.00	10.00	.57**	.52**	.58**	—													
5. Parent's age	35.72	8.24	.39**	.42**	.38**	.16	—												
6. Gender	2.10	.31	.43**	.32**	.37**	.22	.17	—											
7. Educational Attainment	3.61	2.79	-.46**	-.44**	-.42**	-.36**	.12	.42**	—										
8. Income	374.21	15.12	-.38**	-.39**	-.35**	-.27**	.13	.26**	.23	—									
9. Marital status	1.84	1.26	-.36**	-.38**	-.34**	-.33**	.23	.43**	.21	.24**	—								
10. Labor force participation	3.23	1.42	-.47**	-.41**	-.44**	-.36**	.19	.37**	.12	.32**	.22**	—							
11. Living arrangement	1.98	.60	-.37**	-.34**	-.40**	-.22**	.07	-.23**	.35**	-.28**	.27**	.27**	—						
12. Family size	2.48	.77	.45**	.48**	.39**	-.31**	.16	-.32**	.12	-.23**	-.27**	-.23**	.20**	—					
13. Number of children in HH	2.70	.70	.38**	.36**	.42**	-.45**	.06	.17	.13	.11	.10	.03	.11	.06	—				
14. Age of children in HH	4.07	1.78	.34**	.39**	.43**	.52**	.23**	.27**	.06	.26*	.17	.18	.07	.08	.04	—			
15. Parental smoke habits	3.12	.60	.48**	.44**	.41**	.34**	.09	.27**	.12	.33**	.28*	.24*	.16	.11	.10	-.50**	—		
16. Parental physical activity	2.74	1.90	-.52**	-.49**	-.53**	-.39**	.11	.42**	.23	.44**	.29*	.32**	.12	.21	.06	-.52**	-.59**	—	
17. Parental health status	1.43	.76	-.57**	-.54**	-.58**	-.42**	.17	.42**	.23	.24**	.22**	.27**	.20*	.11**	.13	.38**	-.54**	-.55**	—

Note. Gender coded as 1 = male, 2 = female. Educational attainment coded as 1 = No qualifications, 2 = General Education Development, 3 = Certificate or equivalent, 4 = High School Diploma, 5 = University degree or more. Marital status coded as 0 = divorced, 1 = married/cohabiting, 2 = never married, 3 = widowed. Labor force participation coded as 0 = not employed, not in labor force, 1 = self-employed, 2 = employed. Living arrangement coded as 0 = 1 room, 1 = 2-3 rooms, 2 = 4 rooms or more. Family size coded as 1 = adult, 1 = 2-4 adults, 2 = 5 adults or more. Number of children in HH coded as 0 = 1 child, 1 = 2-3 children, 3 = 4 children or more. Age of children in HH coded as 1 = birth - 6 years old, 2 = 7-11 years old, 3 = 12-18 years old. Parental smoke habits coded as 0 = nonsmoker, 1 = ex-smoker, 2 = current smoker. Parental physical activity coded as 0 = no physical activities, 1 = 1-3 days per week, 2 = 4-5 days per week, 3 = 6-7 days per week. Parental health status coded as 0 = unknown health conditions, 1 = COVID-19, 2 = Severe chronic health conditions (e.g., heart disease, lung disease, cancer, diabetes, high blood pressure), 3 = Clinically diagnosed depression/anxiety, 4 = Clinically diagnosed chronic physical health condition, 5 = Pregnancy.

* $p < .05$. ** $p < .01$.

with better parent health status and health habits. Significant positive associations were also observed between parent stress, anxiety, and depression and child anxiety.

Mean differences in dependent variables as a function of individual predictor variables

ANOVAs showed that parent depression, anxiety, and stress, and child anxiety, significantly differed in 13 variables (see Table 3). Parent age, gender, level of educational attainment, logged household income, marital status, labor force participation, the number of rooms in the child's home, the number of adults in the child's household, the number of children in the household, the age of children in the household, whether the respondent was a non, ex, or current smoker, the number of days per week of physical activities, and parental health status were related to depression, anxiety and stress.

Although older parents (+65 years old) exhibited greater depression, anxiety, and stress than younger people, parent age was not related to child anxiety. Women's levels of depression, anxiety and stress were significantly higher than those of men. However, we found no significant difference in child anxiety levels by parent's gender. Interestingly, although single parents exhibited greater anxiety and stress, marital status was not related to depression. However, single parents' children were higher in anxiety.

We also observed some educational differences. Compared to parents who went to school until they were 18, parents without any educational qualifications had higher levels of depression, anxiety and stress during the pandemic. Compared to children whose parents went to school until they were 18, children whose parents had no educational qualifications had higher levels of anxiety during the pandemic. In terms of parents' employment status and income, we observed significant differences in level of depression, anxiety and stress by employment status and income. In addition, children whose primary caregiver was neither employed nor in the labor force appeared to have experienced higher level of anxiety during the pandemic. Overall income was associated with parent depression, anxiety, stress, and child anxiety.

In terms of family living arrangement and family size, we observed significantly greater levels of depression, anxiety and stress in households living in one room compared to those of living larger houses. In addition, family living arrangement was associated with an increased level of child anxiety. We also observed some family size differences, suggesting that, compared to households comprised of two adults (nuclear family), the levels parent depression, anxiety and stress in households of more than five adults (extended family) were higher. However, child anxiety was lower for children living in an extended family arrangement compared with children residing in a nuclear family.

We observed higher parent depression, anxiety and stress in homes with adolescent children compared to young and school-aged children. In addition, compared to young and school-aged children, the level of anxiety was greater in adolescents during the pandemic. The overall number of children was associated with higher levels of depression, anxiety and stress during the pandemic. We observed also a significant difference in the level of child anxiety by number of siblings. Compared to children of large families (+4 children), levels of anxiety were greater for children living in a small family (singleton child).

In terms of parents' smoking habits and physical activity routines, we observed significant differences in the levels of depression, anxiety and stress by smoking habits and physical activity routine. In addition, children whose parents was either physically active or non-smoking appeared

TABLE 3 Mean differences in parents' depression, anxiety, and stress; and child anxiety during pandemic as a function of each demographic characteristic

Measure	Depression			Anxiety			Stress			Child anxiety		
	M	SD	F	M	SD	F	M	SD	F	M	SD	F
<i>Parents age</i>												
<29	23.59	1.11	6.60**	20.37	1.55	5.62**	24.80	1.62	5.44**	48.19	11.59	1.16
30–44	27.18	1.23		20.27	5.24		24.53	3.61		49.62	12.61	
45–64	35.82	3.83		25.05	1.34		24.18	2.38		50.29	10.46	
+65	36.82	1.10		29.05	4.32		26.62	1.73		50.98	9.26	
<i>Gender</i>												
Female	35.69	3.47	5.05**	28.11	2.65	5.21**	34.14	3.98	5.37**	48.69	12.59	3.53
Male	20.57	3.29		19.80	3.97		24.34	5.72		50.16	10.51	
<i>Income</i>												
<99	36.82	1.36	6.71**	28.50	4.46	5.64**	35.50	5.54	5.08**	67.48	12.66	6.09**
100–249	36.25	2.02		27.90	2.23		33.86	4.03		66.53	15.38	
250–499	35.58	2.61		23.00	1.41		24.50	4.95		56.21	13.24	
500–999	27.00	1.73		22.55	1.63		25.59	2.00		55.67	10.37	
+1000	22.42	2.63		20.57	2.18		20.37	2.85		52.48	12.66	
<i>Educational attainment</i>												
No qualifications	36.49	4.63	5.09**	29.31	2.60	4.99**	35.04	3.32	5.88**	69.66	6.91	5.43**
General Education Development Certificate or equivalent (School till aged 16)	29.80	3.32		26.14	2.61		24.67	3.76		60.04	10.03	
High School Diploma or equivalent (school till aged 18)	25.31	3.47		22.22	2.68		23.94	2.78		48.85	10.72	
University degree or more	23.72	4.14		20.29	3.77		20.77	3.69		47.58	11.16	

(Continues)

TABLE 3 (Continued)

Measure	Depression			Anxiety			Stress			Child anxiety		
	M	SD	F	M	SD	F	M	SD	F	M	SD	F
<i>Marital status</i>												
Divorced	35.72	2.90	5.71	25.16	2.61	5.88*	34.29	3.90	5.35**	64.26	10.74	3.74**
Married/Cohabiting	24.83	4.57		20.97	3.78		22.91	5.28		51.81	12.70	
Never Married	35.41	3.26		24.99	2.70		27.90	3.92		59.11	10.44	
Widowed	35.50	3.50		24.09	2.66		29.05	3.98		68.99	10.72	
<i>Labor Force Participation</i>												
Not Employed, Not in Labor Force	33.90	4.26	4.33**	28.04	2.54	5.46**	35.90	5.61	6.21**	68.13	8.08	5.09**
Self-Employed	31.39	1.12		25.99	2.54		34.74	3.71		47.42	10.62	
Employed	25.64	3.32		19.97	2.79		23.37	4.38		49.79	10.27	
<i>Living arrangement: No. of rooms in household</i>												
1	30.89	3.51	6.34**	29.11	2.66	5.62**	34.48	3.92	5.44**	62.26	10.78	2.21**
2-3	25.67	3.29		22.00	2.60		24.19	3.95		59.04	10.54	
4+	20.49	3.25		19.72	2.80		19.84	3.89		48.99	10.27	
<i>Family size: No. of adults in household</i>												
1	25.66	3.43	6.05**	21.87	2.40	5.20**	24.05	4.21	5.57**	69.95	10.39	6.24**
2-4	25.69	3.22		22.35	1.66		24.11	4.04		59.98	10.85	
5+	31.53	2.91		27.11	2.63		36.27	3.92		42.20	13.52	
<i># Children in HH</i>												
1	20.66	.17	4.06**	17.15	2.75	5.21**	20.25	4.08	4.75**	68.59	12.04	5.80**
2-3	27.57	3.62		20.15	2.62		26.13	4.16		50.63	10.81	
4+	30.69	3.41		26.18	3.74		33.79	3.25		50.53	11.69	
<i>Age of children in HH</i>												
# Young Children in HH (0/6)	25.70	3.22	6.27**	17.15	2.79	6.03**	23.81	3.70	5.77**	49.81	10.76	6.05**
# School Children in HH (7/11)	25.83	2.66		17.21	2.67		26.29	4.30		50.76	10.69	
# Adolescents in HH (12/18)	32.86	2.41		25.08	2.85		35.21	4.11		68.75	11.34	

(Continues)

TABLE 3 (Continued)

Measure	Depression			Anxiety			Stress			Child anxiety		
	M	SD	F	M	SD	F	M	SD	F	M	SD	F
<i>Parental smoke habits</i>												
Non-Smoker	25.80	3.17	5.21**	21.00	3.93	4.96**	24.37	3.84	5.01**	40.69	10.48	6.27**
Ex-Smoker	24.22	4.68		21.93	2.59		22.46	5.05		41.70	11.49	
Current Smoker	33.54	3.89		29.33	3.05		36.67	4.09		57.39	12.75	
<i># days of physical activities/week</i>												
0	26.03	2.30	5.75**	22.06	2.78	5.96**	20.02	3.41	5.87**	60.18	10.20	6.53**
1-3	29.76	3.27		24.94	2.78		26.13	3.89		50.69	10.30	
4-5	35.55	3.52		29.19	2.68		28.05	4.11		42.29	10.78	
6-7	35.57	3.23		32.13	2.60		34.17	3.49		42.26	10.47	
<i>Parental health status</i>												
Unknown health conditions	26.34	2.90	5.70**	22.69	1.49	5.41**	26.62	1.73	5.37**	51.66	12.48	5.04**
COVID 19	30.89	3.63		26.90	1.00		31.56	3.53		61.22	8.70	
Severe chronic health conditions (e.g., heart disease, lung disease, cancer, diabetes, high blood pressure)	35.41	3.80		32.43	2.21		34.72	4.31		60.27	7.62	
Clinically diagnosed depression/anxiety	32.90	2.91		28.05	3.16		28.82	4.69		67.07	13.54	
Clinically diagnosed chronic physical health condition	25.47	3.81		21.95	2.82		23.83	4.24		64.26	7.03	
Pregnancy	29.05	3.02		25.32	2.45		27.03	3.91		58.08	13.66	

Note. $N = 10,141$. Gender coded as 1 = male, 2 = female. Educational attainment coded as 1 = No qualifications, 2 = General Education Development, 3 = Certificate or equivalent, 4 = High School Diploma, 5 = University degree or more. Marital status coded as 0 = divorced, 1 = married/cohabiting, 2 = never married, 3 = widowed. Labor force participation coded as 0 = not employed, not in labor force, 1 = self-employed, 2 = employed. Living arrangement coded as 0 = 1 room, 1 = 2-3 rooms, 2 = 4 rooms or more. Family size coded as 0 = 1 adult, 1 = 2-4 adults, 2 = 5 adults or more. Number of children in HH coded as 0 = 1 child, 1 = 2-3 children, 3 = 4 children or more. Age of children in HH coded as 1 = birth - 6 years old, 2 = 7-11 years old, 3 = 12-18 years old. Parental smoke habits coded as 0 = nonsmoker, 1 = ex-smoker, 2 = current smoker. Parental physical activity coded as 0 = no physical activities, 1 = 1-3 days per week, 2 = 4-5 days per week, 3 = 6-7 days per week. Parental health status coded as 0 = unknown health conditions, 1 = COVID-19, 2 = Severe chronic health conditions (e.g., heart disease, cancer, diabetes, high blood pressure), 3 = Clinically diagnosed depression/anxiety, 4 = Clinically diagnosed chronic physical health condition, 5 = Pregnancy.

** $p < .001$.

TABLE 4 Factors associated with levels of parental depression

Variables	B	SE	β	<i>t</i>	<i>p</i>
(Intercept)	25.43	12.68		2.08	<.001
Parents age	10.56	3.24	.28	3.32	<.001
Gender	6.76	2.75	.12	2.72	<.001
Educational attainment	9.26	3.54	.18	2.76	.007
Income (logged)	-8.44	2.76	-.20	-3.08	<.001
Marital status	-6.27	3.04	-.26	-2.71	<.001
Labor force participation	-9.27	3.58	-.19	-2.78	<.001
Living arrangement	-4.37	2.11	-.08	-2.15	<.001
Family size	6.72	2.47	.22	2.02	.005
Number of children in HH	5.34	2.51	.17	2.57	.007
Age of children in HH	8.12	2.45	.23	3.05	.006
Parental smoke habits	16.34	4.62	.31	4.32	<.001
Parental physical activity	-26.45	4.97	-.36	-5.33	<.001
Parental health status	-48.34	8.52	.47	6.58	<.001

Note. $N = 10, 141$. Gender coded as 1 = male, 2 = female. Educational attainment coded as 1 = No qualifications, 2 = General Education Development, 3 = Certificate or equivalent, 4 = High School Diploma, 5 = University degree or more. Marital status coded as 0 = divorced, 1 = married/cohabiting, 2 = never married, 3 = widowed. Labor force participation coded as 0 = not employed, not in labor force, 1 = self-employed, 2 = employed. Living arrangement coded as 0 = 1 room, 1 = 2-3 rooms, 2 = 4 rooms or more. Family size coded as 0 = 1 adult, 1 = 2-4 adults, 2 = 5 adults or more. Number of children in HH coded as 0 = 1 child, 1 = 2-3 children, 3 = 4 children or more. Age of children in HH coded as 1 = birth - 6 years old, 2 = 7-11 years old, 3 = 12-18 years old. Parental smoke habits coded as 0 = nonsmoker, 1 = ex-smoker, 2 = current smoker. Parental physical activity coded as 0 = no physical activities, 1 = 1-3 days per week, 2 = 4-5 days per week, 3 = 6-7 days per week. Parental health status coded as 0 = unknown health conditions, 1 = COVID-19, 2 = Severe chronic health conditions (e.g., heart disease, lung disease, cancer, diabetes, high blood pressure), 3 = Clinically diagnosed depression/anxiety, 4 = Clinically diagnosed chronic physical health condition, 5 = Pregnancy.

$R^2 = .36$, $F(11, 1039) = 7.18$, $p < .001$.

to have experienced lower anxiety during the pandemic. Finally, the overall parental health status was associated with levels of depression, anxiety and stress suggesting that the levels of depression, anxiety and stress were higher during the pandemic for parents who had severe chronic health conditions, such as cancer and diabetes. In addition, we observed a significant difference in child anxiety by parental health status.

Results of multiple regression analyses

Finally, we conducted multiple linear regression analyses to examine the unique effects of significant predictor variables. The results for depression, anxiety and stress are reported in Tables 4, 5, and 6, respectively, and for child anxiety in Table 7. Overall, these results indicate that older parents, mothers, single parents, and those with lower educational attainment, lower household income, less labor force participation, larger family size, more children in the household, older children in the household, had higher levels of parent depression, anxiety, and stress, as well as higher reports of child anxiety. In addition, parental smoking, less frequent engagement in physical activity routines, and overall worse health status were also associated with higher levels of

TABLE 5 Factors associated with levels of parental anxiety

Variables	B	SE	β	<i>t</i>	<i>p</i>
(Intercept)	27.54	13.32		2.11	<.001
Parents age	11.72	3.34	.24	2.78	<.001
Gender	8.63	2.38	.28	2.94	<.001
Educational attainment	-10.63	3.57	-.26	-2.45	<.001
Income (logged)	-15.74	4.10	-.28	-3.98	<.001
Marital status	-5.67	3.45	-.31	-2.76	.004
Labor Force Participation	-10.45	3.87	-.25	-2.29	.012
Living Arrangement	-8.01	2.34	-.17	-2.75	<.001
Family size	8.34	2.98	.28	2.30	<.001
Number of children in HH	10.57	3.35	.24	2.56	.008
Age of children in HH	10.34	3.57	.28	3.45	.051
Parental smoke habits	18.36	4.87	.34	4.86	<.001
Parental physical activity	-28.09	4.67	-.56	-6.45	<.001
Parental health status	-46.31	8.46	.61	6.03	<.001

Note. $N = 10, 141$. Gender coded as 1 = male, 2 = female. Educational attainment coded as 1 = No qualifications, 2 = General Education Development, 3 = Certificate or equivalent, 4 = High School Diploma, 5 = University degree or more. Marital status coded as 0 = divorced, 1 = married/cohabiting, 2 = never married, 3 = widowed. Labor force participation coded as 0 = not employed, not in labor force, 1 = self-employed, 2 = employed. Living arrangement coded as 0 = 1 room, 1 = 2-3 rooms, 2 = 4 rooms or more. Family size coded as 0 = 1 adult, 1 = 2-4 adults, 2 = 5 adults or more. Number of children in HH coded as 0 = 1 child, 1 = 2-3 children, 3 = 4 children or more. Age of children in HH coded as 1 = birth - 6 years old, 2 = 7-11 years old, 3 = 12-18 years old. Parental smoke habits coded as 0 = nonsmoker, 1 = ex-smoker, 2 = current smoker. Parental physical activity coded as 0 = no physical activities, 1 = 1-3 days per week, 2 = 4-5 days per week, 3 = 6-7 days per week. Parental health status coded as 0 = unknown health conditions, 1 = COVID-19, 2 = Severe chronic health conditions (e.g., heart disease, lung disease, cancer, diabetes, high blood pressure), 3 = Clinically diagnosed depression/anxiety, 4 = Clinically diagnosed chronic physical health condition, 5 = Pregnancy.

$R^2 = .58$, $F(11, 1039) = 6.48$, $p < .01$.

parental depression, anxiety, stress, and child anxiety. Together, the predictor variables accounted for 36%–58% of the variance accounted for in the mental health outcome of interest.

DISCUSSION

More than 2 years since the first cases of COVID-19 were documented, this novel virus remains a global public health emergency that is causing unprecedented economic, social, and physical and mental health challenges. The current study leveraged data from the COVID-19 Family Life study to explore the mental health of children and their parents residing in Brazil, Mexico, Colombia and Argentina during the early part of the pandemic. With this focus, our study contributes to the small literature addressing this critical topic in Latin American countries specifically, and more generally in LMICs around the world.

Our findings indicate that socio-economically disadvantaged families fared worse in terms of their mental health during the early phases of the COVID-19 pandemic compared with families with more resources. Factors such as parental unemployment, low parental educational attainment, low family income, single parenthood, and residing in a very small living space (i.e., one

TABLE 6 Factors associated with levels of parental stress

Variables	B	SE	β	<i>t</i>	<i>p</i>
(Intercept)	24.23	12.04		2.46	<.001
Parents age	10.75	3.76	.26	2.23	<.001
Gender	10.43	2.75	.24	2.31	<.001
Educational attainment	-10.02	3.42	-.21	-2.45	<.001
Income (logged)	-18.26	4.72	-.32	-4.21	<.001
Marital status	-8.32	2.93	-.28	-2.34	<.001
Labor force participation	-11.85	3.75	-.27	-2.84	<.001
Living Arrangement	-10.35	2.63	-.29	-2.42	<.001
Family size	6.52	2.21	.23	2.37	<.001
Number of children in HH	8.36	2.85	.31	2.75	<.001
Age of children in HH	10.03	3.94	.34	3.67	<.001
Parental smoke habits	22.45	4.34	.38	4.76	<.001
Parental physical activity	-32.57	6.21	-.34	-5.35	<.001
Parental health status	-45.76	6.27	.36	5.87	<.001

Note. $N = 10, 14$. Gender coded as 1 = male, 2 = female. Educational attainment coded as 1 = No qualifications, 2 = General Education Development, 3 = Certificate or equivalent, 4 = High School Diploma, 5 = University degree or more. Marital status coded as 0 = divorced, 1 = married/cohabiting, 2 = never married, 3 = widowed. Labor force participation coded as 0 = not employed, not in labor force, 1 = self-employed, 2 = employed. Living arrangement coded as 0 = 1 room, 1 = 2-3 rooms, 2 = 4 rooms or more. Family size coded as 0 = 1 adult, 1 = 2-4 adults, 2 = 5 adults or more. Number of children in HH coded as 0 = 1 child, 1 = 2-3 children, 3 = 4 children or more. Age of children in HH coded as 1 = birth - 6 years old, 2 = 7-11 years old, 3 = 12-18 years old. Parental smoke habits coded as 0 = nonsmoker, 1 = ex-smoker, 2 = current smoker. Parental physical activity coded as 0 = no physical activities, 1 = 1-3 days per week, 2 = 4-5 days per week, 3 = 6-7 days per week. Parental health status coded as 0 = unknown health conditions, 1 = COVID-19, 2 = Severe chronic health conditions (e.g., heart disease, lung disease, cancer, diabetes, high blood pressure), 3 = Clinically diagnosed depression/anxiety, 4 = Clinically diagnosed chronic physical health condition, 5 = Pregnancy.

$R^2 = .47, F(11, 1039) = 10.89, p < .001$.

room) were associated with worse parental mental health (i.e., higher anxiety, depression, and stress) as well as higher child anxiety. This is concerning and suggests that the pandemic may have worsened socio-economic disparities in mental health. We echo the calls of other researchers for policymakers to specifically address the needs of vulnerable individuals in pandemic recovery efforts, including strategies to address difficulties in mental health service utilization and follow-up (Aragona et al., 2020; Li et al., 2021). Family structure/living arrangements also appear to play a role in the mental health of families during the pandemic, although the findings are somewhat mixed. Specifically, for parents and children, having more children/siblings in the home was associated with worse mental health. Likewise, living in an extended family arrangement with more than five adults in the home was associated with higher levels of parent depression, anxiety, and stress; however, living in an extended family arrangement was associated with lower child anxiety, suggesting a protective effect for children. Additional research exploring the mechanisms through which extended family arrangements are associated with child mental health during the pandemic would be informative.

Compared to fathers, mothers in our study reported higher anxiety, depression, and stress. Maternal mental health is critical given its profound impact on child development and long-term wellbeing (Phua et al., 2020). Our findings are consistent with those from many other recent

TABLE 7 Factors associated with levels of child anxiety

Variables	B	SE	β	<i>t</i>	<i>p</i>
(Intercept)	28.54	13.73		2.75	<.001
Parents age	6.53	2.20	.26	2.54	<.001
Gender	5.28	2.15	.28	2.37	<.001
Educational attainment	-8.56	2.27	-.35	-2.24	<.001
Income (logged)	-10.33	2.48	-.24	-2.39	.022
Marital status	-10.44	2.52	-.28	-2.38	.004
Labor Force Participation	-8.36	2.85	-.31	-2.75	.031
Living Arrangement	-10.13	3.84	-.32	-3.34	<.001
Family size	-6.78	2.36	-.31	-2.74	<.001
Number of children in HH	-11.35	3.35	-.37	-2.73	<.001
Age of children in HH	6.92	2.27	.29	2.84	.006
Parental smoke habits	-10.43	3.36	-.28	-3.21	<.001
Parental physical activity	-8.26	2.34	-.21	-2.46	<.001
Parental health status	-10.15	3.24	-.28	-3.21	.008

Note. $N = 10, 141$. Gender coded as 1 = male, 2 = female. Educational attainment coded as 1 = No qualifications, 2 = General Education Development, 3 = Certificate or equivalent, 4 = High School Diploma, 5 = University degree or more. Marital status coded as 0 = divorced, 1 = married/cohabiting, 2 = never married, 3 = widowed. Labor force participation coded as 0 = not employed, not in labor force, 1 = self-employed, 2 = employed. Living arrangement coded as 0 = 1 room, 1 = 2-3 rooms, 2 = 4 rooms or more. Family size coded as 0 = 1 adult, 1 = 2-4 adults, 2 = 5 adults or more. Number of children in HH coded as 0 = 1 child, 1 = 2-3 children, 3 = 4 children or more. Age of children in HH coded as 1 = birth - 6 years old, 2 = 7-11 years old, 3 = 12-18 years old. Parental smoke habits coded as 0 = nonsmoker, 1 = ex-smoker, 2 = current smoker. Parental physical activity coded as 0 = no physical activities, 1 = 1-3 days per week, 2 = 4-5 days per week, 3 = 6-7 days per week. Parental health status coded as 0 = unknown health conditions, 1 = COVID-19, 2 = Severe chronic health conditions (e.g., heart disease, lung disease, cancer, diabetes, high blood pressure), 3 = Clinically diagnosed depression/anxiety, 4 = Clinically diagnosed chronic physical health condition, 5 = Pregnancy.

$R^2 = .39$, $F(11, 1039) = 5.63$, $p < .001$.

studies suggesting that COVID-19 related challenges have been especially hard on mothers as they have borne the largest burden of increased child care, home-schooling, and other family and household demands (Wade et al., 2021; Zamarro & Prados, 2021). Recent research utilizing longitudinal datasets with maternal mental health data collected prior to the pandemic onset provide evidence that the pandemic has worsened mental health for mothers, particularly among those who experienced challenging accessing child care and/or lost family income or had low family income prior to COVID-19 (Racine et al., 2021). These findings highlight the need for program and policy development to support mothers during the pandemic recovery. This is especially important because parental mental health challenges are shown to be a risk factor for worse family functioning and poorer child emotional and behavioral health during the pandemic (Hussong et al., 2021), and our bivariate results are consistent with this understanding. Specifically, we found that higher levels of parental stress, anxiety and depression were associated with higher child anxiety.

Our data also suggest that families with adolescents may be especially vulnerable to mental health sequelae stemming from the pandemic, as both parents of adolescents and adolescents themselves fared worse with respect to the psychological outcomes examined than families with younger children. These findings mirror those of a recent studies highlighting the urgent need to



address declines in youth mental health concerns as a result of the pandemic (Magson et al., 2020; Rogers et al., 2021). A recent systematic review suggests that the stressors and motivations to practice social distancing due to the COVID-19 pandemic are difficult for adolescents to process and that they lack coping skills to effectively manage this stressor (Zamarro & Prados, 2021). Moreover, adolescents have experienced reduced social support and heightened feelings of loneliness and isolation during the pandemic. Together, these factors place youth at significantly elevated risk for mental health concerns, including anxiety and depression.

Finally, parental health status and health habits were implicated in both parents' own mental health as well as their children's experience of anxiety symptoms. Parents who engaged in infrequent physical activity and those who were smokers reported worse mental health, and their children had lower anxiety symptoms, compared with parents who reported engaging in regular physical activity and those who indicated they were non-smokers. Likewise, parents with chronic health problems had worse mental health and their children had higher anxiety, compared with healthy parents. Prior studies have found that physical activity is associated with better mental health outcomes for adults in general (McDowell et al., 2019) as well as during the early stages of the COVID-19 pandemic (Jacob et al., 2020). To our knowledge the present study is the first to highlight the positive effects of parental physical activity on children's mental health during the pandemic. Although we did not measure child physical activity in the current study, prior research suggests a positive, but weak, association between parent and child physical activity (Petersen et al., 2020). Consequently, we cannot assume that physically active parents had physically active children, and in turn, that child physical activity underlies the reported lower levels of child anxiety. Rather, we suggest that our results highlight the importance of maintaining healthy lifestyle behaviors, as they may serve a protective function for *all* family members in times of stress and heightened vulnerability to mental health challenges.

Limitations and future directions

Several methodological limitations of this study should be noted. Given the unprecedented and continuously evolving nature of the COVID-19 pandemic, its long-term mental health impacts remain unknown. The cross-sectional design of the current study prohibits inference of a causal relationship between this novel socio-environmental factor and the mental health concerns observed in the current study. Continuing to monitor and study the potential effects of the pandemic during longitudinal study designs is critical to fully understand the relations between the pandemic and observed outcomes, as well as to inform the development of interventions to prevent or mitigate negative effects. Convenience sampling with parent and self-report questionnaires was utilized to effectively gather a large amount of data in a short period of time but introduced external validity concerns as well as biases including selection bias, recall bias, and social desirability bias. Second, although the current sample was large, the cultural diversity across and within Latin American countries calls for increased representativeness of the population in future studies to improve the generalizability of findings. Furthermore, mental health is a complex concept and not all aspects of mental health and illness were assessed. Future studies that employ additional mental health assessment measures with robust psychometric properties are needed to gain a comprehensive understanding of the impact of the COVID-19 pandemic on mental health outcomes.

Implications for social policy

The present study indicates that concerns about the COVID-19 pandemic exacerbating mental health concerns for socially and economically vulnerable families in Latin America are warranted. Among the four countries represented in the current sample, there are differences in pre-pandemic approaches to mental health care and current needs, yet overall, these countries have faced similar challenges and require similar investments. Illustratively, in Mexico, attempts to develop and implement a national mental health policy have been largely unsuccessful and it is estimated that 86% of children and adolescents who need mental health treatment do not get it (Kohn et al., 2018). A contributing factor is that health care is vastly different for individuals depending on whether they have public insurance coverage (serving individuals employed in the formal sector of the economy), private insurance coverage (serving self-paying individuals), or no insurance coverage (individuals who are unemployed or work in the informal sector of the economy, roughly 40% of the population pre-pandemic) (Espinola-Nadurille et al., 2010). Geographical location also plays a role in access to care. Mexico has 32 states that administer their own health care systems. Because these systems are funded by a combination of state and federal funding, there are significant inequalities in health care investments due to states' different financial resources and population needs. Most mental health services are provided primarily through large psychiatric hospitals concentrated in large cities, with few community-based mental health services available including in primary health care settings (Martinez et al., 2017). Thus, access to high-quality mental health services was a major challenge in Mexico before Covid-19 that has likely been exacerbated by the severe economic impacts of the pandemic on this country (Hoehn-Velasco et al., 2022).

In contrast to Mexico, Brazil has had a national mental health policy in place for over four decades with formal mental health services provided under the umbrella of the Unified National Health System (SUS). The implementation of a mental health policy in the 1980s transformed Brazil's mental health system and led to significant improvements in access and quality of mental health care for its population (Almeida, 2019). However, since 2016, this country has experienced major political instability and there have been significant financial disinvestments in the SUS. Thus, like Mexico, Brazil lacks adequate mental health care resources and faces major challenges addressing the cascading and widespread pandemic-related physical and mental health needs of its most vulnerable citizens (Cândido & Gonçalves Júnior, 2021). Both systems-level problems (e.g., low allocation of health budgets to mental health) and individual-level issues (e.g., stigma) are significant barriers to addressing mental health in LMICs in Latin America (Caldas de Almeida, 2013; Sapag et al., 2018).

Coordinated mental health and psychosocial support services need to be integrated into the pandemic response within LMICs currently and after the pandemic subsides to help ameliorate negative outcomes (Kola et al., 2021). Latin American countries have historically invested less in social programs and mental health care compared to other subregions and countries of similar economic status (Minoletti et al., 2012). Addressing the mental health needs necessitates financial investments aligned with broad social and mental health policy goals such as reductions in the incidence and prevalence of mental disorders through prevention and access to treatment, the development of rehabilitation services and other support programs to reduce the severity of mental health problems and secondary disabilities, and mental health stigma, and protecting the rights of people affected by mental illness and their families (Cratsley & Mackey, 2018). Achieving these outcomes will require a three-pronged approach consisting of: (1) national components

(e.g., a national strategy to promote mental health, well-defined links between federal agencies overseeing determinants of mental health and illness, mental health legislation); (2) supportive infrastructure (e.g., addressing the social and economic determinants that lead to poor mental health); and (3) service provision (e.g., health care clinics with primary providers trained to recognize mental health problems, specialists who can treat affected individuals, mental health promotion efforts in schools and workplaces) (Jenkins, 2005; Rodríguez, 2010). Restructuring mental health services and strengthening mental health initiatives to promote mental health in LMICs is a formidable, but critical, task that must be undertaken to address the burgeoning mental health needs created by the Covid-19 pandemic.

REFERENCES

- Alegria, M., NeMoyer, A., Falgàs Bagué, I., Wang, Y., & Alvarez, K. (2018) Social determinants of mental health: where we are and where we need to go. *Current Psychiatry Reports*, 20(11). <https://doi.org/10.1007/s11920-018-0969-9>
- Allen, J., Balfour, R., Bell, R., & Marmot, M. (2014) Social determinants of mental health. *International Review of Psychiatry*, 26(4), 392–407. <https://doi.org/10.3109/09540261.2014.928270>
- Almeida, J. M. (2019) Mental health policy in Brazil: what's at stake in the changes currently under way. *Cadernos de Saúde Pública*, 35(11). <https://doi.org/10.1590/0102-31100129519>
- Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998) Psychometric properties of the 42-item and 21-item versions of the depression anxiety stress scales in clinical groups and a community sample. *Psychological Assessment*, 10(2), 176–181. <https://doi.org/10.1037/1040-3590.10.2.176>
- Antúnez, Z., & Vinet, E. V. (2012) Escalas de Depresión, Ansiedad Y Estrés (DASS - 21): validación de la versión abreviada en Estudiantes Universitarios Chilenos. *Terapia psicológica*, 30(3), 49–55. <https://doi.org/10.4067/s0718-48082012000300005>
- Aragona, M., Barbato, A., Cavani, A., Costanzo, G., & Mirisola, C. (2020) Negative impacts of COVID-19 lockdown on mental health service access and follow-up adherence for immigrants and individuals in socio-economic difficulties. *Public Health*, 186, 52–56. <https://doi.org/10.1016/j.puhe.2020.06.055>
- Ben Brik, A. (2020) Covid 19 family life study. <https://doi.org/10.31234/osf.io/gcqh9>
- Boettcher, J., Zapf, H., Fuerboeter, M., Nazarian, R., Reinshagen, K., Wiegand-Grefe, S., et al. (2021) Perceived mental health in parents of children with rare congenital surgical diseases: a double ABCX model considering gender. *Orphanet Journal of Rare Diseases*, 16(1). <https://doi.org/10.1186/s13023-021-01998-9>
- Braveman, P., Egerter, S., & Williams, D. R. (2011) The social determinants of health: coming of age. *Annual Review of Public Health*, 32(1), 381–398. <https://doi.org/10.1146/annurev-publhealth-031210-101218>
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., et al. (2020) The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet*, 395(10227), 912–920. [https://doi.org/10.1016/s0140-6736\(20\)30460-8](https://doi.org/10.1016/s0140-6736(20)30460-8)
- Caldas de Almeida, J. M. (2013) Mental health services development in Latin America and the Caribbean: achievements, barriers and facilitating factors. *International Health*, 5(1), 15–18. <https://doi.org/10.1093/inthealth/ih5013>
- Choi, K. R., Heilemann, M. V., Fauer, A., & Mead, M. (2020) A second pandemic: mental health spillover from the novel coronavirus (COVID-19). *Journal of the American Psychiatric Nurses Association*, 26(4), 340–343. <https://doi.org/10.1177/1078390320919803>
- Clara, I. P., Cox, B. J., & Enns, M. W. (2001) Confirmatory factor analysis of the Depression–Anxiety–Stress Scales in depressed and anxious patients. *Journal of Psychopathology and Behavioral Assessment*, 23(1), 61–67. <https://doi.org/10.1023/1011095624717>
- Cowie, H., & Myers, C. (2020) The impact of the COVID-19 pandemic on the mental health and well-being of children and young people. *Children & Society*, 35(1), 62–74. <https://doi.org/10.1111/chso.12430>
- Cratsley, K., & Mackey, T. K. (2018) Health policy brief: Global mental health and the United Nations' sustainable development goals. *Families, Systems, & Health*, 36(2), 225–229. <https://doi.org/10.1037/fsh0000329>
- Cutter, S. L., Boruff, B. J., & Shirley, W. L. (2003) Social vulnerability to environmental Hazards. *Social Science Quarterly*, 84(2), 242–261. <https://doi.org/10.1111/1540-6237.8402002>

- Cândido, E. L., & Gonçalves Júnior, J. (2021) COVID-19 Syndemic, government, and impact on mental health: a Brazilian reality. *Frontiers in Psychiatry*, 12. <https://doi.org/10.3389/fpsy.2021.671449>
- Davenport, M. H., Meyer, S., Meah, V. L., Strynadka, M. C., & Khurana, R. (2020) Moms are not OK: COVID-19 and maternal mental health. *Frontiers in Global Women's Health*, 1. <https://doi.org/10.3389/fgwh.2020.00001>
- Davidson, B., Schmidt, E., Mallar, C., Mahmoud, F., Rothenberg, W., Hernandez, J., et al. (2020) Risk and resilience of well-being in caregivers of young children in response to the COVID-19 pandemic. *Translational Behavioral Medicine*, 11(2), 305–313. <https://doi.org/10.1093/tbm/ibaa124>
- Daza, P., Novy, D. M., Stanley, M. A., & Averill, P. (2002) The depression anxiety stress scale-21: spanish translation and validation with a Hispanic sample. *Journal of Psychopathology and Behavioral Assessment*, 24(3), 195–205. <https://doi.org/10.1023/a:1016014818163>
- Dong, E., Du, H., & Gardner, L. (2020) An interactive web-based dashboard to track COVID-19 in real time. *The Lancet Infectious Diseases*, 20(5), 533–534. [https://doi.org/10.1016/s1473-3099\(20\)30120-1](https://doi.org/10.1016/s1473-3099(20)30120-1)
- ElHawary, H., Salimi, A., Diab, N., & Smith, L. (2020) Bibliometric analysis of early COVID-19 research: the top 50 cited papers. *Infectious Diseases: Research and Treatment*, 13, 117863372096293. <https://doi.org/10.1177/1178633720962935>
- Espinola-Nadurille, M., Vargas Huicochea, I., Raviola, G., Ramirez-Bermudez, J., & Kutcher, S. (2010) Mental health care reforms in Latin America: child and adolescent mental health services in Mexico. *Psychiatric Services*, 61(5), 443–445. <https://doi.org/10.1176/ps.2010.61.5.443>
- Feeney, B. C., & Collins, N. L. (2015) A new look at social support: a theoretical perspective on thriving through relationships. *Personality and Social Psychology Review*, 19(2), 113–147. <https://doi.org/10.1177/1088868314544222>
- Fegert, J. M., Vitiello, B., Plener, P. L., & Clemens, V. (2020) Challenges and burden of the coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: a narrative review to highlight clinical and research needs in the acute phase and the long return to normality. *Child and Adolescent Psychiatry and Mental Health*, 14(1). <https://doi.org/10.1186/s13034-020-00329-3>
- Ferrando, P. J. (1994) Factorial structure of the revised children manifest anxiety scale in a Spanish sample: relations with Eysenck personality dimensions. *Personality and Individual Differences*, 16(5), 693–699. [https://doi.org/10.1016/0191-8869\(94\)90211-9](https://doi.org/10.1016/0191-8869(94)90211-9)
- Francisco, R., Pedro, M., Delvecchio, E., Espada, J. P., Morales, A., Mazzeschi, C., et al. (2020) Psychological symptoms and behavioral changes in children and adolescents during the early phase of COVID-19 quarantine in three European countries. *Frontiers in Psychiatry*, 11. <https://doi.org/10.3389/fpsy.2020.570164>
- Garcia de Avila, M., Hamamoto Filho, P., Jacob, F., Alcantara, L., Berghammer, M., Jenholt Nolbris, M., et al. (2020) Children's anxiety and factors related to the COVID-19 pandemic: an exploratory study using the children's anxiety questionnaire and the numerical rating scale. *International Journal of Environmental Research and Public Health*, 17(16), 5757. <https://doi.org/10.3390/ijerph17165757>
- Gobbi, S., Plomecka, M. B., Ashraf, Z., Radziński, P., Neckels, R., Lazzeri, S., et al. (2020) Worsening of Preexisting psychiatric conditions during the COVID-19 pandemic. *Frontiers in Psychiatry*, 11. <https://doi.org/10.3389/fpsy.2020.581426>
- Golberstein, E., Wen, H., & Miller, B. F. (2020) Coronavirus disease 2019 (COVID-19) and mental health for children and adolescents. *JAMA Pediatrics*, 174(9), 819. <https://doi.org/10.1001/jamapediatrics.2020.1456>
- Goarayeb, M. A., & Goarayeb R. (2008) O que penso e sinto”—adaptação da Revised Children's Manifest Anxiety Scale (RCMAS) para o português. *Temas em Psicologia*, 16(1), 27–37. <https://www.redalyc.org/pdf/5137/513753244003.pdf>
- Griffith, A. K. (2020) Parental burnout and child maltreatment during the COVID-19 pandemic. *Journal of Family Violence*, <https://doi.org/10.1007/s10896-020-00172-2>
- Gul, S., Ur Rehman, S., Ashiq, M., & Khattak, A. (2020) Mapping the scientific literature on COVID-19 and mental health. *Psychiatria Danubina*, 32(3–4), 463–471. <https://doi.org/10.24869/psyd.2020.463>
- Haleemunnissa, S., Didel, S., Swami, M. K., Singh, K., & Vyas, V. (2021) Children and COVID19: understanding impact on the growth trajectory of an evolving generation. *Children and Youth Services Review*, 120, 105754. <https://doi.org/10.1016/j.childyouth.2020.105754>
- Hoehn-Velasco, L., Silverio-Murillo, A., Balmori de la Miyar, J. R., & Penglase, J. (2022) The impact of the COVID-19 recession on Mexican households: evidence from employment and time use for men, women, and children. *Review of Economics of the Household*, <https://doi.org/10.1007/s11150-022-09600-2>

- Holmes, E. A., O'Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., et al. (2020) Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. *The Lancet Psychiatry*, 7(6), 547–560. [https://doi.org/10.1016/s2215-0366\(20\)30168-1](https://doi.org/10.1016/s2215-0366(20)30168-1)
- Hussong, A., Midgette, A., Richards, A., Petrie, R., Coffman, J., & Thomas, T. (2021) COVID-19 life events spill-over on family functioning and adolescent adjustment. *The Journal of Early Adolescence*, 42(3), 359–388. <https://doi.org/10.21203/rs.3.rs-90361/v1>
- Iqbal, S. A., & Tayyab, N. (2020) COVID-19 and children: The mental and physical reverberations of the pandemic. *Child: Care, Health and Development*, 47(1), 136–139. <https://doi.org/10.1111/cch.12822>
- Jacob, L., Tully, M. A., Barnett, Y., Lopez-Sanchez, G. F., Butler, L., Schuch, F., et al. (2020) The relationship between physical activity and mental health in a sample of the UK public: a cross-sectional study during the implementation of COVID-19 social distancing measures. *Mental Health and Physical Activity*, 19, 100345. <https://doi.org/10.1016/j.mhpa.2020.100345>
- Jenkins, R. (2005) Supporting governments to adopt mental health policies. *Mental Health Review Journal*, 10(1), 33–38. <https://doi.org/10.1108/13619322200500008>
- Jiao, W. Y., Wang, L. N., Liu, J., Fang, S. F., Jiao, F. Y., Pettoello-Mantovani, M., et al. (2020) Behavioral and emotional disorders in children during the COVID-19 epidemic. *The Journal of Pediatrics*, 221, 264–266.e1. <https://doi.org/10.1016/j.jpeds.2020.03.013>
- Johnson, D. R., & Young, R. (2011) Toward best practices in analyzing datasets with missing data: comparisons and recommendations. *Journal of Marriage and Family*, 73(5), 926–945. <https://doi.org/10.1111/j.1741-3737.2011.00861.x>
- Kar, S. K., Oyetunji, T. P., Prakash, A. J., Ogunmola, O. A., Tripathy, S., Lawal, M. M., et al. (2020) Mental health research in the lower-middle-income countries of Africa and Asia during the COVID-19 pandemic: a scoping review. *Neurology, Psychiatry and Brain Research*, 38, 54–64. <https://doi.org/10.1016/j.npbr.2020.10.003>
- Kohn, R., Ali, A. A., Puac-Polanco, V., Figueroa, C., López-Soto, V., Morgan, K., et al. (2018) Mental health in the Americas: An overview of the treatment gap. *Revista Panamericana de Salud Pública*, 42. <https://doi.org/10.26633/rpsp.2018.165>
- Kola, L., Kohrt, B. A., Hanlon, C., Naslund, J. A., Sikander, S., Balaji, M., et al. (2021) COVID-19 mental health impact and responses in low-income and middle-income countries: reimagining global mental health. *The Lancet Psychiatry*, 8(6), 535–550. [https://doi.org/10.1016/s2215-0366\(21\)00025-0](https://doi.org/10.1016/s2215-0366(21)00025-0)
- Kumar, A., Pareek, V., Prasoorn, P., Faiq, M. A., Kumar, P., Kumari, C., et al. (2020) Possible routes of SARS-Cov-2 invasion in brain: in context of neurological symptoms in COVID-19 patients. *Journal of Neuroscience Research*, 98(12), 2376–2383. <https://doi.org/10.1002/jnr.24717>
- Labella, M. H., Narayan, A. J., McCormick, C. M., Desjardins, C. D., & Masten, A. S. (2017) Risk and adversity, parenting quality, and children's social-emotional adjustment in families experiencing homelessness. *Child Development*, 90(1), 227–244. <https://doi.org/10.1111/cdev.12894>
- Lancet. (2020) COVID-19 in Latin America: a humanitarian crisis. *The Lancet*, 396(10261), 1463. [https://doi.org/10.1016/s0140-6736\(20\)32328-x](https://doi.org/10.1016/s0140-6736(20)32328-x)
- Lee, S. J., Ward, K. P., Chang, O. D., & Downing, K. M. (2021) Parenting activities and the transition to home-based education during the COVID-19 pandemic. *Children and Youth Services Review*, 122, 105585. <https://doi.org/10.1016/j.childyouth.2020.105585>
- Li, W., Wang, Z., Wang, G., Ip, P., Sun, X., Jiang, Y., & Jiang, F. (2021) Socioeconomic inequality in child mental health during the COVID-19 pandemic: first evidence from China. *Journal of Affective Disorders*, 287, 8–14. <https://doi.org/10.1016/j.jad.2021.03.009>
- Liu, D., Baumeister, R. F., & Zhou, Y. (2021) Mental health outcomes of coronavirus infection survivors: a rapid meta-analysis. *Journal of Psychiatric Research*, 137, 542–553. <https://doi.org/10.1016/j.jpsychires.2020.10.015>
- Llibre-Guerra, J. J., Jiménez-Velázquez, I. Z., Llibre-Rodríguez, J. J., & Acosta, D. (2020) The impact of COVID-19 on mental health in the Hispanic Caribbean region. *International Psychogeriatrics*, 32(10), 1143–1146. <https://doi.org/10.1017/s1041610220000848>
- Loades, M. E., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Brigden, A., et al. (2020) Rapid systematic review: the impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *Journal of the American Academy of Child & Adolescent Psychiatry*, 59(11), 1218–1239.e3. <https://doi.org/10.1016/j.jaac.2020.05.009>

- Lovibond, P., & Lovibond, S. (1995) The structure of negative emotional states: comparison of the depression anxiety stress scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, 33(3), 335–343. [https://doi.org/10.1016/0005-7967\(94\)00075-u](https://doi.org/10.1016/0005-7967(94)00075-u)
- Maggi, S., Irwin, L. J., Siddiqi, A., & Hertzman, C. (2010) The social determinants of early child development: an overview. *Journal of Paediatrics and Child Health*, 46(11), 627–635. <https://doi.org/10.1111/j.1440-1754.2010.01817.x>
- Magson, N. R., Freeman, J. Y., Rapee, R. M., Richardson, C. E., Oar, E. L., & Fardouly, J. (2020) Risk and protective factors for prospective changes in adolescent mental health during the COVID-19 pandemic. *Journal of Youth and Adolescence*, 50(1), 44–57. <https://doi.org/10.1007/s10964-020-01332-9>
- Mao, W., & Agyapong, V. I. (2021) The role of social determinants in mental health and resilience after disasters: Implications for public health policy and practice. *Frontiers in Public Health*, 9. <https://doi.org/10.3389/fpubh.2021.658528>
- Marchetti, D., Fontanesi, L., Mazza, C., Di Giandomenico, S., Roma, P., & Verrocchio, M. C. (2020) Parenting-related exhaustion during the Italian COVID-19 lockdown. *Journal of Pediatric Psychology*, 45(10), 1114–1123. <https://doi.org/10.1093/jpepsy/jsaa093>
- Marques de Miranda, D., Da Silva Athanasio, B., Sena Oliveira, A. C., & Simoes-e-Silva, A. C. (2020) How is COVID-19 pandemic impacting mental health of children and adolescents? *International Journal of Disaster Risk Reduction*, 51, 101845. <https://doi.org/10.1016/j.ijdrr.2020.101845>
- Marsac, M. L., Donlon, K. A., Winston, F. K., & Kassam-Adams, N. (2011) Child coping, parent coping assistance, and post-traumatic stress following paediatric physical injury. *Child: Care, Health and Development*, 39(2), 171–177. <https://doi.org/10.1111/j.1365-2214.2011.01328.x>
- Martinez, W., Galván, J., Saavedra, N., & Berenzon, S. (2017) Barriers to integrating mental health services in community-based primary care settings in Mexico City: a qualitative analysis. *Psychiatric Services*, 68(5), 497–502. <https://doi.org/10.1176/appi.ps.201600141>
- Martucci, S. (2021) He's working from home and I'm at home trying to work: experiences of childcare and the work–family balance among mothers during COVID-19. *Journal of Family Issues*, 0192513×2110484. <https://doi.org/10.1177/0192513211048476>
- McDowell, C. P., Dishman, R. K., Gordon, B. R., & Herring, M. P. (2019) Physical activity and anxiety: a systematic review and meta-analysis of prospective cohort studies. *American Journal of Preventive Medicine*, 57(4), 545–556. <https://doi.org/10.1016/j.amepre.2019.05.012>
- Minoletti, A., Galea, S., & Susser, E. (2012) Community mental health services in Latin America for people with severe mental disorders. *Public Health Reviews*, 34(2). <https://doi.org/10.1007/bf03391681>
- Moradi, Y., Mollazadeh, F., Karimi, P., Hosseingholipour, K., & Baghaei, R. (2020) Psychological disturbances of survivors throughout COVID-19 crisis: a qualitative study. *BMC Psychiatry*, 20(1). <https://doi.org/10.1186/s12888-020-03009-w>
- Norton, P. J. (2007) Depression anxiety and stress scales (DASS-21): Psychometric analysis across four racial groups. *Anxiety, Stress & Coping*, 20(3), 253–265. <https://doi.org/10.1080/10615800701309279>
- Olf, M., Primasari, I., Qing, Y., Coimbra, B. M., Hovnanyan, A., Grace, E., et al. (2021) Mental health responses to COVID-19 around the world. *European Journal of Psychotraumatology*, 12(1). <https://doi.org/10.1080/20008198.2021.1929754>
- Orgilés, M., Morales, A., Delvecchio, E., Mazzeschi, C., & Espada, J. P. (2020) Immediate psychological effects of the COVID-19 quarantine in youth from Italy and Spain. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.579038>
- Paterson, R. W., Brown, R. L., Benjamin, L., Nortley, R., Wiethoff, S., Bharucha, T., et al. (2020) The emerging spectrum of COVID-19 neurology: clinical, radiological and laboratory findings. *Brain*, 143(10), 3104–3120. <https://doi.org/10.1093/brain/awaa240>
- Patrick, S. W., Henkhaus, L. E., Zickafoose, J. S., Lovell, K., Halvorson, A., Loch, S., et al. (2020) Well-being of parents and children during the COVID-19 pandemic: a national survey. *Pediatrics*, 146(4), e2020016824. <https://doi.org/10.1542/peds.2020-016824>
- Pedrosa, A. L., Bitencourt, L., Frões, A. C., Cazumbá, M. L., Campos, R. G., De Brito, S. B., et al. (2020) Emotional, behavioral, and psychological impact of the COVID-19 pandemic. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.566212>

- Perou, R., Claussen, A. H., Lichstein, J., Black, L. I., Jones, S. E., Danielson, M. L., et al. (2022) Mental health surveillance among children — United States, 2013–2019. *MMWR Supplements*, 71(2), 1–42. <https://doi.org/10.15585/mmwr.su7102a1>
- Petersen, T. L., Møller, L. B., Brønd, J. C., Jepsen, R., & Grøntved, A. (2020) Association between parent and child physical activity: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 17(1). <https://doi.org/10.1186/s12966-020-00966-z>
- Pfefferbaum, B., Jacobs, A. K., Van Horn, R. L., & Houston, J. B. (2016) Effects of displacement in children exposed to disasters. *Current Psychiatry Reports*, 18(8). <https://doi.org/10.1007/s11920-016-0714-1>
- Phua, D. Y., Kee, M. Z., & Meaney, M. J. (2020) Positive maternal mental health, parenting, and child development. *Biological Psychiatry*, 87(4), 328–337. <https://doi.org/10.1016/j.biopsych.2019.09.028>
- Polanczyk, G. V., Salum, G. A., Sugaya, L. S., Caye, A., & Rohde, L. A. (2015) Annual research review: a meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *Journal of Child Psychology and Psychiatry*, 56(3), 345–365. <https://doi.org/10.1111/jcpp.12381>
- Poudel, K., & Subedi, P. (2020) Impact of COVID-19 pandemic on socioeconomic and mental health aspects in Nepal. *International Journal of Social Psychiatry*, 66(8), 748–755. <https://doi.org/10.1177/0020764020942247>
- Racine, N., Cooke, J. E., Eirich, R., Korczak, D. J., McArthur, B., & Madigan, S. (2020) Child and adolescent mental illness during COVID-19: a rapid review. *Psychiatry Research*, 292, 113307. <https://doi.org/10.1016/j.psychres.2020.113307>
- Racine, N., Hetherington, E., McArthur, B. A., McDonald, S., Edwards, S., Tough, S., et al. (2021) Maternal depressive and anxiety symptoms before and during the COVID-19 pandemic in Canada: A longitudinal analysis. *The Lancet Psychiatry*, 8(5), 405–415. [https://doi.org/10.1016/s2215-0366\(21\)00074-2](https://doi.org/10.1016/s2215-0366(21)00074-2)
- Racine, N., Korczak, D. J., & Madigan, S. (2020) Evidence suggests children are being left behind in COVID-19 mental health research. *European Child & Adolescent Psychiatry*, <https://doi.org/10.1007/s00787-020-01672-8>
- Rajabi, M. (2020) Mental health problems amongst school-age children and adolescents during the COVID-19 pandemic in the UK, Ireland and Iran: a call to action and research. *Health Promotion Perspectives*, 10(4), 293–294. <https://doi.org/10.34172/hpp.2020.46>
- Reynolds, C. R., & Richmond, B. O. (1978) What I think and feel: a revised measure of children's manifest anxiety. *Journal of Abnormal Child Psychology*, 6(2), 271–280. <https://doi.org/10.1007/bf00919131>
- Reynolds, C. R., & Richmond, B. O. (2000) *Revised children's manifest anxiety scale (RCMAS) manual*. Los Angeles, CA: Western Psychological Services.
- Rocha, R., Atun, R., Massuda, A., Rache, B., Spinola, P., Nunes, L., et al. (2021) Effect of socioeconomic inequalities and vulnerabilities on health-system preparedness and response to COVID-19 in Brazil: a comprehensive analysis. *The Lancet Global Health*, 9(6), e782–e792. [https://doi.org/10.1016/s2214-109x\(21\)00081-4](https://doi.org/10.1016/s2214-109x(21)00081-4)
- Rodríguez, J. J. (2010) Mental health care systems in Latin America and the Caribbean. *International Review of Psychiatry*, 22(4), 317–324. <https://doi.org/10.3109/09540261.2010.500863>
- Rogers, A. A., Ha, T., & Ockey, S. (2021) Adolescents' perceived socio-emotional impact of COVID-19 and implications for mental health: results from a U.S.-based mixed-methods study. *Journal of Adolescent Health*, 68(1), 43–52. <https://doi.org/10.1016/j.jadohealth.2020.09.039>
- Roos, L. E., Salisbury, M., Penner-Goeke, L., Cameron, E. E., Protudjer, J. L., Giuliano, R., et al. (2020) Supporting families to protect child health: parenting quality and household needs during the COVID-19 pandemic. *SSRN Electronic Journal*, <https://doi.org/10.2139/ssrn.3685933>
- Rubin, K. H., & Mills, R. S. (1988) The many faces of social isolation in childhood. *Journal of Consulting and Clinical Psychology*, 56(6), 916–924. <https://doi.org/10.1037/0022-006x.56.6.916>
- Sama, B. K., Kaur, P., Thind, P. S., Verma, M. K., Kaur, M., & Singh, D. D. (2020) Implications of COVID-19-induced nationwide lockdown on children's behaviour in Punjab, India. *Child: Care, Health and Development*, 47(1), 128–135. <https://doi.org/10.1111/cch.12816>
- Sameroff, A. J. (2009) *The transactional model of development: how children and contexts shape each other*. American Psychological Association, DC, US, pp. 3–21. <https://doi.org/10.1037/11877-001>
- Sapag, J. C., Sena, B. F., Bustamante, I. V., Bobbili, S. J., Velasco, P. R., Mascayano, F., et al. (2018) Stigma towards mental illness and substance use issues in primary health care: challenges and opportunities for Latin America. *Global Public Health*, 13(10), 1468–1480. <https://doi.org/10.1080/17441692.2017.1356347>

- Scholten, S., Velten, J., Bieda, A., Zhang, X. C., & Margraf, J. (2017) Testing measurement invariance of the depression, anxiety, and stress scales (DASS-21) across four countries. *Psychological Assessment*, 29(11), 1376–1390. <https://doi.org/10.1037/pas0000440>
- Sinclair, S. J., Siefert, C. J., Slavin-Mulford, J. M., Stein, M. B., Rennan, M., & Blais, M. A. (2011) Psychometric evaluation and normative data for the depression, anxiety, and stress scales-21 (DASS-21) in a nonclinical sample of U.S. adults. *Evaluation & the Health Professions*, 35(3), 259–279. <https://doi.org/10.1177/0163278711424282>
- Spinelli, M., Lionetti, F., Setti, A., & Fasolo, M. (2020) Parenting stress during the COVID-19 outbreak: Socioeconomic and environmental risk factors and implications for children emotion regulation. *Family Process*, 60(2), 639–653. <https://doi.org/10.1111/famp.12601>
- Stata Corporation. (n.d.) *MI*. in: *Stata Manual*. College Station, TX.
- Taquet, M., Luciano, S., Geddes, J. R., & Harrison, P. J. (2021) Bidirectional associations between COVID-19 and psychiatric disorder: retrospective cohort studies of 62 354 COVID-19 cases in the USA. *The Lancet Psychiatry*, 8(2), 130–140. [https://doi.org/10.1016/s2215-0366\(20\)30462-4](https://doi.org/10.1016/s2215-0366(20)30462-4)
- Thomas, D. S., Jang, S., & Scandlyn, J. (2020) The CHASMS conceptual model of cascading disasters and social vulnerability: the COVID-19 case example. *International Journal of Disaster Risk Reduction*, 51, 101828. <https://doi.org/10.1016/j.ijdr.2020.101828>
- Varatharaj, A., Thomas, N., Ellul, M. A., Davies, N. W., Pollak, T. A., Tenorio, E. L., et al. (2020) Neurological and neuropsychiatric complications of COVID-19 in 153 patients: a UK-wide surveillance study. *The Lancet Psychiatry*, 7(10), 875–882. [https://doi.org/10.1016/s2215-0366\(20\)30287-x](https://doi.org/10.1016/s2215-0366(20)30287-x)
- Varela, R. E., Sanchez-Sosa, J. J., Biggs, B. K., & Luis, T. M. (2008) Anxiety symptoms and fears in Hispanic and European American children: cross-cultural measurement equivalence. *Journal of Psychopathology and Behavioral Assessment*, 30(2), 162–162. <https://doi.org/10.1007/s10862-007-9069-6>
- Vignola, R. C., & Tucci, A. M. (2014) Adaptation and validation of the depression, anxiety and stress scale (DASS) to Brazilian Portuguese. *Journal of Affective Disorders*, 155, 104–109. <https://doi.org/10.1016/j.jad.2013.10.031>
- Vindegaard, N., & Benros, M. E. (2020) COVID-19 pandemic and mental health consequences: systematic review of the current evidence. *Brain, Behavior, and Immunity*, 89, 531–542. <https://doi.org/10.1016/j.bbi.2020.05.048>
- Viner, R. M., Russell, S. J., Croker, H., Packer, J., Ward, J., Stansfield, C., et al. (2020) School closure and management practices during coronavirus outbreaks including COVID-19: A rapid systematic review. *The Lancet Child & Adolescent Health*, 4(5), 397–404. [https://doi.org/10.1016/s2352-4642\(20\)30095-x](https://doi.org/10.1016/s2352-4642(20)30095-x)
- Wade, M., Prime, H., Johnson, D., May, S. S., Jenkins, J. M., & Browne, D. T. (2021) The disparate impact of COVID-19 on the mental health of female and male caregivers. *Social Science & Medicine*, 275, 113801. <https://doi.org/10.1016/j.socscimed.2021.113801>
- Whiteford, H., Ferrari, A., & Degenhardt, L. (2016) Global burden of disease studies: implications for mental and substance use disorders. *Health Affairs*, 35(6), 1114–1120. <https://doi.org/10.1377/hlthaff.2016.0082>
- World Health Organization Coronavirus Disease [COVID-19] Dashboard. (2021) WHO Coronavirus (COVID-19) Dashboard. <https://covid19.who.int> (accessed 1.8.21)
- World Health Organization, Department of Child and Adolescent Health and Development. (1999) *The importance of caregiver-child interactions for the survival and healthy development of young children: a review*. Dept. of Child and Adolescent Health and Development. World Health Organization, Geneva.
- Zamarro, G., & Prados, M. J. (2021) Gender differences in couples' division of childcare, work and mental health during COVID-19. *Review of Economics of the Household*, 19(1), 11–40. <https://doi.org/10.1007/s11150-020-09534-7>
- Zhang, S. X., & Chen, J. (2021) Scientific evidence on mental health in key regions under the COVID-19 pandemic – meta-analytical evidence from Africa, Asia, China, Eastern Europe, Latin America, South Asia, Southeast Asia, and Spain. *European Journal of Psychotraumatology*, 12(1). <https://doi.org/10.1080/20008198.2021.2001192>

AUTHOR BIOGRAPHIES

Anis Ben Briq is associate professor and found director of the program of social policy and evaluation research at the College of Public Policy at Hamad Bin Khalifa University in Qatar. His research interests focus on family and child wellbeing and welfare, social policy, evaluation.



Natalie Williams is a clinical psychologist and associate professor of Child, Youth and Family Studies at the University of Nebraska-Lincoln, in Nebraska, USA. Her research interests focus on family stress, coping, and adaptation in the context of health and illness.

Rosario Esteinou is a family sociologist and has been a researcher for over 30 years at the Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS - Center of Research and Higher Studies in Social Anthropology) in Mexico City. Her research interests focus on family and couple relationships, parenting, adolescents and youth, and family policy.

Iván Darío Moreno-Acero is a researcher at the Family Institute at the University de La Sabana in Bogotá, Colombia. His research interests focus on sociology of the family, sociology of education and research methods.

María Belén Mesurado Member of the Philosophy Institute and Professor of Universidad Austral. Associate researcher at National Scientific and Technical Research Council (CONICET). She obtained her undergraduate degree in Psychology (2003) and a Ph.D. in Psychology (2010) at Universidad Nacional de San Luis in Argentina. Her research interests focus on positive development, parenting, and prosocial behavior.

Patricia Debeljuh is the Director of the Research Center for Work and Family, IAE Business School - Austral University in Buenos Aires, Argentina. She is Academic Director of the Latin American Association of Ethics, Business and Economics (ALENE). Her research interests focus on business ethics, corporate social responsibility, work and family and women leadership.

Jose Storopoli is associate professor of Universidade Nove de Julho (UNINOVE) in Sao Paulo, Brazil. His research interests focus on statistical models and machine learning algorithms for supporting public policy and decision making. Olivia Núñez Orellana is Director of Analysis and Strategic Monitoring of the Association “A Favor de lo Mejor” and former director of the Mexico City section of the John Paul II Pontifical Theological Institute for the Sciences of Marriage and the Family.

Olivia Núñez Orellana is Director of Analysis and Strategic Monitoring of the Association “A Favor de lo Mejor” and former director of the Mexico City section of the John Paul II Pontifical Theological Institute for the Sciences of Marriage and the Family.

Spencer L. James is associate professor of Family Life and an Africana Studies affiliate at Brigham Young University. He directs the Global Families Research Initiative, which focuses on global family relationships and how those relationships influence the wellbeing of children, adolescents, and adults. Within this broader stream of research, he focuses on two lines: the first on the consequences of family relationships for child well-being, and the second addressing how and why people form, maintain, and dissolve romantic relationships. Currently, he is working on several projects that examine how family dynamics and child well-being are linked in sub-Saharan Africa.

How to cite this article: Ben Brik A., Williams, N., Esteinou, R., Acero, I. D. M., Mesurado, B., Debeliuh, P., et al. (2022) Parental mental health and child anxiety during the COVID-19 pandemic in Latin America. *Journal of Social Issues*, 1–29.
<https://doi.org/10.1111/josi.12523>