Journal of Pediatric Psychology, 2022, 1–9
https://doi.org/10.1093/jpepsy/jsac048
Original Research Article

Correlates and Patterns of COVID-19 Vaccination Intentions among Parents of Children with Type 1 Diabetes

Christine H. Wang [1], PhD, Jasmine Jones,[2] BS, Marisa E. Hilliard [2], PhD, Carrie Tully [1], PhD, Maureen Monaghan,[1,3] PhD, Brynn E. Marks,[1,3] MD, MPH, Tom Hildebrandt,[4] PsyD, and Randi Streisand,[1,3] PhD

[1]Children's National Hospital, Washington, DC, USA, [2]Baylor College of Medicine & Texas Children's Hospital, Houston, TX, USA, [3]George Washington University School of Medicine, Washington, DC, USA, and [4]Mount Sinai School of Medicine, New York, NY, USA

All correspondence concerning this article should be addressed to Christine H. Wang, PhD, Children's National Hospital, 111 Michigan Ave, NW, Washington, DC 20010, USA. E-mail: cwang@childrensnational.org

Received November 17, 2021; revisions received May 6, 2022; accepted May 7, 2022

Abstract

Objective To examine psychosocial, sociodemographic, medical, and coronavirus disease 2019 (COVID-19) experiences as correlates of COVID-19 vaccination intentions among parents of children with type 1 diabetes (T1D). **Methods** 121 parents of children with T1D (*M*child age = 7.78 ± 1.70; *M*A1c = 8.3% ± 1.5%) in the mid-Atlantic and Southwest regions completed self-report measures in February to March 2021. **Results** Parents' general vaccination behaviors and attitudes were associated with COVID-19 vaccination intentions. Child insurance type and social distancing adherence were associated with vaccination intention in the Southwest site. Higher A1c was associated with lower intention. Vaccine safety was the top reported concern. **Conclusions** COVID-19 vaccination intentions are important to address in parents of youth with health conditions.

Key words: children; COVID-19; diabetes; parents; vaccination.

Introduction

The United States Food and Drug Administration (FDA) issued an emergency use authorization (EUA) of the first COVID-19 vaccine in December 2020. Full vaccination against COVID-19 prevents serious illness, including "long COVID," hospitalization, and death (Dror et al., 2020). Age-based vaccine eligibility have expanded over time, but one long-standing issue that should be proactively addressed is parent vaccine hesitancy, defined as when parents delay or refuse some or all vaccinations for their children (Gowda & Dempsey, 2013). Identifying correlates of parent vaccine hesitancy, intentions, and attitudes is vital to mitigating the current COVID-19 pandemic through high child vaccination (Bass et al., 2021). Given the increased risks of severe illness in people with certain underlying medical conditions, understanding parent COVID-19 vaccination intentions is particularly important in parents of youth with chronic health conditions (Tsankov et al., 2021).

Adults who are parents have higher rates of COVID-19 vaccine hesitancy and avoidance than other non-parent adults (Dror et al., 2020). Parents with higher vaccine hesitancy report that their personal beliefs, based on intuition and vaccine information from trusted relatives and friends, are the most

influential in their vaccination decisions (Rhodes et al., 2020). An international survey in Spring 2020 found that parents with high COVID-19 vaccination intention believed they were protecting their children and others, while parents with low COVID-19 vaccination intention cited the vaccine's novelty and perception of children's low risk of severe COVID-19 illness as barriers (Goldman et al., 2020). Additional predictors of higher parent COVID-19 vaccination intentions included older child age, lack of child chronic illness, and previous childhood vaccinations (e.g., flu vaccine; Goldman et al., 2020). Data from Canada suggest that parents who prioritized COVID-19 risks over potential vaccine side effects and whose children had more complete vaccination histories also had higher parent COVID-19 vaccination intentions (Lackner & Wang, 2021). However, having children with COVID-19 health risk factors was associated with lower parent COVID-19 vaccination intention (Lackner & Wang, 2021).

Data on vaccination intentions in the general population may also inform our understanding of parent vaccination intentions. Among adults, factors associated with higher COVID-19 vaccination intention include knowing someone with severe COVID-19 outcomes (e.g., hospitalization, death), concerns about family member infection, perception of COVID-19 as more severe, previous flu vaccination, and perception of benefits to the community (Chu & Liu, 2021; Coe et al., 2022; Latkin et al., 2021). People who practiced more COVID-19 preventative behaviors (e.g., social distancing, mask-wearing) also had higher COVID-19 vaccination intention (Latkin et al., 2021). Some differences across racial, ethnic, educational, and socioeconomic groups have also emerged: people of color, those with lower-income, and lower education have reported lower COVID-19 vaccination intentions (Bass et al., 2021; Rhodes et al., 2020).

One unique population includes children with type 1 diabetes (T1D). Risk for hospitalization and severe illness from COVID-19 infection is increased among adults with T1D, particularly those with sub-optimal metabolic control (Demeterco-Berggren et al., 2022; Gregory et al., 2021). However, this increased risk has not been observed in youth with T1D (Cardona-Hernandez et al., 2021; Demeterco-Berggren et al., 2022). Specifically, hyperglycemia impairs the immune response and people with diabetes are at higher risk for many types of infection. Relatedly, emerging research from the CDC also shows that, compared to youth (i.e., <18 years old) without COVID-19 infections (matched for age/sex), there is a 2.5× increased risk of new diabetes diagnosis (i.e., type 1, 2 and other diabetes) in youth following COVID-19 infection (Centers for Disease Control and Prevention, 2022a). However, despite these unique considerations for children with T1D, to date, no research has reported on COVID-19 vaccination intentions or related factors in parents of children with T1D. Understanding parent vaccination intentions in this population is important, given increased risk for severe illness from COVID-19 in adults with diabetes, emerging availability of COVID-19 vaccines for the pediatric population (compared to adolescents and adults), and children's reliance on parents for health management and COVID-19 protection.

Thus, the current study aimed to examine psychosocial, sociodemographic, and COVID-19 experiences as possible correlates of COVID-19 vaccination intentions among parents of early school-age children with T1D (i.e., parent intentions to vaccinate their children). The current study occurred 2–3 months after the FDA issued its first EUA for a COVID-19 vaccine for adults when the vaccine was available for individuals ≥12 years.

We hypothesized that past parent vaccine behaviors, lower parental general vaccine hesitancy, worse pandemic experiences (i.e., more COVID-19 exposure and severe outcomes, more social distancing, and more parent COVID-19 distress), and various demographic (i.e., child insurance type, parent race/ethnicity) and T1D-specific medical indicators (i.e., shorter T1D duration, lower hemoglobin A1c [A1c]) would be associated with higher COVID-19 vaccination intention. We also hypothesize that these associations would differ between COVID-19 vaccine-naïve families (i.e., families where no members had received the COVID-19 vaccine) and families where at least one person received the vaccine. Among parents with lower COVID-19 vaccination intention, we explored their concerns and strategies to increase vaccination intentions. Given differences in COVID-19 rates and timelines in the Southwest vs. mid-Atlantic regions of the United States, differences in results were also explored by site.

Methods

Procedures

Participants in the current study were drawn from 157 parents of young children with T1D, who had previously participated in a multi-site randomized clinical trial of a behavioral intervention for parents of children newly diagnosed with T1D (Hilliard et al., 2017; Shneider et al., 2021; Tully et al., 2021). Information on the initial pool of eligible participants has been published elsewhere (Shneider et al., 2021). The trial occurred at two U.S. pediatric hospitals in the mid-Atlantic and Southwest regions between 2015 and 2019. During the COVID-19 pandemic, the sites' institutional review boards gave permission to re-contact participants who had completed all trial activities and follow-ups ≥6 months prior to complete additional

online questionnaires about their COVID-19 pandemic experiences on two occasions without additional consent. The first was in June/July 2020 (Wang et al., 2021) and the second was in February/March, 2021 (focus of this analysis). If two weeks passed without a response, a text and/or email reminder was sent. Participants were compensated $50.

Participants

In February/March, 2021, 121 parents participated, which represents 82% of all eligible participants (see Table I for sociodemographic information; of the 121, 88 [72.7%] came from the original intervention group and 33 [27.3%] were originally in usual care).

Measures

Sociodemographics and Medical Characteristics

Parents self-reported on sociodemographic indicators as part of the original RCT, including parent race/ethnicity and child health insurance type. Child insurance type was dichotomous (public insurance = 1; private insurance = 2) and parent/race ethnicity was categorical (1 = White, non-Hispanic; 2 = Black/African American; 3 = Latinx/Hispanic; 4 = Asian/Asian American, Alaskan Native/Native American, or mixed race; this last group was collapsed for analyses, given the small sample size of each group). Child A1c (most recent) was collected from medical chart, and T1D duration was calculated using the date of diagnosis and date of questionnaire completion.

COVID-19 Pandemic Experiences

The Pandemic Parenting-Type 1 Diabetes (PP-T1D) survey is a self-report questionnaire on parents' COVID-19 experiences developed by this research team (see Wang et al., 2021 for details), and it was completed online by participants. Participants rated each item using the timeframe "Since the COVID-19 pandemic." Only relevant PP-T1D items were included in the current study, such as the following: "Any COVID-19 exposure" was operationalized as whether the participant, their child, or family members had experienced any COVID-19 symptoms, diagnoses, treatments, hospitalizations, or death. "COVID-19 severe exposure" was operationalized as whether the participant reported that they, their child, or other family member had undergone treatments, hospitalizations, or died as a result of contracting COVID-19. The "Any COVID-19 exposure" and "COVID-19 severe exposure" items differ; the later only includes treatments, hospitalizations and death. "Strict COVID-19 social distancing" was operationalized as participants endorsing strictly limiting interactions with others (i.e., self-quarantining).

Parent COVID-19-Specific Distress

This was a domain measured in the PP-T1D that was used in the current study. The total score was created based on the sum of 12 items (rated on a 5-point Likert scale; 1 = not at all; 5 = extremely/almost all of the time) from the PP-T1D measuring parents' reports of their own levels of anxiety, stress, depressive symptoms, eating, sleep, and activity specifically during the COVID-19 pandemic ($\alpha = .84$). Higher scores represented more COVID-19-specific distress.

Vaccination Attitudes and Behaviors

Four items (each with different Likert-scale response options) about COVID-19 vaccine receipt in the family, parents' COVID-19 vaccination intention, general (not COVID-19 specific) parent vaccine hesitancy, and past vaccination behaviors were also included in the PP-T1D in the current study.

Whether someone in the family had already received a COVID-19 vaccine was also dichotomous (yes/no). The 5-point Likert scale item on "Parent COVID-19 vaccination intention" was dichotomized into "higher" (selected response indicating everyone in the family intends to get the COVID-19 vaccine) and "lower" intention (selected any of the following responses: "unsure" who will get vaccinated, "no one" intends to get vaccinated, or "only adults" or "only children" will get vaccinated). The 5-point Likert scale item on "general parent vaccine hesitancy" was dichotomized into "lower" (selected response indicating they were either "not at all" or "not too hesitant") and "higher" general parent vaccine hesitancy (selected response indicating they were "not sure," "somewhat," or "very" hesitant). "Past parent vaccine behavior" was dichotomous (yes/no response to whether parent has declined vaccine in the past for reasons other than allergy/medical); this item was taken directly from the Parent Attitudes about Childhood Vaccines (PACV) Survey (Opel et al., 2011).

Parents who endorsed lower COVID-19 vaccination intention (i.e., "no one" intends to get vaccinated, "unsure" who intends to get vaccinated, "adults only" will get vaccinated) answered an additional item about their COVID-19 vaccine concerns. Parents who reported "no one intends to get vaccinated" and "unsure who intends to get vaccinated" answered a further item on strategies that would increase their COVID-19 vaccine intention (this was not collected from the "adults only" group). These strategies were developed based on prior research on parental vaccine hesitancy and strategies currently (at the time of the study) that were being implemented to increase vaccine acceptance. With the exception of the item from the PACV, all other items were developed by an expert

Table I. *Caregiver and Child Demographic and Medical Characteristics*

Caregiver demographic characteristics	
Site	Mid-Atlantic: 55 (45.4%) Southwest: 66 (54.5%)
Education	Some high school: 14 (11.6%) Some college: 42 (34.7%) College: 26 (21.5%) Graduate/professional: 38 (31.4%)
Gender	Female: 113 (93.4%) Male: 8 (6.6%)
Marital status	Married: 93 (78.2%) Another relationship status: 26 (21.8%)
Race/ethnicity	Non-Hispanic, White: 75 (62.5%) Black/African American: 15 (12.5%) Hispanic/Latina/o/x: 16 (13.3%) Asian American: 10 (8.3%) Multiracial: 3 (2.5%) Alaskan native/American Indian: 1(<1%)
Child sociodemographic and medical characteristics	
Child insurance type	Public: 32 (26.7%) Private: 88 (73.3%)
Child age	7.8 ± 1.7 years
Child A1c ($N = 58$)[a]	8.3% ± 1.5%
Child T1D duration	3.4 ± 72 years

[a]This A1c includes values for 58 participants only, as A1c values were limited due to telehealth diabetes care during the COVID-19 pandemic.

in vaccine hesitancy and have been used in other, ongoing studies. See Appendix.

Data Analytic Plan

All analyses were conducted in SPSS v.27. COVID-19 experience variables, any COVID-19 exposure (1 = yes, 0 = no), COVID-19 severe exposure (1 = yes, 0 = no), strict COVID-19 social distancing (i.e., self-quarantine; 1 = "I strictly limited my interactions with others;" 0 = "I have gone about my normal routine" or "I tried to follow guidelines related social distancing") and parent vaccine attitudes/behavior variables (general parent vaccine hesitancy, 1 = low hesitancy, 2 = high hesitancy; parent COVID-19 vaccination intention, 1 = higher, 0 = lower; vaccine receipt in the family, 0 = no, 1 = yes; past parent vaccine behavior, 0 = no, 1 = yes; see "Vaccination attitudes and behaviors" under Methods section for more details) were all dichotomized.

Parent COVID-19-specific distress, A1c, and T1D duration were continuous. Independent *t*-tests were used to examine continuous variables. χ^2 analyses, Fisher–Freeman–Halton exact tests, and Fisher's exact tests were used to examine the associations between categorical variables; φ, a χ^2-based measure of association between two categorical variables, is provided for interpretation purposes (higher values indicate a stronger association between two categorical variables, with values >.25 considered "very strong" association; Akoglu, 2018). Site differences were examined using subgroup analysis.

Results

Respondent Characteristics

In February/March, 2021, of the 157 possible participants, 148 participants were eligible (i.e., completed their final assessment for the RCT ≥6 months ago), and 121 completed surveys and 27 either declined participation or did not reply to our requests. Compared to those who declined/did not reply, those who completed surveys were more likely to come from the Southwest site [$\chi^2(1) = 3.98$, $p = .046$]. February/March, 2021 respondents had similar demographic indicators (i.e., child insurance type, marital status, parent race/ethnicity; $p > .05$) as those who declined/did not reply, and there were no differences by treatment condition from the original trial.

Vaccine Attitudes, Behaviors, and COVID-19 Vaccination Intentions

At the time of data collection (February/March, 2021), 69.6% ($N = 80$) reported all family members were COVID-19 vaccine-naïve, and 30.4% ($N = 35$) of the respondents had at least one parent and/or adult in the family who had received the COVID-19 vaccine. For the whole sample, 43.4% ($N = 49$) of parents reported high COVID-19 vaccination intention ("everyone"). Among parents with lower COVID-19 vaccination intention, 15.9% ($N = 18$) reported "only adults" intended to receive the COVID-19 vaccine, 22.1% ($N = 25$) reported being "unsure" about the COVID-19 vaccine, and 18.6% ($N = 21$) reported "no one" intended to get the vaccine. No participant reported that "only children" intended to receive the COVID-19 vaccine.

Among COVID-19 vaccine-naïve families, in line with hypotheses, parents who had declined childhood vaccines in the past (pre-pandemic) had higher general parent vaccine hesitancy [$\chi^2(1) = 14.22$, $\varphi = -.44$, $p < .001$) and lower COVID-19 vaccination intention [$\chi^2(1) = 11.73$, $\varphi = .40$, $p < .001$). Parents with higher general vaccine hesitancy had lower COVID-19 vaccination intention [$\chi^2(1) = 10.66$, $\varphi = -.37$, $p = .001$). These associations between past parent vaccine behavior, vaccine hesitancy, and COVID-19 vaccination intention were not significant among vaccinated families ($N = 35$; Fisher exact tests, all p's > .05). Rates of COVID-19 vaccine receipt, COVID-19 vaccination intention, past vaccine behavior, and general vaccine hesitancy were not different based on site (all p's >.05).

Sociodemographics, Medical Characteristics, COVID-19 Experiences, and Parent COVID-19 Vaccination Intentions

Hypotheses about pandemic experiences and demographic indicators and parent vaccine intention were partially supported. In the Southwest site only, child private insurance (compared to public) and strict social distancing (i.e., self-quarantine) were each associated with higher parent COVID-19 vaccination intention [insurance: $\chi^2(1) = 6.50$, $\varphi = .33$, $p = .01$; social distancing: $\chi^2(1) = 8.9$, $\varphi = .38$, $p = .003$]. Parent race/ethnicity, COVID-19 exposure (any or severe), and parent COVID-19-specific distress were unrelated to parent COVID-19 vaccination intention (no site differences; all p's $>.05$).

Hypotheses about pandemic experiences and medical indicators and parent vaccine intention were partially supported. Compared to parents of children with longer T1D durations, parents of children with shorter T1D durations had higher vaccine intentions [3.54 vs. 3.28 years; $t = 2.14$, Cohen's d = .41 (95% CI: .03–.80), $p = .04$], and results were not different between sites ($p > .05$). Furthermore, parents with higher vaccine hesitancy had children with higher A1cs compared to the A1cs of children of parents with lower vaccine hesitancy [8.9% vs. 7.9%; $t = 2.46$, Cohen's d = –.70 (95% CI: –1.26 to –.12), $p = .02$]. Site differences were not examined for A1c due to small sample size. Otherwise, no differences in T1D duration and A1c emerged based on other parent vaccine attitudes.

COVID-19 Vaccine Concerns and Strategies to Increase COVID-19 Vaccination Intention

For the three low intention groups, concern about the vaccine's safety was the top reason for their lower vaccination intention ("no one" = 52%, 11/21; "unsure" = 64%, 16/25; "adult only" = 61%). The second most common reason among respondents who said "no one" intends to be vaccinated was belief that natural immunity was superior (33.3%, $N = 7/21$); among respondents who were "unsure," confusion about what information to trust (48%, $N = 12/25$) was the second most commonly reported concern; and, among respondents who reported "adults only" were getting the COVID-19 vaccine, "waiting to see if an effective treatment becomes available" (16.7%, $N = 3/18$) was reported as the second most common reason for their reasoning.

For respondents who reported "no one intends to be vaccinated" and "unsure who will get vaccinated" (the "adult only" group was not surveyed about strategies), the most commonly endorsed strategy to increase COVID-19 vaccination intentions was having more time to evaluate vaccine safety ("no one": 66.6%, $N = 14/21$; "unsure": 76.0%; $N = 19/25$) and vaccine effectiveness (47.6%, $N = 10/21$; 64.0%; $N = 16/25$). Among respondents who reported "unsure who will get vaccinated," 28% ($N = 7/25$) endorsed recommendations from a trusted healthcare provider would increase their COVID-19 vaccination intention. On the other hand, among respondents who reported "no one intends to be vaccinated," less than 1% said healthcare provider recommendations would be beneficial. Furthermore, less than 1% of both types of respondents reported that recommendations from a community/spiritual leader, government, and/or CDC would affect their COVID-19 vaccination intention.

Discussion

These are the first data on COVID-19 vaccination attitudes, behaviors, and intentions in parents of school-age children with T1D, a recognized risk factor for more severe COVID-19 infection in some adults with T1D. Overall, the results suggest a wide range of intentions for family vaccination and point to potential areas of intervention in order to enhance vaccine uptake.

In the months shortly following the FDA's EUA of the first COVID-19 vaccine for adults (early 2021), less than one-half of parents of children with T1D in this study reported "everyone" in the family, including children, intended to receive the COVID-19 vaccine. This contrasts with data from a pediatric asthma sample in Canada (conducted August, 2020) and a general, international sample (conducted March to May, 2020), which reported approximately two-thirds of parents endorsed vaccination intentions (Drouin et al., 2021; Goldman et al., 2020). These differences may be due to younger child age, which is a predictor of lower parent COVID-19 vaccination intention (Goldman et al., 2020) and defining characteristics of this sample. It is also possible that vaccine intentions may have been more positive in parents of youth with asthma, given that COVID-19 significant impacts on the respiratory system. Also, in the pediatric asthma study, 70% parents had a college education or more (vs. about 50% in the current sample), and higher parent education has been associated with lower parent vaccination hesitancy in general (Gowda & Dempsey, 2013). The comparison studies were conducted when a COVID-19 vaccine did not yet exist, whereas our study was conducted within a few months of the U.S. FDA's EUA of the first COVID-19 vaccine for adults. It is possible that parents may overestimate their vaccination intentions when a vaccine is just a theoretical plausibility, and opinions or intentions may have changed as people had more exposure to media or other discourse about vaccines over time. Finally, cultural, political, and public health differences between countries may have also contributed to different

responses in vaccination intentions across studies (Sallam, 2021).

Results align with adult studies that find adherence to COVID-19 preventative behaviors, such as social distancing, and socioeconomic status (i.e. child private insurance type) are associated with higher COVID-19 vaccination intention (Chu & Liu, 2021; Latkin et al., 2021), though there were significant site differences in our study. The differing COVID-19 restrictions between the two regions, such as mask requirements, business/school openings, as well as historical and sociological differences between the two regions, may explain these site differences; however, such postulations require further empirical support. We found no differences in parent COVID-19 vaccine intention based on parent racial/ethnic identity, differing from earlier studies (Warren et al., 2020). Data are accumulating about temporal shifts in vaccination attitudes, vaccine uptake, and access across racial/ethnic and socio-economic groups in the United States (Liu & Li, 2021), and research on individual medical decisions in racial/ethnic minority groups must be considered in the context of America's history of racial oppression and present-day racial inequities (Corbie-Smith, 2021).

Other studies have shown increased rates of seasonal influenza vaccination among youth with optimal T1D glycemic control, as defined by an A1c $< 7\%$ (CDC, 2022b), suggesting that adherence to diabetes management is positively associated with adherence to recommended vaccination practices. Although we found a statistically significant increase in vaccine intention among more recently diagnosed youth with T1D (3.54 vs. 3.28 years; $p = .04$), the difference of 0.26 years is likely not clinically significant. Further studies including a broader age range are needed to address whether T1D duration and parent vaccine intentions are associated.

Clinically, vaccine recommendations from pediatric healthcare and mental health providers may have an important role on parent COVID-19 vaccine intention, especially for some parents of children with T1D who experience uncertainty about the COVID-19 vaccine due to difficulty identifying trustworthy information sources. The only other reported study of parent COVID-19 vaccination intention in a pediatric chronic illness sample found that contact with a healthcare professional increased intention (Drouin et al., 2021). Briefly assessing parent perceptions of the trustworthiness of their information sources could identify families most likely to benefit from professional recommendations. Pediatric psychologists can have both a direct (e.g., addressing needle phobias, general anxiety management) and indirect (e.g., providing educational materials, evaluate trustworthiness of medical information sources, and training healthcare providers on motivational interviewing skills) role on parents' vaccine intentions.

The current study has several strengths. To our knowledge, this is the one of the few studies to examine parent COVID-19 vaccination perceptions for their children in a pediatric chronic illness population, and the focus on T1D is important given the elevated risks of COVID-19 for adults with diabetes (Drouin et al., 2021). The current study also has more socioeconomic and racial/ethnic diversity than that of most T1D samples, improving generalizability of findings.

The study is not without limitations, including use of the newly developed, unvalidated PP-T1D. However, our use of vaccination-related questions from the PACV Survey (Opel et al., 2011) strengthens our assessment of this important topic. Many factors can influence parent vaccine attitudes, including exposure to COVID-19 misinformation, political ideology, and government mistrust (Corbie-Smith, 2021; Latkin et al., 2021; Loomba et al., 2021), which were not assessed. Moreover, parent vaccination attitudes and behaviors exist on a spectrum (Gowda & Dempsey, 2013), and we did not examine some parts of this spectrum (e.g., parents who may delay the vaccine, but ultimately get vaccinated). Relatedly, no vaccine existed for children (i.e., under 16 years), at the time of data collection; thus, it is unclear how parents' vaccination attitudes and behaviors may change once a COVID-19 vaccine for children is available. Although the CDC stated that people with T1D were at higher risk for severe COVID-19 infection without providing any further stratification of this risk based on age, it is possible that youth with T1D are not a high-risk group and that belief may have impacted vaccination intention, particularly given the lower risk for severe COVID-19 among healthy youth. Furthermore, in addition to multiple waves of the COVID-19 pandemic, several historical national events (Summer 2020 George Floyd Murder, US 2020 presidential election, 6 January, 2021 storming of the U.S Capitol, and the Texas 2021 Winter storm) occurred prior to data collection; the impact of such events on results was not assessed. Also, though child insurance type was also collected at baseline of the original RCT, child insurance type is highly stable; among 30,000 children, only $<1\%$ of children changed from public to private insurance type and vice versa over the course of 12 months (Tumin et al., 2019). Moreover, this study did not have a comparator sample—thus, it is unclear whether the same findings would have borne out in any parent/youth population from these regions recruited at this specific point in time. Relatedly, at the time of data collection, only specific populations were eligible for the COVID-19 vaccine (age, occupation, medical necessity, etc.); thus, responses may

differ if data were collected at a point when the general population was eligible for the vaccine.

Given that child COVID-19 vaccination ultimately rests on parents' vaccination decisions, additional studies focused on *parent* COVID-19 vaccination intentions, and specifically parents of children with chronic illness, are needed. Future studies should include a broader range of constructs (e.g., concern about contracting COVID-19/perceptions of COVID-19 severity, political affiliation, information sources). Given evidence of strategies that have been effective to increase parent vaccination intention (Gowda & Dempsey, 2013), future studies should examine interventions to increase parent COVID-19 vaccination intention and, once COVID-19 vaccines are approved for all children, vaccine uptake. Overall, public health campaigns should focus on highlighting vaccine safety and efficacy, especially for youth who are at elevated risk due to their medical condition.

Acknowledgments

We thank Robin Kochel PhD for her guidance on the assessment of vaccination intentions.

Funding

National Institutes of Diabetes and Digestive and Kidney Diseases 1R01 DK102561 (PI: R.S.).

Conflicts of interest: Dr. Marks has received investigator initiated research support from Tandem Diabetes Care, Inc. and Dexcom.

Data Availability Statement

Data available upon reasonable request.

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Appendix

Vaccine Questions

Have you and/or others in your household already received a COVID-19 vaccine?

a. Yes, but only some/all adults (age 18+)
b. Yes, but only some/all children (age < 18)
c. Yes, everyone in the household
d. Unsure
e. No, no one in the household
f. Decline

When a vaccine for COVID-19 becomes available, and you are given the opportunity, do you intend for you and/or others in your household to receive it?

a. Yes, but only for adults (age 18+) in the household
b. Yes, but only for children (age < 18) in the household
c. Yes, for everyone in the household
d. Unsure
e. No, not for anyone in the household
f. Decline

If you answered (d. or e.) above, please share why you are unsure whether anyone in the home will receive a COVID-19 vaccine.

- I am concerned that it may not be safe
- I am concerned that it may not be effective
- I am confused about what information to trust
- I think that other strategies provide sufficient protection (e.g., masks, hand washing, social distancing)
- I think that developing antibodies and/or immunity naturally is better than a vaccine
- Members of my household already had COVID-19 and have antibodies
- I am waiting to see if an effective treatment becomes available
- Other
- Decline

If you answered (a.), please share why any children in your home may not receive a COVID-19 vaccine.

- I am concerned that it may not be safe for children
- I believe that children are less likely to get COVID-19
- I think that developing antibodies and/or immunity naturally is better than a vaccine
- My child/children already had COVID-19 and have antibodies
- My child/children are immunocompromised and cannot receive vaccines
- I am waiting to see if an effective treatment becomes available
- Other
- Decline

If you answered (d. or e.) above, please share what would make you feel more comfortable about members of your household receiving a COVID-19 vaccine.

- More time to evaluate its safety
- More time to evaluate its effectiveness
- A recommendation from a trusted healthcare professional
- A recommendation from a trusted community leader or spiritual leader
- A recommendation from the Centers for Disease Control
- A recommendation from the government
- Nothing would make me feel more comfortable about receiving a vaccine
- Other
- Decline

In general, how hesitant about vaccines would you consider yourself to be?

- Not at all hesitant
- Not too hesitant
- Not sure
- Somewhat hesitant
- Very hesitant
- Decline

In the past, have you ever decided not to have your child get a vaccine (e.g., seasonal flu or swine flu [H1N1] shots) for reasons other than illness or allergy?

- Yes
- No
- Don't know
- Decline