

# How COVID-19 impacted child and family health and healthcare: a mixed-methods study incorporating family voices

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## Abstract

To describe how social disruptions caused by the COVID-19 pandemic impacted child access to healthcare and child health behaviors in 2020. We used mixed-methods to conduct surveys and in-depth interviews with English- and Spanish-speaking parents of young children from five geographic regions in the USA. Participants completed the COVID-19 Exposure and Family Impact Survey (CEFIS). Semistructured telephone interviews were conducted between August and October 2020. Of the 72 parents interviewed, 45.8% of participants were Hispanic, 20.8% Black (non-Hispanic), and 19.4% White (non-Hispanic). On the CEFIS, the average (*SD*) number of social/family disruptions reported was 10.5 (3.8) out of 25. Qualitative analysis revealed multiple levels of themes that influenced accessing healthcare during the pandemic, including two broad contextual themes: (a) lack of trustworthiness of medical system/governmental organizations, and (b) uncertainty due to lack of consistency across multiple sources of information. This context influenced two themes that shaped the social and emotional environments in which participants accessed healthcare: (a) fear and anxiety and (b) social isolation. However, the pandemic also had some positive impacts on families: over 80% indicated that the pandemic made it “a lot” or “a little” better to care for their new infants. Social and family disruptions due to COVID-19 were common. These disruptions contributed to social isolation and fear, and adversely impacted multiple aspects of child and family health and access to healthcare. Some parents of infants reported improvements in specific health domains such as parenting, possibly due to spending more time together.

## Keywords

COVID-19, Healthcare access, Mixed-methods research, Underserved populations

## INTRODUCTION

In early 2020, the COVID-19 pandemic brought the world to a standstill. The rapid spread of this novel infection and the unprecedented public health measures needed to contain it quickly changed social environments across the USA. The social impacts of the pandemic have been especially difficult for children and their families, who have had to navigate age-specific challenges related to virtual schooling, mask-wearing, and lack of vaccine availability for children. Further, families from low-income and

## Implications

**Practice:** Healthcare providers need to work to rebuild trust in the medical system in order to continue to provide high-quality medical care during the COVID-19 pandemic.

**Policy:** The social impacts of the COVID-19 pandemic are far-reaching, and policies that support a whole-child approach to recovery are imperative.

**Research:** Future research should be aimed at identifying root causes of lack of trust in the medical system during this public health crisis, in order to develop better communication strategies from public health entities in the future.

racial and ethnic minority groups have shouldered a disproportionate burden of both disease prevalence and the social challenges related to the pandemic [1–4]. As strategies are built to support recovery, developing a deeper understanding of how the pandemic has impacted the social fabric of parents and young children, especially those with lower incomes and those who are part of racial and ethnic minority groups, will be critical for an equitable path forward.

Characterizing the full impact of the COVID-19 pandemic on child health will require a broad understanding of how children and families have experienced the pandemic and its secondary effects [5]. The secondary or indirect effects of the COVID-19 pandemic are wide ranging, and may include effects on child development [6], access to education [7, 8], housing instability [9], financial instability [10], food insecurity [11, 12], and limited access to healthcare [13]. In addition, high levels of stress, depression, and mental illness have been a prominent secondary consequence [14]. Due to the rapidly evolving nature of this pandemic relatively little is known about how about how the social disruptions from the pandemic may have impacted child access to healthcare and child health behaviors, especially in racial and ethnic

minority groups that have been disproportionately impacted by the pandemic. Understanding how families have experienced the social consequences of the COVID-19 pandemic will lead to an informed approach to developing strategies to support the recovery of child physical and mental health.

The purpose of this study was to identify social and family disruptions that families experienced during the COVID-19 pandemic and to explore how these impacted child and family health in 2020. We specifically consider how these social and family disruptions impacted child access to healthcare and child health behaviors in 2020. We used a mixed-methods approach to conduct surveys and in-depth interviews with parents of young children from five geographic regions in the USA. We sought to describe how the social and family disruptions of the COVID-19 pandemic were associated with access to healthcare and changes in health behaviors.

## METHODS

### Study design

This was a mixed-methods study, conducting key informant interviews paired with surveys at a single timepoint. Recruitment and data collection occurred between August and October 2020. Participants were recruited from a sample of parent/infant dyads who were already enrolled in an ongoing randomized controlled trial for obesity prevention, called Greenlight Plus (funded by PCORI, contract # AD-2018C1-112). The ongoing trial is being conducted at six sites across five regions of the country: Duke University, New York University, Stanford University, University of North Carolina at Chapel Hill, University of Miami, and Vanderbilt University Medical Center. This study was approved by the Institutional Review Board at Vanderbilt University Medical Center, which served as the central IRB and developed reliance agreements with each participating institution's IRB. In addition to the written informed consent prior to participating in the parent trial, participants also gave additional verbal consent prior to participation in this nested study.

### Greenlight Plus trial study sample

The Greenlight Plus trial recruited 900 parent–infant dyads; this supplemental COVID-19 study was nested within the larger trial. As such, these participants had the same inclusion and exclusion criteria of the parent trial on obesity prevention, and parent–infant dyads were eligible if: parent/legal guardian was English- or Spanish-speaking, infant presented to clinic for the first newborn visit, parent reported to study staff that they intended to bring their child to the index clinic for at least 2 years, parent owned a smartphone with access to data services, and completed baseline data collection. Infants were excluded if they were <34 weeks gestation or birth weight <1,500 g; weight <3rd

percentile, or had any chronic medical problem that may affect weight gain. Parents were excluded if they were <18 years old, had serious mental or neurologic illness, or poor visual acuity (corrected vision worse than 20/50). There were no additional inclusion or exclusion criteria for the COVID-19 supplemental study.

### Mixed-methods study sample

Between August and October 2020, participants enrolled in Greenlight Plus were contacted and invited to participate in surveys and semistructured interviews, either during a planned trial data collection timepoint, or at a separate time if the respondent preferred. Participants were informed that the purpose of this supplemental study was to understand the impact of COVID-19 on participants and were offered an additional \$20 gift card to complete the survey and an additional \$50 gift card to participate in the semistructured interviews. Purposive sampling was conducted to ensure geographical representation across six participating institutions and to include both Spanish- and English-speaking participants.

### Survey

Participants completed quantitative measures, which included the baseline demographics and survey for the overall trial, plus additional survey items that addressed the impact of COVID. All surveys were administered verbally and stored in a secure REDCap database. Demographic characteristics were measured based on a survey developed by the study team. COVID-19 impact was assessed by the COVID-19 Exposure and Family Impact Survey (CEFIS) [15]. The CEFIS consists of two parts. Part 1 reports life disruptions due to COVID-19 via 25 items that measure participant exposure to COVID-19 and a variety of related events. Response options to Part 1 are dichotomous “Yes/No” answers. To gauge total exposure, a summed score can be created (range 0–25), with a higher score representing greater exposure to COVID-19-related events. Part 2 consists of 12 items that measure the impact of COVID-19 on participants' and families' lives. These are scored on a four-point Likert scale with the following response options: 1—Made it a lot better, 2—Made it a little better, 3—Made it a little worse, and 4—Made it a lot worse. We asked participants to base their responses on changes that occurred from the beginning of the COVID-19 pandemic through the date of the survey.

### Interview guide development

A semistructured interview guide was developed to explore parental perceptions of how COVID-19 affected their family's health, healthcare access, and child health behaviors. The concepts of “family health” and “family healthcare access” were not defined for participants; instead, participants'

conceptualization of these constructs was elicited through open-ended questions. Later, we used qualitative analysis to identify relevant themes. Questions were developed based on expert opinion from pediatric health experts, with varied expertise related to early child obesity prevention, health literacy, general pediatrics, and child psychology, and input from the overall trial's Stakeholder Advisory Board, which included parents and healthcare providers. Domains assessed included: (a) family changes due to COVID, (b) obtaining healthcare for the family, and (c) diet and physical activity behaviors. A bilingual translation team with multiple native Spanish-speakers representing different countries of origin developed a consensus Spanish translation of the guide through an iterative process.

#### Interview protocol

Interviews were conducted by three trained interviewers who completed a standard certification process, which included training by experts in qualitative research methods and a mock interview. For participants who preferred Spanish, interviews were conducted by certified bilingual personnel. Interviews lasted 30–45 min and were conducted using a HIPAA-secure version of Zoom or via phone. Interviews were digitally recorded and transcribed verbatim. Interviews conducted in Spanish were translated into English by bilingual staff before analysis. Spanish-speaking coders, to ensure that the translated text retained the same meaning as the original Spanish versions, reviewed all translations.

#### Data analysis

We used descriptive statistics from the quantitative survey data to report patterns in social disruptions and the impact of those disruptions on families' lives. Percentages and means were calculated for demographic characteristics and CEFIS scores for the overall sample and then separately for English- and Spanish-speaking participants. We were then able to compare through convergence and expansion how the qualitative themes related to the quantitative results. To identify themes from the qualitative transcripts, we used a process called thematic analysis [16]. This method uses both an inductive and theoretically driven approach to identify, describe, and organize themes from interviews with the goal of giving voice to participant experiences [17]. Transcripts were initially read in their entirety to learn about broad concepts and to share initial thoughts about repeating themes. An initial codebook was developed based on these discussions and codes were created that were: (a) identified a priori by the research team based on initial research questions, or (b) identified by coders as representing new or emergent themes arising from participants. The initial codebook was reviewed by the entire research team and modified based on feedback. Following the development of

a refined codebook, all transcripts were coded independently by two coders. Differences in coding were examined and adjudicated until consensus was reached. Groupings of codes were organized into themes and subthemes, with illustrative quotes selected to represent each. Data organization, retrieval, and stratification by language were facilitated by using NVivo software [18].

Through triangulation, a process for strategically utilizing both quantitative and qualitative methods together, we examined convergence and expansion [19]. Convergence is a strategy used to determine whether the quantitative and qualitative results provide the same answer to the same question (i.e., whether quantitative assessment of the degree of disruption due to COVID-19 concurs with qualitative interview data regarding participant perceived COVID-19 impacts and their experiences during the pandemic). Expansion is a strategy to determine whether the qualitative data can explain unanticipated findings produced by the quantitative data (i.e., whether the quantitative data that suggest variation in the degree of disruption in the context of COVID-19 pandemic can be further explained by the qualitative data).

#### RESULTS

To arrive at the final study sample, 329 were contacted to determine interest, and 72 (21.8%) agreed to participate in in-depth interviews. Of the 72 parents who participated in interviews, the average (*SD*) age was 30.3 (6.5), and 98.6% were women. The average (*SD*) age of infants at the time of the interview was 4.7 (3.2) months. The majority of participants were from racial and ethnic minority groups: 45.8% of participants were Hispanic, 20.8% Black (non-Hispanic), and 19.4% White (non-Hispanic). Language preference was self-reported as English among 69.4% of participants and Spanish among 30.6% of participants. The participants also reported indicators of low socioeconomic status across a range of domains: 22.2% had not received a high school education, 43.1% had an annual household income below \$35,000, and 31.9% reported financial hardship. Full demographic characteristics of the participants are included in Table 1, stratified by language preference.

#### Quantitative measures: social and family disruptions

Overall, participants reported a high degree of disruption from the COVID pandemic. On the CEFIS Part 1, the average (*SD*) number of social/family disruptions reported was 10.5 (3.8) out of a possible 25. Some of the most common disruptions were closed schools (95.8%), decreased family income (66.2%), and cancelation of important family events (69.0%) (Table 2). Approximately 39% of participants reported that someone in their family had symptoms or was diagnosed with COVID.

**Table 1** | Baseline characteristics by language

	English (N = 50)	Spanish (N = 22)	Total (N = 72)
Parent age (years)	28.5 (5.7)	34.1 (6.7)	30.3 (6.5)
Age of infant at time of interview (months)	4.7 (3.4)	4.7 (2.9)	4.7 (3.2)
Caregiver gender			
Female	49 (98.0%)	22 (100.0%)	71 (98.6%)
Caregiver race or ethnicity			
Black, non-Hispanic	15 (30.0%)	0 (0.0%)	15 (20.8%)
Hispanic	12 (24.0%)	21 (95.5%)	33 (45.8%)
White, non-Hispanic	14 (28.0%)	0 (0.0%)	14 (19.4%)
Other, non-Hispanic	6 (12.0%)	0 (0.0%)	6 (8.3%)
Prefer not to answer	0 (0.0%)	1 (4.5%)	1 (1.4%)
Multiple races or ethnicities	3 (6.0%)	0 (0.0%)	3 (4.2%)
Caregiver born outside of the USA	13 (26.0%)	22 (100.0%)	35 (48.6%)
Caregiver education level			
High school complete or above	46 (92.0%)	10 (45.5%)	56 (77.8%)
Annual household income			
Less than \$10,000	8 (16.0%)	2 (9.1%)	10 (13.9%)
\$10,000–19,999	5 (10.0%)	2 (9.1%)	7 (9.7%)
\$20,000–34,999	9 (18.0%)	5 (22.7%)	14 (19.4%)
\$35,000–49,999	9 (18.0%)	5 (22.7%)	14 (19.4%)
\$50,000 or more	10 (20.0%)	0 (0.0%)	10 (13.9%)
Not sure or prefer not to answer	9 (18.0%)	8 (36.4%)	17 (23.6%)
How difficult is paying monthly bills?			
Not at all difficult	23 (46.0%)	5 (22.7%)	28 (38.9%)
Not very difficult	16 (32.0%)	5 (22.7%)	21 (29.2%)
Somewhat difficult	9 (18.0%)	11 (50.0%)	20 (27.8%)
Very difficult	2 (4.0%)	1 (4.5%)	3 (4.2%)
Number of children living in home			
0	1 (2.0%)	0 (0.0%)	1 (1.4%)
1	19 (38.0%)	6 (27.3%)	25 (34.7%)
2	17 (34.0%)	4 (18.2%)	21 (29.2%)
3	7 (14.0%)	5 (22.7%)	12 (16.7%)
≥4	6 (12.0%)	7 (31.8%)	13 (18.1%)
Marital status			
Married	20 (40.0%)	9 (40.9%)	29 (40.3%)
Unmarried couple living together	12 (24.0%)	6 (27.3%)	18 (25.0%)
Divorced, separated, or widowed	1 (2.0%)	0 (0.0%)	1 (1.4%)
Single, never married	17 (34.0%)	7 (31.8%)	24 (33.3%)
Caregiver general health status			
Excellent	13 (26.0%)	3 (13.6%)	16 (22.2%)
Very good	18 (36.0%)	7 (31.8%)	25 (34.7%)
Good	13 (26.0%)	9 (40.9%)	22 (30.6%)
Fair	6 (12.0%)	3 (13.6%)	9 (12.5%)

**Qualitative analysis: healthcare access**

Since the quantitative survey data indicated that participants had experienced substantial social and family disruption, we sought to understand the impact of these disruptions for families with children on health and healthcare through in-depth interviews. The qualitative analysis revealed multiple levels of themes that influenced accessing healthcare during the pandemic, including two broad contextual themes: (a) lack of trustworthiness

of the medical system and governmental organizations, and (b) uncertainty due to multiple and conflicting sources of information. This context influenced two themes that emerged and shaped the social and emotional environments in which participants accessed healthcare: (a) fear and anxiety and (b) social isolation. Within this context, we identified the following themes that characterized participants' healthcare experiences and health behaviors: (a) changes in seeking healthcare; (b) barriers to

**Table 2 | CEFIS<sup>1</sup> Part 1 (COVID-19 disruptions)**

	Total (N= 71) <sup>b</sup>
CEFIS Part 1 scale score (0–25)	10.5 (3.8)
CEFIS Part 1 items	
We had a “stay at home” order	59 (83.1%)
Our schools or childcare centers were closed	68 (95.8%)
Our child/ren’s education was disrupted <sup>b</sup>	55 (78.6%)
We were unable to visit or care for a family member	45 (63.4%)
Our family lived separately for health, safety or job demands	39 (54.9%)
Someone moved into (or back into) our home	7 (9.9%)
We had to move out of our home	3 (4.2%)
Someone in the family kept working outside the home (essential personnel)	52 (73.2%)
Someone in the family is a healthcare provider/first responder providing direct care	20 (28.2%)
We had difficulty getting food	26 (36.6%)
We had difficulty getting medicine	9 (12.7%)
We had difficulty getting health care when we needed it	10 (14.1%)
We had difficulty getting other essentials	28 (39.4%)
We self-quarantined due to travel or possible exposure	26 (36.6%)
Our family income decreased	47 (66.2%)
A member of the family had to cut back hours at work	52 (73.2%)
A member of the family was required to stop working (expect to be called back)	44 (62.0%)
A member of the family lost their job permanently	26 (36.6%)
We lost health insurance/benefits	7 (9.9%)
We missed an important family event or it was canceled (e.g., wedding, graduation, birth, funeral, travel [including vacation], other)	49 (69.0%)
Someone in the family was exposed to someone with COVID-19	33 (46.5%)
Someone in the family had symptoms or was diagnosed with COVID-19	28 (39.4%)
Someone in the family was hospitalized for COVID-19	6 (8.5%)
Someone in the family was in the Intensive Care Unit (ICU) for COVID-19	4 (5.6%)
Someone in the family died from COVID-19	4 (5.6%)

<sup>1</sup>COVID-19 Exposure and Family Impact Survey.

<sup>b</sup>N = 1 English-speaking interview participant did not respond to the CEFIS survey, and their data are not included in this table. N = 1 Spanish-speaking participant did not respond to the education disruption item, and the rest of their data is included in this table.

accessing the healthcare system; (c) changes in healthcare needs; and (d) changes in health behaviors. A pictorial representation of the potential relationship between these thematic levels is shown in Fig. 1. The authors' developed this visual representation by combining our knowledge of the social-ecological framework and participant responses to illustrate how participant-reported themes related to one another conceptually.

*Theme 1: trustworthiness: (a) medical systems and government organizations and (b) multiple and inconsistent sources of information*

Participants regularly indicated that it was difficult to determine which people and information to trust. As shown in Table 3, one participant said, "I don't really believe anything. I just really mind myself and I just stay home." One subtheme that emerged was uncertainty about trustworthiness of medical systems and government organizations. Participants expressed mixed opinions about whether to trust governmental organizations such as the CDC, with some seeking them out for information and others expressing concerns that politics diminishes sources they would have otherwise trusted. Concerns about trustworthiness extended to medical systems and healthcare providers. Some participants thought these sources might exaggerate dangers related to COVID.

Participants also expressed concerns about navigating multiple additional information sources, which sometimes conflicted and generated additional uncertainty. Family and friends were a common source of information, but the trustworthiness of information from them varied, and

differences of opinion from family generated tension. Social media intensified confusion about whom to trust: some participants indicated confidence in social media generally, and in verified accounts of scientists and health departments in particular, while acknowledging that they had to navigate through substantial potentially false information.

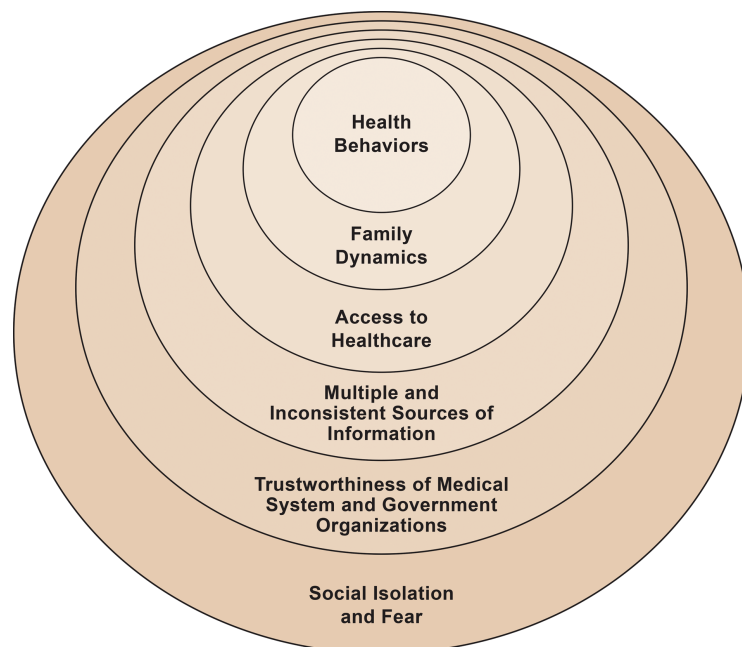
*Theme 2: emotional impact of COVID-19: (a) social isolation and (b) fear*

A consistent theme that emerged in almost all interviews was the perceived emotional effects of COVID-19 (Table 4). Social isolation was common and driven by parents' desire to protect their infants from COVID-19 infection. This was in addition to the social isolation caused by social distancing guidelines. Social isolation from the COVID pandemic affected multiple dimensions, including relationships with family and friends, lack of childcare, and boredom and stress.

Fear also was a dominant emotion expressed. Fear took multiple forms, including fear of exposure, particularly for young infants, and participants described high levels of stress that resulted from shielding their infants from exposure. Participants also described fear of death for themselves and family members; at times, for some, this was fear accentuated by having endured COVID infection.

**Mixed-methods evaluation: impact on healthcare access**

On the CEFIS, parents reported having difficulty accessing medication (12.7%) and healthcare (14.1%; Table 2). This difficulty was especially pronounced for Spanish-speaking participants, with 22% reporting difficulty obtaining healthcare when



**Fig 1 |** Pictorial representation of the potential relationships between themes identified in the qualitative analysis. Based on the social-ecological framework.

**Table 3 | Trustworthiness in the medical system/government organizations and uncertainty due to multiple sources of information: subthemes and illustrative quotes**

Theme	Subtheme	Illustrative quotes
Trustworthiness of medical systems and government organizations	Varying confidence in public health and government organizations	<p>“These are sources that I would’ve traditionally trusted only because World Health Organization is such a big international body that I thought it wasn’t politically, or I don’t know, financially-motivated body at all. But then, I don’t know, I feel like my trust in them and the CDC under this administration especially has diminished.”</p> <p>“So I try to go off of the CDC just because they’re the most reliable.”</p>
	Varying confidence in healthcare providers	<p>“Even if you receive a message from a doctor, you’d be like ‘Has this thing been exaggerated or what?’ You might feel like COVID is being exaggerated, so you don’t have to trust everything, everything you get on your phone. It wasn’t easy to trust it.”</p> <p>“I trust it because COVID is true. I trust whatever they say...from the doctors. They’ve told me a lot. Keep safe. Stay home. Wear a mask. Clean your hand every time. Don’t go around a lot of people. Like that. Yeah, they told me that.”</p>
Trustworthiness of multiple information sources	Absence of trusted authority for information	<p>“I can’t say that there is an authority that I trust 100% at this time for unbiased information. No, there is none.”</p>
	Social media as a key news and information source	<p>“People’s real experiences, are better than the news, right now. Because experiences, we’re getting through the phones. People they’re giving and telling you what’s going on, more than the news. Because they’re kind of exaggerating about a lot of things, on the news... I don’t know, I think the phone is a better way to get more information, than the news.”</p> <p>“Facebook is where I see the news. That’s where I check, like that, this type of information that they publish and all is where I see it. Look, there are two sides to it. See, there is a lot of information that can be real or a lot of information that can be false. That’s where the doubt is, because we don’t know who says the truth or how. That and even though we don’t really know if it is real. We can see a lot, but it’s that—like that”</p>

(Continued)

**Table 3 | Continued**

Theme	Subtheme	Illustrative quotes
	Misinformation shared through social media	“Ugh. I’m part of some family WhatsApp chat. And just the forwarded misinformation, and videos, and links to super shady sites that people just... People regurgitate information that they hear from somebody who heard it from somebody, and they just pass it on without doing due diligence and actually checking out the source of this information is astounding. I’m getting information from left, right, and center on Instagram, on WhatsApp groups”
	Family and friends expressing wide range of opinion	“Some of my family thinks it’s ridiculous and fake, and others don’t... Nobody really knows what’s going on.”
	Limitations of television news as an information source	“I try to watch the news, but the news sometimes don’t get it all right.”

Participants regularly indicated that it was difficult to determine which people and information to trust.

**Table 4 | Social isolation, fear, and anxiety: subthemes and quotations**

Subtheme	Quotation
Limited contact with family	(In relation to pregnant woman’s mother testing positive for COVID) “It was really horrid, just because I already knew in my head that I was not going to be able to see my mom after delivery and for awhile after that. That was especially not for delivery, but because I was going to have a newborn baby and then I had my toddler to think about. I just didn’t want to put them at risk either.”
Limited contact with friends	“It affected my relationship with a few of my friends because I told them not to come see me because I see on social media they’re still hanging out.”
Lack of childcare	“We’re seeing them in a socially distanced way. So when I see my family or when I see friends, people can’t help with him the way that they normally would.”
Stress and boredom	“You cannot go out, that makes you stressed from being stuck inside for so long and not being able to go out, go to the park or anything freely. Being locked up makes you very stressed, even more so for the children, they get bored of being locked up and as a mother you get stressed with them.”
Fear of exposure	“I don’t take her [baby] out at all just because of COVID. I’m really scared that I’ll touch something, then I’ll touch her. I just don’t want to risk anything at all.”
Fear of death	“A fear came to my family that maybe we were going to die, but in that very moment of being afraid there was a lot of faith in our hearts. The only thing we had, prayer. We are a Christian family. The only thing we had, clinging to God, because I tell you that I had a fever and pain in my body as you cannot imagine.”

A consistent theme that emerged in almost all interviews was the perceived emotional effects of COVID-19.



needed. Qualitative analysis of participants' experiences accessing healthcare revealed the following themes, which were related to perceptions of trustworthiness and emotional effects of COVID-19: (a) changes in seeking healthcare and (b) policies that changed healthcare access (Table 5). Notably both these themes were designed to reduce exposure and resulting harm from COVID.

#### *Changes in seeking healthcare*

In interviews, many participants described decreased use of healthcare systems due to fear of COVID. In some cases, participants avoided routine preventive care due to fear of COVID exposure. However, this was more pronounced for their own care, while maintaining the priority of well-child visits for children, especially to receive standard childhood immunizations.

#### *Policies that changed healthcare access*

Hospital policies designed to provide safety were nearly universally experienced with fear, discomfort, and frustration. This was both through the physical discomfort of wearing masks and requiring testing during labor, and, also, the inability for loved ones to be present during important and stressful life events like delivering a baby. Telehealth was experienced variably by participants: some appreciated the convenience, while others thought that lack of a physical examination led to inferior care.

#### *Mixed-methods analysis: changes in health behaviors*

To examine the impact of the pandemic on health behaviors, we performed a quantitative analysis of participants' responses to the CEFIS, then used qualitative findings to explore and understand these findings. On the CEFIS, a majority of participants reported improvement in the following areas: parenting, family members getting along, and their ability to care for infants and other children in the family (Fig. 2). This was reflected in a theme that emerged from qualitative analysis: many participants described more and higher-quality family time (Table 6). This experience was not universal; a substantial minority on the CEFIS indicated worsening in these areas; this was echoed in the qualitative findings by respondents who indicated that their attention to infants was more limited due to juggling the needs of multiple children and at-home learning (Table 6).

On the CEFIS, a majority of participants, but not all, reported an improvement in their own sleep. Qualitative analysis revealed similar substantial variation in impact on participants' sleep, ranging from themes of fewer sleep interruptions for infants, to less organized child and family sleep routines (Table 6). Participants reported mixed impacts of COVID on eating habits, with the majority reporting improvement, and physical activity, with a

majority reporting worsening (Fig. 2). Similarly in the qualitative analysis, participants described some areas of improvement in eating, such as more exclusive breastfeeding and greater involvement in infant feeding, while also describing that older children experienced less healthy eating habits and more screen time. In addition, parents reported significant emotional stress for children who were missing friends at school and who were having difficulty with online school. Families who spoke Spanish reported substantial difficulty accessing online video platforms required for online school.

#### *Differences by race/ethnicity*

In general, there were not major differences by race and ethnicity in the parent-reported social impact of COVID on family health. Key differences that were reported by participants from racial and ethnic minority groups, especially those that spoke Spanish, indicated more challenges accessing safety-net programs designed to mitigate the effects of the COVID-19 pandemic. In addition, Spanish-speaking families also indicated a hesitancy to access governmental programs for fear of changing immigration policies and the potential for the inability to receive government support in the future. Families who spoke Spanish also reported difficulties accessing online video platforms required for online school. Despite these challenges, participants from Spanish-speaking families did not as consistently report higher levels of stress. Rather, they often spoke of silver linings related to these challenges, including the opportunity to spend more time with family.

## **DISCUSSION**

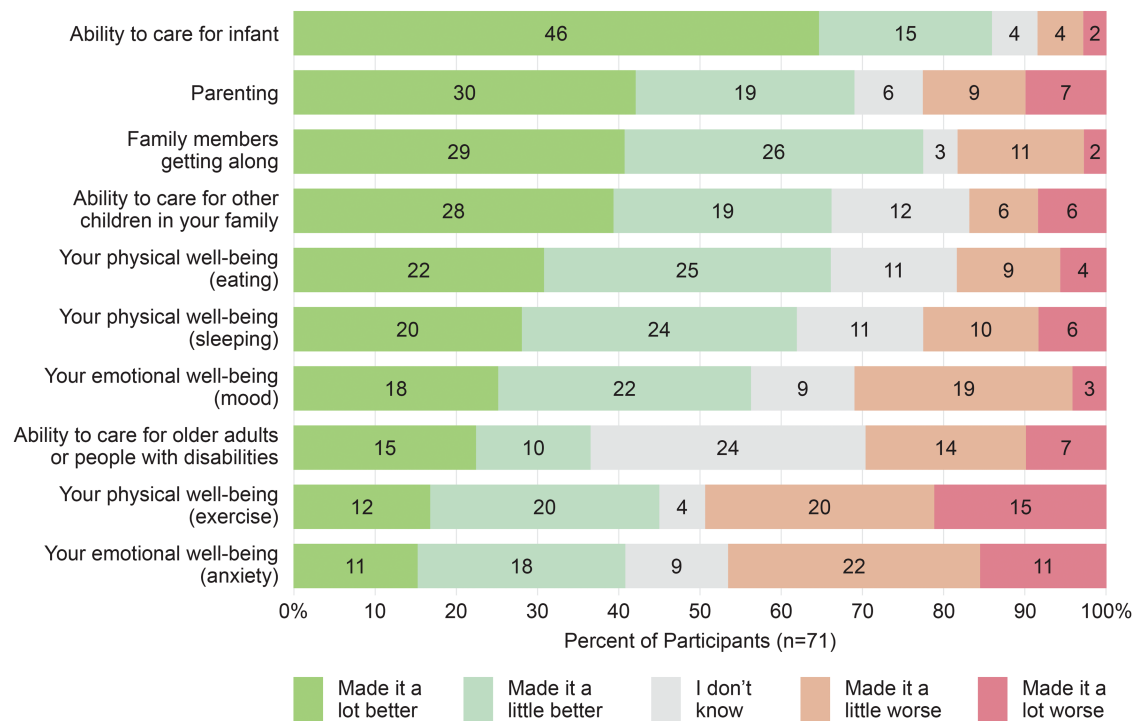
This mixed-methods evaluation of the social impacts of the COVID pandemic revealed that fear, anxiety, and stress dominated parents' experiences with healthcare access and health behaviors. Many of these parents of young infants also had older children and reported high levels of disruption to normal routines in almost every area of their lives. The social isolation and stress caused by the pandemic had many effects on families' healthy eating, physical activity, mental health, and access to healthcare. In addition, participants expressed uncertainty about the trustworthiness of institutions, including governmental and medical organizations, and the reliability of information from multiple sources. However, both the quantitative and qualitative results indicated that the social and family impacts of the pandemic were not universally negative. The majority of parents reported improvements in some areas, including emotional and physical well-being, parenting, and how families got along together. Taken together, it is clear that the secondary effects of the COVID-19 pandemic were nuanced and multifaceted.

Table 5 | Impact of COVID on healthcare system access

Theme	Subtheme	Illustrative quote
Changes in seeking healthcare	Lack of visitors and support during birth experiences	“No. It’s only one patient, one visitor. She was the patient and I was the visitor. That’s it... Yeah, I was by myself when we had to go back to the hospital. I was by myself when I gave birth... because my visitors they were out of town. I had to go in an ambulance.”
	Avoidance of healthcare settings	“We were kind of scared going to the emergency room, because there was a lot of cases on the pandemic. So, everybody was trying not going to the hospital.”
		“Before, I was thinking about trying to access therapy. It came to my mind only because the depression got worse as the pregnancy progressed. But then, when everything shut down, there’s nowhere you can go. And our insurance just does not have good providers that they cover at all... But then, I don’t really want to do virtual anything because I feel like I couldn’t concentrate. And being at home, it just wouldn’t work for me.”
	Limitations to children’s healthcare due to virtual care	“... it’s my first time breastfeeding because I didn’t breastfeed with my daughter, but I was having a lot of problems latching him on, and ... I couldn’t get actually go and see the doctor. Oh, I have only talked to her through the phone... I don’t know why, I feel like I’ve had a lot of questions because it’s not the same like going in-person and talking on the phone. Talking on the phone, I usually forget a lot of things, a lot of questions that I might want to ask.”
Policies that changed healthcare access	Prioritizing healthcare for children	“The truth is, almost nobody [other adults in her household/family] goes to visit the clinics. If not for my children who go for example to check-ups, vaccinations, whatever I have to take them to.”
	Difficulty with healthcare access due to hospital policies that prohibited children from attending visits	“It’s a bit stressful because they don’t allow more children, only the patient and yourself and I don’t have anyone to leave my daughters with. My husband has to stop working those days to take care of the girls so I can go to appointments.”
	Challenges obtaining care due to COVID evaluation protocols	“But I just feel like they need to figure out a better way to determine if somebody’s really actually sick or they have allergies or whatever the case may be, because sending someone over to the COVID side and then they have to sit there and wait... I waited forever, for one, to sit in there and wait on them to come see my baby. Then when he came in, he had the whole everything on and I’m just looking like, ‘Okay.’ Which I get it, you’re trying to protect yourself, but we don’t get COVID. Don’t do that. And I would really appreciate you to hurry and move the process along quickly so I can get out of here because... That’s what upset me about that. If I would have known y’all were going to freak out like that, I wouldn’t have brought my baby to the doctor.”
	Varying experiences with delivery of care by telehealth	“It was a weird feeling to talk over computer to the doctor. I felt like it wasn’t, I felt like I couldn’t get my point across, I guess, because I wasn’t physically there.. they ended up sending him to get an x-ray. Turns out nothing was wrong, but I feel like if we were physically there they would be like... ‘we don’t need to send you to go get an x-ray’ and have to put him through this ordeal.”

Participants reported changes in how they sought out healthcare and how policy changes impacted their access to healthcare.

### Participant Responses on the CEFIS



**Fig 2 |** Participant responses to the COVID-19 Exposure and Family Impact Survey. This figure displays the responses to 12 items that measure the impact of COVID-19 on participants' and families' lives. They are scored on a four-point Likert scale with the following response options: 1—Made it a lot better, 2—Made it a little better, 3—Made it a little worse, and 4—Made it a lot worse.

The use of a mixed-methods approach in this analysis helps inform the somewhat surprising finding that the majority of parents of infants indicated improvements in several health domains related to the pandemic. The most commonly reported domain that showed improvement in the quantitative results was that over 80% indicated that the pandemic made it “a lot” or “a little” better to care for their new infants. The qualitative results would suggest that these improvements were influenced by an increase in family quality time, fewer barriers to breastfeeding, more time to be involved in establishing early child feeding routines, and better sleep routines. In addition, in the quantitative analysis, over 50% of participants reported that their mood was “a lot” or “a little” better. While fear and social isolation were dominant emotions throughout the interviews, one consistent theme that emerged from the qualitative analysis was the ability to spend more quality time with family members and children. Positive experiences described by some parents of infants in this study may reflect the specific developmental stage of infants, and parents’ recognition of potential benefits of having more time to spend focusing on their specific needs, including feeding, play, and sleep patterns.

These results suggest paths to supporting children and their parents on recovery from this pandemic. Given the fear and anxiety that dominated the experience of parents of infants, and the challenges

they described to health access, healthcare organizations may need to take steps to reengage with parents. For example, actively revisiting visitor policies has potential to alleviate the isolation and access challenges described by participants. Recognizing that parents have described healthcare access challenges due to COVID protocols, healthcare organizations may need to identify ways to mitigate impact on access, flow, and experience. Since our participants described mixed experiences with telehealth, careful attention to the future role of telehealth is needed. Proactive, timely, multilingual, and multimedia communication from healthcare organizations regarding the evolving pandemic could help to address the misinformation parents described and help parents of young children reidentify healthcare organizations as their primary and trusted source of health information.

Parents and young children will also need support in recovering from the emotional trauma and stress related to social isolation and the fear of the pandemic. Parents of infants described finding value in increased time together, and policy and program supports may be needed to build upon that recognition and ensure that parents have both the quantity and quality of time needed with infants to foster early relational health. Finally, the healthcare profession and governmental and public health organizations will need to work to reestablish trustworthiness. This holistic support of children and families should not be the exclusive

**Table 6 | Changes in child health behaviors: subthemes and quotations**

Family quality time	Subtheme	Quotation
Family quality time	More and better quality family time	“Well, I have more time with her, and definitely, the silver lining in anything is that my husband has more time with her as well. She’s getting both parents, which I guess I wasn’t really expecting, because I wasn’t expecting COVID to be as bad as it is. That’s a silver lining. She gets both her parents and stuff like that... making sure she’s getting as much love and attention as she needs. Since we’re both home all day, that’s what she’s getting. She’s getting lots and lots of love and attention.”
Sleep routines	Attention divided between multiple children	“I’m splitting my time between her and my toddler when he would normally be in daycare for part of that time. So I give him some individual time and she gets a lot of my own time too but otherwise, if my son was in daycare he would be at daycare for seven hours out of three days out of the week, which would just be her and I.”
Sleep routines	Beneficial for child sleep	“Because we’re not having to get her up at 6:00 am to drop her off. So me working at home, I’ll just let her wake up whenever she wants to. She’s not as fussy in the mornings when she gets to wake up on her own time. That’s helped a lot, too. There’s not as much morning schedule frustrations and meltdowns and stuff.”
Sleep routines	Disorganized sleep routines	“Our sleep schedule is all out of whack... but with them not doing much and them not being on their regular schedule... They’re not taking naps anymore, they’re staying up late. Even if I tell them to go to bed, they’re in the bed just in the dark playing. They’re not tired.”
Eating habits	Greater involvement in infant feeding	“But I feel like, again, it’s been a little bit easier because I can try all these different foods with him, cause I have more time to. And it’s better because I can just sit there and like, give all of my time to him. Introducing these new foods, making sure that they’re pinched off like the tiniest bits. But yeah, I think that’s definitely, probably been a positive part.”
Eating habits	Simpler for exclusive breastfeeding	“It hasn’t affected it. But I guess if I was working, maintaining breastfeeding would be more difficult. So in a way, I’m kind of blessed to not have a job because I’m doing exclusive breastfeeding, and I plan on doing it. And it was easier to establish that being with him 24/7... I pumped a lot with my first one because I couldn’t get him to latch and it was just so stressful. And you constantly worry about losing your milk supply and, oh, just the anxiety. But now, I’m not stressed out at all because there’s nowhere for me to go for an extended period of time, so I don’t have to worry about milk supply because I’m constantly with the baby.”
Eating habits	Less healthy mealtime routines for older children	“He’s snacking more. I think it’s hard to... When, again, you’re going nowhere and every day is the same, especially in the middle of the pandemic and we had a lockdown and we’re just indoors the whole day, I don’t think we had any specific meal time. It was when he said, ‘Oh, I want something.’ I’d make him something. But yeah, I think his snacking increased, again, exponentially.”
Eating habits	Less healthy mealtime routines for older children	“Yeah, they eat a lot... I guess because they’re bored, or... I think sometimes they eat because the food is sitting there. There’s nothing else to do but to eat and watch TV. Or eat and play. Or eat more. You know what I’m saying? Or it could be like... Like I said, the school thing. Because you know like when they go to school, they eat lunch. You know, they eat breakfast, and they have a snack, then they eat lunch, then they come home and eat, but being that they’re at home for breakfast, lunch, dinner, 24... You know what I’m saying? They eat a lot, to me.”

(Continued)

Table 6 | Continued

	Subtheme	Quotation
Older child emotional stress		<p>“Only thing that’s been hard is like my son, like, him not being able to interact with other people because he was used to interacting. Going to school everyday and interacting with his peers... I kind of feel like he’s not getting as much attention as he want or whatever. Because he has no one to interact with. I didn’t for a while, too. When I was pregnant I didn’t have anyone to interact with. But now that she’s here I have company and he doesn’t.”</p>
Screen time	Infant screen time increased	<p>“Yeah, it’s definitely increased. I didn’t think when he was born in January, I wasn’t expecting, or to give him as much screen time as he has gotten. Which isn’t really that much, but I guess it’s been maybe an hour, maybe two hours a day. Which isn’t bad, but it’s still not something when he was born that I was thinking I was going to do. Because I thought I’d have more options, I guess, other things.”</p>
	Older child screen time use increased	<p>“Definitely increased, just due to the fact that we can’t really go anywhere. He doesn’t go to school to see his friends, so he’ll talk to his friends on his game console, the PlayStation 4. While he’s playing with them, that’s how they communicate...And it’s hard to be kind of strict on him, because I kind of try to see it from his point of view, but at the same time it’s difficult, because he is on there a lot.”</p>
Chronic medical conditions		<p>“We’ve all gained weight. For sure. Yeah, yeah, I’m much less active than I was before.”</p> <p>“It’s been hard because with the blood pressure and all, I constantly have to take my blood pressure every day. Sometimes my clip’s not working. We have to call in and do everything over the phone. And then, if the sun is up, I have to wear this hot mask outside, I can’t breathe. So it’s very hard.”</p> <p>“Maybe we eat more because of anxiety, I don’t know. There are days when I’m feeling really bad that I’ve felt a bit depressed, there are days when I feel like I don’t have an appetite and on others I may have anxiety and just eat and eat. I feel like I’ve gained a lot of weight.”</p>

Parents reported changes in family time and child health behaviors related to the pandemic.

purview of one sector of our society. Rather, governmental policies, school systems, local nonprofits, and healthcare should work together to build a comprehensive social recovery plan for families and children.

This study had several limitations. First, as with all qualitative studies, the data are specific to the parents who participated in these interviews and not intended to be generalizable; however, the geographic distribution of participants captured a broad range of parent and infant experience. The strength of this qualitative approach is that it gives voice to people's experiences in a way that quantitative evaluations sometimes cannot. In addition, we recruited families from minority and low socioeconomic status communities. This is an important and often understudied population, though not generalizable to the U.S. population as a whole. Another limitation is that we were not able to robustly compare differences between important racial/ethnic subgroups due to limited sample size. We were not able to compare differences by income, as many participants responded, "I don't know" when asked to report annual household income.

## CONCLUSIONS

The social impact of the pandemic on child and family health access to healthcare has been diverse and multifaceted. Social isolation and fear were ubiquitous, and many parents faced challenges to accessing healthcare for themselves and their children. However, many parents of young infants reported improvements in multiple health domains, largely explained by more family time together. Building a plan for recovery will need a holistic approach from multiple sectors of society that consider these nuanced and multifaceted social impacts of COVID-19.

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## Compliance with Ethical Standards

**Conflict of Interest:** The authors have no financial conflicts of interest.

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