



COVID-19 Impacts on Families of Color and Families of Children With Asthma

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Abstract

Objective This cross-sectional study quantified differences in (a) social determinants of health (SDOH) and perceived changes in SDOH during the 2019 novel coronavirus (COVID-19) pandemic and (b) COVID-19 psychosocial impacts across four groups: (a) non-Hispanic White (NHW) parents of children with asthma, (b) Black, Indigenous, or other People of Color (BIPOC) parents of healthy children, (c) BIPOC parents of children with asthma, and (d) NHW parents of healthy children (referent). The NIMHD Framework was used to identify SDOHs that may change for families during COVID-19. **Methods** Parents were recruited via Prolific ($N = 321$) and completed questions about COVID-19 family impacts on employment, income, access to food and healthcare, and psychosocial functioning, including discrimination. It was hypothesized that NHW families of children with asthma and BIPOC families would endorse greater negative outcomes relative to NHW parents of healthy children. **Results** BIPOC families experienced greater food insecurity and discrimination relative to NHW parents of healthy children. When compared with the NHW healthy group, COVID-19 resulted in greater parent-reported resource losses for both BIPOC groups and greater reductions in healthcare access for both asthma groups. Children with asthma and BIPOC children had greater distress surrounding COVID-19. BIPOC and NHW parents of children with asthma reported greater worries about resource losses due to COVID-19. **Conclusions** The pandemic is widening inequities for BIPOC families, especially for families of children with asthma. These results highlight the need for interventions that address the needs of underserved communities, providing the infrastructure, policies, and supports needed to reduce health inequities during and after COVID-19.

Introduction

Although the 2019 novel coronavirus pandemic (COVID-19) has had enormous impacts on nearly everyone, it appears to be more detrimental for certain groups (Abrams & Szeffler, 2020a; Fortuna et al., 2020; Patrick et al., 2020). The psychosocial burden of COVID-19 seems to be especially heavy for parents (Patrick et al., 2020), particularly parents of children

with pre-existing medical conditions (e.g., asthma; Pinar Senkalfa et al., 2020; Tural et al., 2020), and Black, Indigenous, or other People of Color (BIPOC) populations (Abrams & Szeffler, 2020a; Fortuna et al., 2020). COVID-19 is shedding a glaring light on the existing racial and health inequities in the United States, with BIPOC populations experiencing greater financial, physical, and mental health burdens during

COVID-19 (Abrams & Szeffler, 2020a; Fortuna et al., 2020). Specifically, BIPOC individuals are disproportionately suffering from COVID-19 (Abedi et al., 2020; Laurencin & McClinton, 2020), a trend mirrored among children, with BIPOC children experiencing higher COVID-19 cases and hospitalizations (Kim et al., 2020).

Social determinants of health (e.g., discrimination, poverty, access to healthcare, housing; henceforth, SDOH) appear to be fueling ethnic/racial disparities in COVID-19 outcomes (Azar et al., 2020), and are also linked to disparities in asthma onset, control, morbidity, and mortality (Williams et al., 2009). COVID-19 is exacerbating existing SDOH factors, with common sequelae of COVID-19 being income and/or employment loss, food insecurity, and changes to healthcare access (Karpman et al., 2020).

National Institute of Minority Health and Health Disparities Research Framework

The National Institute of Minority Health and Health Disparities (NIMHD) Research Framework integrates social ecological theory, life course theory, and an existing National Institute of Aging model to identify factors that are dynamically related and work synergistically to influence health disparities across marginalized populations, including BIPOC populations (Black/African American, Hispanic/Latino, Asian, American Indian [AI]/Alaska Native, and Native Hawaiian/other Pacific Islander; Alvidrez et al., 2019; National Institute on Minority Health and Health Disparities, 2017). This study drew upon the NIMHD Health Disparities Research Framework to contextualize key influences affecting disparities during the COVID-19 pandemic, including SDOH, to identify potential intervention targets. This study examined contributors to and differences in health disparities across individual, interpersonal, and community/societal levels (Supplementary Material 1).

Important Factors for Families of Children With Asthma

Although some research suggests that having asthma may not be associated with increased susceptibility to COVID-19 (Green et al., 2021; Papadopoulos et al., 2020), other research indicates that individuals with moderate to severe asthma may be at higher risk of experiencing severe symptoms if they contract COVID-19 (Centers for Disease Control and Prevention [CDC], 2020). It remains unclear if asthma increases the risk of morbidity/mortality associated with COVID-19 among youth (Abrams & Szeffler, 2020b). For example, some data suggest that the pandemic has resulted in reduced asthma-related emergency room visits (Kenyon et al., 2020) and limited, negative effects on pediatric asthma control

(Papadopoulos et al., 2020). Yet, medical care disruptions, increased exposure to home-based triggers, and distress may also lead to deteriorations in asthma control for others (Oreskovic et al., 2020; Papadopoulos et al., 2020).

SDOH Among Families of Children with Asthma

Pandemic-related changes in SDOH are important to consider for families of children with asthma because deleterious SDOH (e.g., poor housing/neighborhood conditions, poverty, secondhand smoke exposure, and healthcare access difficulties) have a substantial impact on the course of pediatric asthma (Abrams & Szeffler, 2020a), and are often more prevalent for marginalized communities.

Parent and Child Psychosocial Functioning for Families of Children With Asthma

Individual and family psychosocial functioning are important outcomes in their own right, and as seen in Supplementary Material 1, are also contributors to health disparities. Parent and child mental health have been impacted by the pandemic (Patrick et al., 2020). Mental health has deteriorated for 27% of parents (Patrick et al., 2020), and pre- and post-COVID-19 studies have shown that parents are experiencing poorer mental health during the pandemic (Gassman-Pines et al., 2020). Although many children are adapting well during COVID-19, one U.S. study found that 14% of children's mental health worsened during the pandemic (Patrick et al., 2020). Importantly, employment/income loss, caregiver burden, food insecurity, and a history of household illness during COVID-19 have demonstrated associations with poorer parental and child psychological functioning (Gassman-Pines et al., 2020; Patrick et al., 2020; Russell et al., 2020). To date, there is limited psychosocial research with adequate representation of BIPOC families.

The scientific community has noted concerns about increased psychological distress among parents of children with asthma during COVID-19 (Krivec et al., 2020). A cross-sectional Turkish study found that parents of children with lung disease (e.g., cystic fibrosis, primary ciliary dyskinesia, and interstitial lung disease) experienced more COVID-19 anxiety but similar levels of general anxiety and depressive relative to parents of healthy children; based on parent-proxy reports, children with lung diseases experienced more anxiety, but not depression, compared with healthy children (Tural et al., 2020). In a similar Turkish study, children with cystic fibrosis and their mothers had more anxiety relative to their healthy peers, and again maternal anxiety was associated with increased child anxiety (Pinar Senkalfa et al., 2020). One study in Istanbul found that parents of children with asthma ($N = 60$) reported concerns about healthcare access

difficulties during the pandemic, and difficulties consulting with their child's pediatrician was related to increased parental depression (Hepkaya et al., 2020). However, research focused on families of children with asthma remains limited.

Important Factors for BIPOC Families

Racism and Discrimination

Racism and discrimination are included in the NIMHD model (Supplementary Material 1), and have demonstrated associations with chronic stress and a multitude of negative health outcomes that may hinder ability to fight disease (Miller & Vittrup, 2020). Numerous scholars have voiced concerns about ongoing, and potentially worsening, racism and discrimination during the pandemic among Asian (Liu & Modir, 2020), Latinx (Cholera et al., 2020), and Black communities (Alvidrez et al., 2019; Fortuna et al., 2020; Manson, 2020; Miller & Vittrup, 2020). Although there is a paucity of research on COVID-19 impacts on Indigenous (e.g., AI) populations, AI community leaders have expressed concerns for the health of their constituents given their propensity for worse physical and mental health outcomes if infected with COVID-19 (Sandoiu, 2020; Urbatsch & Robledo, 2020). Discrimination among BIPOC families require urgent attention as they are important for these families' current and future mental and physical health (Comas-Díaz et al., 2019; Liu & Modir, 2020).

SDOH Among BIPOC Families

SDOH, often markers of systematic racism, likely contribute to the increased burden of numerous chronic medical conditions (e.g., asthma) and COVID-19 on BIPOC families (Abrams & Szeffler, 2020a; Hooper et al., 2020; Kaiser Family Foundation, 2018; Tai et al., 2021). Emerging research has demonstrated that the following factors contribute to increased COVID-19 risk: prepandemic income disparities (Tai et al., 2021; U.S. Department of Labor, 2020), poorer/denser housing conditions (Brangin, 2020; Dutko et al., 2013; Hooper et al., 2020; Khunti et al., 2020), employment in service jobs or as essential workers (Laurencin & McClinton, 2020; Tai et al., 2021), healthcare access difficulties, lack of health insurance, mistrust of medical providers, housing and food insecurities, and barriers to accessing COVID-19 information (e.g., reduced technology access; Artiga et al., 2020; Bergstresser, 2015; Cholera et al., 2020; Hooper et al., 2020; Tai et al., 2021; Supplementary Material 1). Thus, SDOH are critical factors to consider when examining enhanced COVID-19 risk among BIPOC families; however, many important SDOH are also *deteriorating* during the pandemic, creating greater risk for BIPOC families. BIPOC families are experiencing more employment loss, financial

hardships, and food insecurity during the pandemic relative to non-Hispanic White (NHW) families (Karpman et al., 2020). These COVID-19 changes in SDOH may negatively impact the physical and mental well-being of families now and in the future (Abrams & Szeffler, 2020a).

Parent and Child Psychosocial Functioning Among BIPOC Families

BIPOC parents were already experiencing high prepandemic rates of psychological distress compared with NHW parents (Karpman et al., 2018; Sandstrom et al., 2019). This prepandemic distress is now intersecting with the stress associated with the disproportionate burden of COVID-19 among BIPOC families and the recent, highly publicized demonstrations of racism in the United States, placing BIPOC families at risk for increased mental health burdens (Fortuna et al., 2020). Yet, there is no research that explores the mental health of BIPOC parents or children during COVID-19.

Important Factors for BIPOC Families of Children With Asthma

There is a paucity of psychosocial research focused on children with asthma, and no research with adequate representation of BIPOC families or fathers. However, these areas of research are greatly needed given that Black, Puerto Rican, and Indigenous populations have the highest rates of asthma (American Lung Association, 2020) combined with experiencing additional SDOH (described earlier) due to structural racism. Thus, BIPOC families of children with asthma may be facing greater barriers to healthcare accessibility and asthma management (Abrams & Szeffler, 2020a). A recent study demonstrated that BIPOC adult patients were more likely to have worse asthma control and more COVID-19 resource losses, including employment loss and difficulty affording medications, relative to NHW patients (Baptist et al., 2020). Although the need is clear, there is limited research focused on mental health and SDOH during COVID-19 for BIPOC families of children with asthma.

Current Study

To date, few studies have focused on psychosocial functioning and exposure to detrimental SDOH during the pandemic among BIPOC families and families of children with asthma, and none have focused on BIPOC families of children with asthma. The aim of the current cross-sectional, online study was to quantify group differences in (a) SDOH, including perceived changes in income, parental employment, food security, and mental health and medical care during COVID-19, and (b) COVID-19 psychosocial impacts, e.g., worry about COVID-19 and worry about

finances, across four groups of parents: (a) NHW parents of children with asthma, (b) BIPOC parents of healthy children, (c) BIPOC parents of children with asthma, and (d) NHW parents of healthy children (referent group). The NIMHD Health Disparities Research Framework (Alvidrez et al., 2019; National Institute on Minority Health and Health Disparities, 2017) was used to identify important SDOH factors that may change (i.e., worsen) for families during COVID-19. It was hypothesized that NHW healthy families would have less mental health concerns, less exposures to detrimental SDOH, and less changes to SDOH during COVID-19 relative to NHW families of children with asthma, BIPOC families of healthy children, and BIPOC families of children with asthma, with the largest differences existing between the NHW healthy families and BIPOC families of children with asthma. This study also investigated how parental history of having COVID-19 and child history of COVID-19 testing (due to low numbers of COVID-19 diagnoses) would relate to psychosocial outcomes; it was hypothesized that these experiences would each be related to elevated mental health concerns.

Materials and Methods

Participants and Study Design

This study utilized Prolific (www.prolific.co) (Palan & Schitter, 2018), a crowdsourcing participant panel. Crowdsourcing methods produce comparable results to traditional in-person methodologies (Edgar et al., 2016), and research suggests that Prolific provides data with higher reliability and validity compared with alternative platforms (Peer et al., 2017). This study obtained IRB approval and informed consent for all participants. This study recruited four groups of parents ($N = 321$) from June 2020 to August 2020: (a) NHW parents of children with asthma ($n = 62$, 18.7%), (b) BIPOC parents of children with asthma ($n = 91$, 27.5%), (c) BIPOC parents of healthy children ($n = 100$, 30.2%), and (d) NHW parents of healthy children ($n = 68$, 20.5%; referent group). Inclusion criteria included parents aged ≥ 18 years, and parents as the legal guardian who lived with a child between the ages of 5–17 years. To identify eligible participants for each group, participants first completed a screener that assessed parent age, legal guardianship, and living with a child between the ages of 5–17 years; race/ethnicity and presence of child chronic medical conditions (e.g., asthma and other chronic medication conditions). Screener information from participants eligible for the study was exported and sorted based on group inclusion criteria. Parents who lived with a child with asthma (ages 5–17 years old) were eligible for one of two asthma groups (i.e., NHW or BIPOC parents with a child with asthma).

Parents who self-identified as being Black, AI/Alaskan Native, Latinx, Asian, from an “Other race/ethnic group,” or from multiple racial/ethnic backgrounds (e.g., from a White and other racial/ethnic background) were included in one of the respective BIPOC parent groups. Race and ethnicity were conceptualized as sociocultural constructs. Parents who lived with a child between 5 and 17 years old and who did not have any children in this age group with any chronic medical conditions were eligible for our healthy study groups. After participants were sorted into the study groups, a random number generator was used to select a random subset of parents from each group to participate in the full survey. Participants were reimbursed for screener and survey completion based on the Prolific recommended reimbursement rate (a minimum of \$6.50/hr).

The initial sample included 329 participants. All participant responses were screened for inconsistent responding, nonsensical free text answers, and incorrect responses on attention check items (Chmielewski & Kucker, 2020). Any cases that were flagged as potentially problematic were examined in more detail by four evaluators. Participants who missed $\geq 50\%$ of attention checks were removed ($N = 7$); this threshold was used in an effort to maximize data accuracy while also retaining a sample that is representative of populations of interest (e.g., not excluding parents who may have lower literacy; Chmielewski & Kucker, 2020). One participant was removed due to inconsistent responding resulting in a sample of 321. Due to missing data, sample sizes varied across analyses, with most analyses including 278 individuals with complete data on study variables of interest (86.6% of the sample).

Measures

Demographic Information

Parents reported on family demographics, including parent ethnicity/race, age, gender identity, education level (\geq Bachelor’s Degree vs. lower education), family income, number of children, parent COVID-19 job risk, parent medical conditions, parent and child health insurance status, and child age and gender identity. Child asthma status was assessed by asking parents if their child was ever diagnosed with asthma by a healthcare provider (e.g., doctor); research has documented the validity of parent report of child asthma status (Joesch et al., 2006).

Child COVID-19 Experiences and Impacts

Parents completed the COVID-19 Adolescent Symptom and Psychological Experience Questionnaire-Parent (CASPE-P), a freely available NIH PhenX Toolkit measure (Ladouceur, 2020). This study focused on child, family, peer COVID-19

experiences, changes in family resources due to COVID-19, and how COVID-19 impacted child psychosocial functioning. Parents reported on their target child's personal experiences with COVID-19 (e.g., child tested, diagnosed, or quarantined for COVID-19), family experiences with COVID-19 (e.g., number of household members diagnosed, quarantined, hospitalized, and/or who died from COVID-19), and the child's friends' experiences with COVID-19 (e.g., diagnosed, quarantined, and/or hospitalized for COVID-19). The CASPE-P also assesses perceived changes in SDOH due to COVID-19. Parents indicated (*yes/no*) to which changes in employment or income had occurred due to COVID-19, with the following options: job loss by caregivers, difficulty paying bills or buying necessities (e.g., food), adults having to work longer hours, adults filing for unemployment, and applying for government assistance (e.g., food stamps).

Parents answered questions about how COVID-19 had impacted their child's psychosocial functioning in the past week, including questions in the following domains: emotional experiences due to COVID-19, concerns surrounding COVID-19, past week worry about COVID-19, and stress surrounding the uncertainty and life disruptions caused by COVID-19; all response options ranged from 1 (*very slightly/not at all*) to 5 (*extremely*). Because there was no prior psychometric data available, exploratory factor analyses and other analyses (e.g., internal reliability) were conducted to establish how data about child past week emotional experiences and past week concerns surrounding COVID-19 from this measure should be used for primary analyses. Detailed descriptions of these analyses and the results are presented in [Supplementary Material 2](#). Based on these analyses, two subscales of the past week emotional experiences due to COVID-19 (i.e., diminished positive emotional experiences [Cronbach's $\alpha = .82$] and negative emotional experiences [Cronbach's $\alpha = .94$]) and three subscales from the past week concerns about COVID-19 (i.e., concerns about COVID-19 and child/family health [Cronbach's $\alpha = .92$]; concerns about COVID-19 and resource/educational losses [Cronbach's $\alpha = .87$]; and concerns about family conflict [Cronbach's $\alpha = .85$]) were used in primary analyses.

Parent COVID-19 Experiences and Impacts

Parents completed the Mental Health Impacts module and the Coronavirus Impacts and Pandemic Stress module from the Johns Hopkins University COVID-19 Community Response Survey, a freely available NIH PhenX Toolkit measure ([Mehta, 2020](#)). Questions from the *Coronavirus Impacts and Pandemic Stress* module included assessed if the parent had been diagnosed with COVID-19; if COVID-

19 had changed household income and access to food (response options : 0 = *No* to 3 = *Severely/Frequently*) or access to medical and mental health-care (response options : 0 = *None* to 4 = *Severely*); and if there had been any household stress/discord (response options: 0 = *None*; 1 = *Household members occasionally get short-tempered with one another*; 2 = *Household members frequently get short-tempered with one another*; *children get into physical fights*; 3 = *Household members frequently get short-tempered with one another*; *adults in home throw things or harm one another*). Several questions in the Mental Health Impacts module assessed *anxiety and worry during the pandemic*; exploratory factor analysis identified questions in the primary analyses. Three subscales emerged: General COVID-19 Anxiety (Cronbach's $\alpha = .91$); Resource Loss Concerns (e.g., fears about finances/food during COVID-19; Cronbach's $\alpha = .87$); and COVID-19 Infection Concerns (Cronbach's $\alpha = .90$).

Social determinants of health

Parents answered three questions about past year food insecurity: (a) the food we bought didn't last and we didn't have money to buy more; (b) we couldn't afford to eat balanced meals; and (c) "did adults ever cut down or skip meals because there wasn't enough money for food?" The response options for the first two questions ranged from 0 (*never true*) to 2 (*often true*), and the response options for the third question were *yes/no*. Parents also reported on whether there had been a time during the past year that they needed medical care but did not get it due to cost (*yes/no*). All SDOH items were drawn from the NIH PhenX SDOH protocol ([Phenx, 2020](#)).

Discrimination

Parents completed the Everyday Discrimination Scale ([Williams et al., 1997](#)). This measure had excellent psychometric properties in prior studies ([Krieger et al., 2005](#); [Williams et al., 1997](#)) and in the current sample (Cronbach's $\alpha = .92$). Parents completed an additional question that assessed whether they had ever believed they would have received better medical care if they belonged to a different race/ethnicity ([Phenx, 2020](#)).

Data Analysis

First, analyses identified study group differences in demographic variables (using $\alpha = .1$); parent age, education, and asthma status differed by groups ([Supplementary Material 3](#)). Next, analyses examined study group differences in COVID-19 experiences, after controlling for parent age, education, and child asthma status. Logistic regression analyses were conducted with binary dependent variables; multinomial logistic regressions were used for categorical

dependent variables. ANOVAs were conducted with continuous dependent variables, and, *B* values using robust SEs were reported due to significant heteroskedasticity (the NHW healthy group was the referent group); if significant heteroskedasticity was detected, *F* values were not reported. The same analytic approach was used for the remaining aims. When examining study group differences in SDOH, parental history of COVID-19, and child history of COVID-19 testing were included as covariates given their associations with variables of interest. The remaining analyses controlled for parent age, education, asthma, COVID-19 history, and child COVID-19 testing history. Analyses on child psychosocial functioning included child age and gender as covariates, and analyses on parental psychosocial functioning included parent gender as a covariate. An alpha level of .05 was used; no alpha inflation correction procedures were used given the limited information on COVID-19.

Results

Sample Description

About 50% of the sample was female; the average parent age was 36 years old and the average child age was 8 years old (for detailed participant information, see [Supplementary Material 3](#)). There were no differences in COVID-19 exposures and treatment between the four study groups, after controlling for parent age, education, and child asthma status ([Supplementary Material 4](#)).

Study Group Differences in SDOH Past Year Exposures to SDOH

Initial analyses investigated study group differences in past year SDOH; subsequent analyses examined group differences in perceived changes to SDOH due to COVID-19. BIPOC parents of children with asthma were more likely to run out of food/unable to purchase more food in the past year relative to NHW parents of healthy children. BIPOC parents of healthy children and BIPOC parents of children with asthma experienced more discrimination during the past year relative to NHW parents of healthy children. Parents' experiences of discrimination also occurred within healthcare contexts: BIPOC parents of healthy children ($p = .01$) and of children with asthma ($p = .08$) were more likely than NHW parents of healthy children to have experienced a situation where they believe they would have received better medical care if they were a member of a different race or ethnicity. There were no significant group differences in healthcare access difficulties regarding cost ([Table I](#)).

Perceived COVID-19 Impacts on SDOH

Results revealed that COVID-19 had a more pervasive impact on BIPOC parents of children with asthma relative to other parents. When compared with NHW parents of healthy children, BIPOC parents of children with asthma reported greater difficulties paying bills or purchasing food, more income loss, and more difficulties accessing healthcare due to COVID-19. BIPOC parents of healthy children and NHW parents of children with asthma reported significantly greater income loss compared with NHW parents of healthy children. NHW parents of children with asthma described more healthcare access difficulties compared with NHW parents of healthy children. There were no significant group differences in caregiver employment loss, parents' hourly employment, applications for unemployment or government assistance, or access to mental health treatments. Importantly, parental history of COVID-19, a covariate in the above analyses, was associated with increased risks (i.e., more income loss, food insecurity, health and mental healthcare treatment difficulties, employment loss, and applications for governmental assistance) during the pandemic across analyses. Child history of COVID-19 testing was not associated with increased risk for parent-reported SDOH changes during COVID-19.

Study Group Differences in the Psychosocial Impacts of COVID-19

Child Psychosocial COVID-19 Impacts

Based on parent-proxy reports, children with asthma and BIPOC children (with and without asthma) experienced greater psychosocial struggles during COVID-19 than NHW healthy children ([Table II](#)). When compared with NHW healthy children, NHW children with asthma experienced more past week negative emotional experiences, COVID-19 worry, stress due to the uncertainty ($p = .08$), and life disruptions associated with COVID-19. BIPOC children with asthma and BIPOC healthy children had more past week concerns about personal and family health, concerns about financial resources and educational losses, and more stress due to the uncertainty and life disruptions associated with COVID-19 relative to their NHW healthy peers. BIPOC children with asthma were also thinking more about COVID-19 compared with NHW healthy children. Parental history of COVID-19 was significantly associated with increased child negative emotional experiences due to COVID-19 ($B = 7.81$), concerns about personal and family health ($B = 2.83$), concerns about family conflict ($B = 1.92$), concerns about resource loss and educational losses ($B = 4.38$), and stress surrounding the uncertainty caused by COVID-19 ($B = 0.58$) across analyses. Children who had been tested for COVID-19 experienced more negational emotional experiences due to

Table 1. Conditional Models Examining Family Differences in Social Determinants of Health and COVID-19 Impacts on Social Determinants of Health

Social determinants of health ^a	Study groups								Wald test/F
	NHW parents of healthy children ^b		NHW parents of children w/asthma		BIPOC parents of healthy children		BIPOC parents of children w/asthma		
	Mean (SE)/N (%)	Referent group	Mean (SE)/N (%)	OR (CI)/B using robust SEs ^c	Mean (SE)/N (%)	OR (CI)/B using robust SEs ^c	Mean (SE)/N (%)	OR (CI)/B using robust SEs ^c	
Healthcare access									
Didn't get medical care in past year due to cost	8 (11.8%)	—	5 (8.1%)	0.49 (0.14–1.76)	7 (7.0%)	0.52 (0.17–1.58)	12 (13.2%)	0.86 (0.30–2.48)	2.13, <i>p</i> = .55
Food insecurity in past year									
Food didn't last, and couldn't afford more (range: 0–2)	0.26 (11)	—	0.34 (0.10)	<i>B</i> = 0.08, <i>p</i> = .38, η^2 = 0.003	0.34 (0.10)	<i>B</i> = 0.08, <i>p</i> = .28, η^2 = 0.004	0.51 (0.10)	<i>B</i> = 0.24, <i>p</i> = .02, η^2 = 0.02	—
Couldn't afford to eat balanced meals (range: 0–2)	0.50 (0.11)	—	0.53 (0.10)	<i>B</i> = 0.03, <i>p</i> = .75, η^2 = 0.00	0.53 (0.10)	<i>B</i> = 0.03, <i>p</i> = .69, η^2 = 0.001	0.68 (0.10)	<i>B</i> = 0.18, <i>p</i> = .07, η^2 = 0.01	—
Adults reduced/skipped meals because there wasn't enough money for food	6 (8.8%)	—	7 (11.3%)	1.36 (0.39–4.70)	8 (8.0%)	1.13 (0.35–3.60)	14 (15.4%)	1.93 (0.63–5.92)	1.73, <i>p</i> = .63
Discrimination									
Ever a time you would have gotten medical care if you had belonged to a different race	3 (4.4%)	—	1 (1.6%)	0.29 (0.03–3.01)	19 (19.0%)	5.47 (1.49–20.11)	13 (14.3%)	3.51 (0.88–13.97)	12.63, <i>p</i> = .01
Sum Frequency Score on Everyday Discrimination Scale (range: 0–50)	13.13 (1.70)	—	14.54 (1.62)	<i>B</i> = 1.41, <i>p</i> = .36, η^2 = 0.003	17.41 (1.63)	<i>B</i> = 4.28, <i>p</i> ≤ .001, η^2 = 0.05	18.12 (1.52)	<i>B</i> = 5.00, <i>p</i> ≤ .001, η^2 = 0.05	—
Changes in social determinants of health during COVID-19 ^a									
Caregiver(s) lost job during pandemic	9 (13.2)	—	8 (12.9%)	0.99 (0.30–3.02)	14 (14.0%)	1.26 (0.47–3.35)	17 (18.7%)	1.69 (0.62–4.59)	1.66, <i>p</i> = .65
Having difficulty paying bills/buying food during pandemic	6 (8.8%)	—	9 (14.5%)	1.87 (0.56–6.26)	16 (16.0%)	2.13 (0.72–6.31)	28 (30.8%)	5.27 (1.80–15.40)	12.05, <i>p</i> = .01
Adults having to work longer hours	5 (7.4%)	—	8 (12.9%)	2.88 (0.79–10.53)	12 (12.0%)	2.14 (0.63–7.26)	14 (15.4%)	3.35 (0.98–11.46)	4.01, <i>p</i> = .26
Adult filed for unemployment	9 (13.2%)	—	6 (9.7%)	0.72 (0.22–2.36)	11 (11.0%)	0.90 (0.33–2.49)	9 (9.9%)	0.76 (0.25–2.30)	0.41, <i>p</i> = .94
Applied for public assistance/food stamps	5 (7.4%)	—	3 (4.8%)	0.93 (0.19–4.67)	7 (7.0%)	1.40 (0.37–5.25)	8 (8.8%)	1.73 (0.45–6.65)	1.04, <i>p</i> = .79
Degree COVID-19 has changed house hold income (range: 0–3)	0.90 (0.19)	—	1.35 (0.18)	<i>B</i> = 0.45, <i>p</i> = .02, η^2 = 0.02	1.32 (0.19)	<i>B</i> = 0.43, <i>p</i> = .01, η^2 = 0.03	1.31 (0.17)	<i>B</i> = 0.42, <i>p</i> = .01, η^2 = 0.02	<i>F</i> = 2.96, <i>p</i> = .03, η^2 = 0.03
Degree COVID-19 has changed access to food (range: 0–3)	0.75 (0.15)	—	0.91 (0.14)	<i>B</i> = 0.16, <i>p</i> = .28, η^2 = 0.004	0.90 (0.14)	<i>B</i> = 0.15, <i>p</i> = .18, η^2 = 0.01	0.94 (0.13)	<i>B</i> = 0.19, <i>p</i> = .14, η^2 = 0.01	<i>F</i> = 0.81, <i>p</i> = .45, η^2 = 0.01
Degree COVID-19 reduced access to medical care (range: 0–4)	1.17 (0.21)	—	1.69 (0.20)	<i>B</i> = 0.52, <i>p</i> = 0.03, η^2 = 0.02	1.25 (0.20)	<i>B</i> = 0.09, <i>p</i> = .63, η^2 = 0.001	1.56 (0.21)	<i>B</i> = 0.40, <i>p</i> = .045, η^2 = 0.02	<i>F</i> = 3.18, <i>p</i> = .02, η^2 = 0.03
Degree COVID-19 reduced access to mental healthcare (range: 0–4)	0.84 (18)	—	1.10 (0.17)	<i>B</i> = 0.26, <i>p</i> = .19, η^2 = 0.01	0.96 (0.18)	<i>B</i> = 0.13, <i>p</i> = .39, η^2 = 0.003	0.97 (0.16)	<i>B</i> = 0.13, <i>p</i> = .42, η^2 = .0002	—

Note. NHW = Non-Hispanic White. Estimated marginal means are presented. The cell *N*'s and percentages are based on the full sample (*N* = 321); sample sizes for specific analyses were lower to missing data on covariates.

^aAnalyses controlled for variables found to be different (*p* < .1) between groups (i.e., parent age, parent education, and parent asthma status) and if the child had been tested for COVID-19 and if parent had been diagnosed with COVID-19.

^bReferent Group is Non-Hispanic, White Parents of Healthy Children.

^cIf significant heteroscedasticity was detected, parameter estimates with robust SEs were reported.

Table II. Conditional Models Examining Differences in COVID-19 Psychosocial Impacts on Child

	Study groups								
	NHW parents of healthy children ^b		NHW parents of children w/asthma		BIPOC parents of healthy children		BIPOC parents of children w/asthma		
	Mean (SE)/N (%)	Referent group	Mean (SE)/N (%)	B using robust SEs ^c	Mean (SE)/N (%)	B using robust SEs ^c	Mean (SE)/N (%)	B using robust SEs ^c	
Child COVID-19 psychosocial impacts ^a									
Past week diminished positive emotional experiences because of COVID-19 (range: 5–25)	16.47 (0.91)	—	15.83 (0.86)	$B = -0.64, p = .50, \eta^2 = 0.002$	15.63 (0.88)	$B = -0.84, p = .31, \eta^2 = 0.004$	14.99 (0.81)	$B = -1.48, p = .06, \eta^2 = 0.01$	$F = 1.14, p = .33, \eta^2 = 0.01$
Past week negative emotional experiences because of COVID-19 (range: 10–50)	21.84 (1.59)	—	25.33 (1.49)	$B = 3.49, p = .02, \eta^2 = 0.02$	23.26 (1.53)	$B = 1.42, p = .25, \eta^2 = 0.005$	23.37 (1.41)	$B = 1.52, p = .24, \eta^2 = 0.006$	—
Past week concern about COVID-19 and child/family health (range: 4–20)	9.75 (0.83)	—	10.92 (0.78)	$B = 1.17, p = .14, \eta^2 = 0.008$	11.02 (0.79)	$B = 1.26, p = .049, \eta^2 = 0.02$	11.76 (0.74)	$B = 2.01, p = .003, \eta^2 = 0.04$	$F = 2.46, p = .06, \eta^2 = 0.03$
Past week concern about COVID-19 resource/educational losses (range: 6–30)	11.08 (0.93)	—	12.36 (0.88)	$B = 1.27, p = .17, \eta^2 = 0.007$	12.42 (0.90)	$B = 1.33, p = .06, \eta^2 = 0.01$	12.95 (0.84)	$B = 1.87, p = .02, \eta^2 = 0.02$	—
Past week concern about COVID-19 and family conflict (range: 3–15)	5.52 (0.49)	—	5.63 (0.46)	$B = 0.11, p = .82, \eta^2 = 0$	5.39 (0.48)	$B = -0.13, p = .76, \eta^2 = 0$	5.75 (0.44)	$B = 0.24, p = .60, \eta^2 = 0.001$	—
In the past week, how much was child thinking a lot about COVID-19 (range: 1–5)	2.12 (0.22)	—	2.66 (0.21)	$B = 0.55, p = .01, \eta^2 = 0.02$	2.33 (0.21)	$B = 0.22, p = .19, \eta^2 = 0.007$	2.63 (0.20)	$B = 0.51, p = .01, \eta^2 = 0.03$	—
Past week stress about uncertainty surrounding COVID-19 (range: 1–5)	2.33 (0.20)	—	2.64 (0.19)	$B = 0.31, p = .08, \eta^2 = 0.01$	2.74 (0.20)	$B = 0.41, p = .01, \eta^2 = 0.02$	2.87 (0.20)	$B = 0.54, p = .001, \eta^2 = 0.04$	$F = 3.15, p = .03, \eta^2 = 0.04$
Past week stress about life disruptions due to COVID-19 (range: 1–5)	2.05 (1.63)	—	2.57 (0.20)	$B = 0.52, p = .01, \eta^2 = 0.03$	2.52 (0.20)	$B = 0.47, p = .01, \eta^2 = 0.03$	2.65 (0.19)	$B = 0.60, p \leq .001, \eta^2 = 0.05$	$F = 3.88, p = .01, \eta^2 = 0.04$

Note. NHW = Non-Hispanic White. Estimated marginal means are presented. Higher scores reflect more distress.

^aAnalyses controlled for parent age, parent education, parent asthma status, if the child had been tested for COVID-19, if parent had been diagnosed with COVID-19, child age, and child gender.

^bReferent Group is Non-Hispanic, White Parents of Healthy Children.

^cIf significant heteroscedasticity was detected, parameter estimates with robust standard errors were reported.

^dF tests are only presented when there was not significant heteroscedasticity; to facilitate harmony with the other analyses, when F tests were significant, follow up probing of the main effect was done using B's with robust standard errors, comparing study groups to referent (NHW parents of healthy children).

COVID-19 ($B = 3.86$), concerns about personal and family health ($B = 2.02$), concerns about resource loss and educational losses ($B = 2.61$), worries about COVID-19 ($B = 0.39$), and stress surrounding the uncertainty caused by COVID-19 ($B = 0.50$).

Parent Psychosocial COVID-19 Impacts

BIPOC parents (both groups) and NHW parents of children with asthma were more worried about resource losses due to COVID-19 compared with NHW parents of healthy children; however, there were no group differences in general COVID-19 anxiety or COVID-19 infection concerns. BIPOC parents of healthy children were significantly less likely than NHW parents of healthy children to endorse moderate household discord during the pandemic (e.g., household members frequently being short-tempered with each other/children physically fighting; [Table III](#)). Parental history of COVID-19 was significantly associated with increased likelihood of experiencing moderate ($B = 2.69$) and more significant household discord ($B = 3.44$) during the pandemic across analyses. Parents of children who had been tested for COVID-19 experienced more general COVID-19 anxiety ($B = 2.65$) and more worries about COVID-19 resource losses ($B = 3.63$).

Discussion

This study provides preliminary evidence that families of children with asthma and BIPOC families are experiencing greater amounts of COVID-19-related burdens relative to NHW parents of healthy children. Specifically, BIPOC families (of children with and without asthma) experienced more past year food insecurity and discrimination. COVID-19 has resulted in more parent-reported resource losses for both BIPOC groups and reduced healthcare access for both asthma groups; children with asthma and BIPOC children had more psychological distress surrounding COVID-19. Further, BIPOC and NHW parents of children with asthma were more worried about COVID-19 resource losses. The impacts of COVID-19 on families appear to be wide-reaching, negatively affecting parent and child mental health, and key drivers of overall physical health. Multilevel interventions, potentially guided by the NIMHD Health Disparities Research Framework ([Supplementary Material 1](#)), are needed to support the psychosocial and resource-related well-being of families of children with asthma and families of color ([Alvidrez et al., 2019](#); [National Institute on Minority Health and Health Disparities, 2017](#)).

Racial inequities pervaded the United States before the pandemic, and COVID-19 health disparities are likely to widen for BIPOC families without proper

intervention tactics ([Tai et al., 2021](#)). This study illustrated that BIPOC families are experiencing significantly greater resource losses, healthcare access difficulties, and discrimination during the pandemic. Based on past year experiences, BIPOC families of children with asthma also experienced more food insecurity. Food insecurity may be impacted by the loss of school-based lunches: 45% of lower income BIPOC youth rely on free/reduced priced lunches for adequate nutrition compared with 8% of NHW youth ([Snyder & Musu-Gillette, 2015](#)). These findings are consistent with other research that has documented greater income loss, employment loss, and food insecurity among BIPOC individuals during the pandemic ([Karpman et al., 2020](#)). Results also highlight the potential consequences of ongoing structural racism (see [Supplementary Material 1](#)).

This study demonstrated that families of children with asthma (BIPOC and NHW) have experienced differential impacts during the pandemic, with BIPOC families of children with asthma experiencing the most negative impacts of COVID-19 relative to other study groups. These findings are consistent with past research, which has documented that SDOH were associated with asthma development and course ([Abrams & Szeffler, 2020a](#)). When compared with NHW families of healthy children, BIPOC families of children with asthma had more difficulties paying bills or purchasing food, more perceived income loss, and more perceived difficulties accessing healthcare due to COVID-19. BIPOC families of healthy children and NHW parents of children with asthma also reported greater income loss compared with the NHW healthy group. NHW families of children with asthma reported more healthcare access disruptions. This was the first study to document how COVID-19 is affecting SDOH among families of children with asthma (NHW and BIPOC), and findings illustrated that BIPOC families of children with asthma appear to have experienced the most detrimental impacts. These findings are consistent with another recent study, which demonstrated that Black and Latinx adults with asthma had more resource losses and poorer asthma control during COVID-19 relative to their NHW counterparts ([Baptist et al., 2020](#)).

In this study, the same families who were disproportionately burdened by COVID-19 resource losses (i.e., NHW families of children with asthma, BIPOC families of children with asthma, and BIPOC families of healthy children) also experienced greater psychological distress during the pandemic compared with NHW families of healthy children after adjusting for covariates (i.e., parental history of COVID-19, child history of being COVID-19 testing, etc.). This pattern coincides with other research which documented that COVID-19 resource losses were associated with

Table III. Conditional Models Examining Differences in COVID-19 Psychosocial Impacts on Parent

	Study groups							
	NHW parents of healthy children ^b		NHW parents of children w/asthma		BIPOC parents of healthy children		BIPOC parents of children w/asthma	
	Mean (SE)/N (%)	Referent group	Mean (SE)/N (%)	OR (CI)/B using robust SEs ^c	Mean (SE)/N (%)	OR (CI)/B using robust SEs ^c	Mean (SE)/N (%)	OR (CI)/B using robust SEs ^c
Parent COVID-19 psychosocial impacts ^a								
General COVID-19 anxiety (range: 4–20)	10.62 (0.90)	—	11.52 (0.85)	—	10.66 (0.86)	—	11.15 (0.81)	—
Resource loss concerns (e.g., fears about finances/food during COVID-19; range: 5–25)	11.92 (1.14)	—	15.02 (1.07)	$B = 3.10, p = .01, \eta^2 = 0.03$	14.40 (1.07)	$B = 2.48, p = .01, \eta^2 = 0.02$	14.49 (1.01)	$B = 2.57, p = .01, \eta^2 = 0.02$
COVID-19 infection concerns (range: 3–15)	9.69 (0.75)	—	10.04 (0.67)	—	10.56 (0.72)	—	10.49 (0.67)	—
Household discord during pandemic ^e	—	—	—	—	—	—	—	—
Referent = no household discord	24 (35.3%)	—	23 (37.1%)	—	49 (49.0%)	—	31 (34.1%)	—
Household members occasionally get short-tempered with one another	28 (41.2%)	—	22 (35.5%)	0.83 (0.36–1.91)	41 (41.0%)	0.85 (0.41–1.76)	40 (44.4%)	1.28 (0.59–2.79)
Household members frequently get short-tempered with one another; children get into physical fights	9 (13.2%)	—	6 (9.7%)	0.75 (0.22–2.59)	4 (4.0%)	0.23 (0.06–0.92)	7 (7.7%)	0.60 (0.18–2.07)
Household members frequently get short-tempered with one another; adults in home throw things or harm one another	1 (1.5%)	—	5 (8.1%)	5.17 (0.46–58.34)	1 (1.0%)	0.61 (0.03–11.69)	5 (5.5%)	2.12 (0.18–25.55)

Note. NHW = Non-Hispanic White. Estimated marginal means are presented. Higher scores reflect more distress.

^aAnalyses controlled for parent age, education, asthma status, gender, if the child had been tested for COVID-19, and if parent had been diagnosed with COVID-19.

^bReferent Group is Non-Hispanic, White Parents of Healthy Children.

^cIf significant heteroscedasticity was detected, parameter estimates with robust standard errors were reported.

^dF tests are only presented when there was not significant heteroscedasticity; to facilitate harmony with the other analyses, when F tests were significant, follow-up probing of the main effect was done using B's with robust standard errors, comparing study groups to referent (NHW parents of healthy children).

^eParental asthma status was removed as covariate because it caused errors in model.

poorer parental and child psychological functioning (Gassman-Pines et al., 2020; Patrick et al., 2020; Russell et al., 2020). This is the first study to investigate the psychological impacts of COVID-19 among children with asthma and families of color. Our results are consistent with prior studies that found increased psychological distress among children with cystic fibrosis (Pinar Senkalfa et al., 2020) and other chronic lung diseases (Tural et al., 2020) compared with healthy controls during COVID-19. Findings of this study also illuminated that BIPOC children (with and without asthma) appear to have experienced greater distress, including more worrying about resource losses during the pandemic relative to NHW healthy children. According to the NIMHD Health Disparities Research Framework, elevated mental health concerns and increased exposure to detrimental SDOH are contributors to health disparities (Alvidrez et al., 2019), suggesting that BIPOC children are particularly in need of additional supports during the pandemic to buffer their current exposure to drivers of health inequity.

There were few differences in parental psychological functioning between groups; however, BIPOC parents and NHW parents of children with asthma were more worried about resource losses due to COVID-19 compared with NHW parents of healthy children. This is an important finding because poorer parental psychological functioning during the pandemic has been correlated with more parent-child conflicts (Russell et al., 2020) and poorer child psychological outcomes (Romero et al., 2020). The lack of other differences in parental mental health points to the resilience of BIPOC parents and parents of children with asthma; this individual/familial resilience, and potential community resilience, may buffer against other risks. Future research should investigate possible mechanisms supporting these families' resilience (e.g., social support and cultural involvement/enculturation) to inform disparity reduction interventions. Overall, these findings add to our limited understanding of how COVID-19 is affecting families of children with asthma (Hepkaya et al., 2020), and highlights resilience and the need for resource supports among BIPOC families and families of children with asthma.

Importantly, parental history of having COVID-19 and child history of receiving COVID-19 testing, both covariates in models, were both significantly associated with increased psychological distress among children. Parental COVID-19 history was also associated with numerous deleterious changes to SDOH (e.g., income loss, food insecurity, and healthcare disruptions) and moderate household discord, and child COVID-19 testing history was associated with more COVID-19 general anxiety and worry about resource losses

among parents. These findings highlight the need for systematic screening and referrals for families affected by COVID-19.

Current results highlight the urgent need for multi-level interventions that address SDOH and psychosocial needs of underserved communities, which may contribute to increased infrastructure, policies, and supports needed to systematically reduce health inequities during and after the pandemic (Boulware, 2020). The NIMHD Health Disparities Research Framework (Supplementary Material 1) identified key influences on health disparities for this study, which informs potential intervention targets. For example, community- and societal-level interventions could be used to enhance quality healthcare access for underserved communities, such as creating policies/laws to support medical care and other resources (e.g., economic assistance, water, and food; see the Indian Health Service allocated funds from the CARES Act [Indian Health Service, 2020]), enhancing funding for community health and mental health centers, and enhancing transportation and technology that would aid communities in accessing healthcare. In conjunction with these larger system interventions, interpersonal and individual level interventions (e.g., individual or family therapy for enhancing coping) may help to mitigate risks to positively influence change.

This study advances our understanding of COVID-19 impacts on BIPOC families and families of children with asthma; however, it has notable limitations. The cross-sectional design of this study limits our understanding of the longitudinal impact of COVID-19 and precludes our ability to determine causal relations. Although the use of crowdsourcing methods have demonstrated comparable results to in-lab methods (Edgar et al., 2016) and allowed for nationwide recruitment of individuals from diverse backgrounds, there are also sample limitations. Our sample had higher levels of education and income than found in the general population (U.S. Census Bureau, 2020), which limits the generalizability of findings (e.g., families with lower education/income and families living in rural/underserved areas). Importantly, the disparities found in the current sample may be even more pronounced among a sample with greater representation of families from rural areas, with lower education/income, and from underserved areas. The use of parent-proxy for assessing child psychosocial functioning is another limitation; shared method variance and parental worry may have influenced parent-proxy reports of child psychosocial functioning. Future research should incorporate both child and parent report of psychological COVID-19 impacts to increase generalizability. Several questions that assessed parental COVID-19 concerns lacked appropriate psychometric support from prior literature; however, our factor analytic

approach may offset this concern. Future psychometric validation studies should be conducted on these parental COVID-19 concerns items. Another limitation is that we did not examine current asthma symptoms, severity, morbidity, or duration/type of asthma treatment; future research should investigate how these variables relate to family well-being during the pandemic (e.g., access to medical care, parent and child mental health). Last, it remains unclear how prepandemic levels of SDOH and psychological functioning influenced current pandemic levels.

Despite the noted limitations, this study has several strengths which contribute to the emerging literature related to COVID-19. This study utilized a diverse sample of caregivers from underrepresented backgrounds, including BIPOC families and male caregivers, both populations who are largely understudied or limited in previous pandemic psychosocial research. Findings add to our limited understanding of how COVID-19 is affecting families of children with asthma and BIPOC families, and highlight the importance of enhancing resource supports for families of color and families of children with medical conditions. Future research should identify how SDOH and COVID-19 distress is associated with broader parent and child psychosocial functioning among families of children with asthma and BIPOC families, and how the pandemic may be influencing general family functioning (e.g., changes in school programming during the pandemic may influence parental stress, which in turn affects child psychosocial functioning).

Supplementary Data

Supplementary data can be found at: <https://academic.oup.com/jpepsy>.

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