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Parental attitudes in the pediatric emergency department about the COVID-19 vaccine

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ABSTRACT

Background: COVID-19 vaccinations are now recommended in the United States (U.S.) for children ≥ 6 months old. However, pediatric vaccination rates remain low, particularly in the Hispanic/Latinx population.
Objective: Using the 4C vaccine hesitancy framework (calculation, complacency, confidence, convenience), we examined parental attitudes in the emergency department (ED) towards COVID-19 vaccination, identified dimensions of parental vaccine hesitancy, and assessed parental willingness to have their child receive the COVID-19 vaccine.
Methods: As part of a larger multi-methods study examining influenza vaccine hesitancy, we conducted interviews that included questions about COVID-19 vaccine authorization for children. We used directed content analysis to extract qualitative themes from 3 groups of parents in the ED: Hispanic/Latinx Spanish speaking (HS), Hispanic/Latinx English speaking (HE), non-Hispanic/non-Latinx White English speaking (WE). Themes were triangulated with the Parent Attitudes about Childhood Vaccines (PACV) survey, where higher scores indicate increased vaccine hesitancy.
Results: Factors influencing vaccine hesitancy were mapped to the 4C framework from 58 sets of interviews and PACVs. HE and HS parents, compared to WE parents, had less knowledge about COVID-19 and its vaccine, and more beliefs in COVID-19 vaccine myths. However, both HS and HE parent groups were more inclined to endorse COVID-19 vaccine effectiveness as a reason to have their children vaccinated. HS parents felt that COVID-19 increased their fear of illnesses in general and were worried about confusing COVID-19 with other infections. Median PACV scores of HS (Mdn = 20) and HE (Mdn = 20) parent groups were higher than of WE parents (Mdn = 10), but parental willingness to have their child receive COVID-19 vaccination was similar across groups.
Conclusions: Higher COVID-19 vaccine hesitancy among HS and HE parents compared to WE parents may be attributed to insufficient knowledge about COVID-19, its vaccine, along with COVID-19 vaccine myths. Efforts to provide targeted vaccine education to different populations is warranted.
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1. Introduction

As of early summer 2022, there have been over 13 million child COVID-19 cases reported in the United States (U.S.), representing 19 % of all cases [1]. With growing evidence of their safety and efficacy among all age groups, COVID-19 vaccinations are now recommended in the U.S. for children as young as 6 months old [2,3]. Yet only 60 % of children aged 12–17 years and 30 % of children aged 5–11 years have been fully vaccinated against COVID-19 [4,5].

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Though rates of pediatric COVID-19 vaccination by race/ethnicity are not currently reported by the U.S. Centers for Disease Control and Prevention (CDC), the ten states that have been tracking this data show mixed findings regarding rates among non-White populations as compared to White populations [6,7]. In California, where this study took place, Hispanic/Latinx children aged 5–17 have lower vaccination rates compared to non-Hispanic/non-Latinx White children [8]. However, Hispanic/Latinx children are 2.3 times more likely to be hospitalized due to COVID-19 compared to non-Hispanic/non-Latinx White children [9] and represent a disproportionate percentage of pediatric COVID-19 deaths when compared to their percent of the U.S. population [10].

Vaccine hesitancy, defined as "delay in acceptance or refusal of vaccination despite the availability of vaccinations services," was listed by the World Health Organization (WHO) as one of the top ten threats to global health in 2019 [11,12]. Vaccine hesitancy is complex and context specific, varying across time, place, and vaccine type [13]. Various demographic groups also show differences in vaccine hesitancy. For instance, Spanish language has been associated with increased vaccine hesitancy [14]. To help measure and facilitate a better understanding of vaccination behavior, the WHO and Betsch et al. developed the 4C model, which describes 4 domains of hesitancy [13,15]. The "4 Cs" are *confidence* (e.g., trust in effectiveness and safety of vaccines and the system that delivers them), *convenience* (e.g., physical availability, affordability, willingness to pay, geographical accessibility), *complacency* (e.g., perceived risks of diseases are low, vaccination not seen as necessary) and *calculation* (e.g., individuals' engagement in extensive information search, weighing pros and cons) [13,15]. Recent studies have shown that the most common predictors of COVID-19 vaccine hesitancy are lack of confidence in effectiveness and safety of the vaccine, along with low perceived risk of disease [16–19].

Limited studies assess parental attitudes towards COVID-19 vaccination using the 4C model of vaccine hesitancy [20]. To our knowledge, no studies have examined the parental attitudes of a primarily Hispanic/Latinx population in an emergency department (ED). Because the pandemic has made it more difficult to access routine healthcare, the ED provides an access point to increase pediatric COVID-19 vaccination. The aims of this study were to examine among three groups, Hispanic/Latinx Spanish speaking (HS), Hispanic/Latinx English speaking (HE), and non-Hispanic/Latinx White English speaking (WE): 1) parental attitudes toward COVID-19 vaccination and predictors of parental vaccine hesitancy, 2) parental willingness to have their child receive the COVID-19 vaccine, and 3) associations between parents' willingness to receive the COVID-19 vaccine and willingness to have their child vaccinated when it became available.

2. Methods

2.1. Study design and participants

We conducted a multi-methods study using quota sampling to gather qualitative and quantitative data from 3 groups of parents in the ED (HS, HE, and WE). This study was conducted as part of a larger project examining influenza vaccine hesitancy. We focused on HE and HS parents because these two groups have been underrepresented in the literature on vaccine hesitancy. WE parents are the most well-represented group in the literature on parental vaccine hesitancy and were recruited as a comparison group. We extensively piloted our study methods in Spanish and English. We recruited study participants from an urban tertiary care, free-standing children's hospital ED in southern California with an annual visit volume (pre-pandemic) of over 95,000 visits. Potentially eligible parents were approached during available research team hours. The majority of the interviews were conducted prior to COVID-19 vaccine authorization for children.

HS, HE, and WE parents of children aged $\geq$ 6 months to 12 years of age, presenting to the Children's Hospital Los Angeles (CHLA) ED, were eligible for participation. We chose the upper bound of this age range because parental attitudes towards vaccination for pre-adolescents have been shown to be different from parental attitudes for adolescent vaccination [5]. Exclusion criteria included being a parent who could not speak English or Spanish, the patient triaged as an Emergency Severity Index of 1 (i.e., critical patients), and a patient with chronic complex medical conditions (not including asthma). Children with chronic complex medical conditions were excluded because they have more frequent contact within the healthcare system and opportunities to be vaccinated and have been shown to have different vaccination rates than other children [21,22].

Our multi-methods design [23] involved the collection of qualitative and quantitative datasets within the same session for every research enrollment. After consenting to participate, we engaged each parent in a qualitative semi-structured interview, followed by the administration of the Parent Attitudes about Childhood Vaccines (PACV) survey [24]. We deliberately chose this order to minimize priming bias since the PACV questions specifically ask about vaccine hesitancy, whereas the semi-structured interview consisted of non-directional questions aimed at exploring parents' willingness *or* hesitancy to receive the COVID-19 vaccine for themselves and their children. The institutional review board at our hospital approved this project.

2.2. Qualitative strand

We explored parental attitudes towards COVID-19 vaccination for both themselves and their children with semi-structured interviews [25] in English or Spanish. The semi-structured interview was audio-recorded and transcribed for analysis. The *COVID-19 vaccination questions* were a subset of a longer interview script exploring perspectives on influenza vaccination. Semi-structured interview questions were formulated from an extensive literature review. The 4Cs Vaccine Hesitancy model described above formed the foundation from which questions were created [13,14]. These questions were asked in an open-ended manner to explore the attitudes of enrolled parents and assess parental vaccine hesitancy. We continued with interviews up until the point of thematic saturation within each of the three parent groups. English interviews were conducted by study author JS, while Spanish interviews were conducted by study author, JP, who is fluent and certified in Spanish.

2.2.1. Qualitative data analysis

We used directed content analysis [26] to extract themes from the semi-structured interview transcripts. This approach first involved reviewing and deductively coding the transcripts using a literature-based codebook. This codebook was created via an extensive primary literature search of the main ideas and concepts behind vaccine hesitancy, and then involved inductively coding the same transcripts by creating new codes to fill in gaps and ensure completeness. Directed content analysis was most appropriate because we wanted to validate and further explore the theoretical framework of the 4Cs of vaccine hesitancy, rather than create an original theory.

Two coders were used to establish trustworthiness of qualitative findings [27]: one clinician (JS) and one non-clinical researcher with expertise in qualitative research and coding (AS). The coders met after every 2–4 interviews to review and consolidate coding and reconcile any differences. Coding disputes were resolved

through discussion with co-authors DL and PC. This process continued until thematic saturation was achieved. A final round of interviews was conducted after saturation to confirm that no additional themes emerged. Through discussion with the study team, the themes were then grouped together within the 4C framework [13,14].

2.3. Quantitative strand

Following each semi-structured interview, we administered the PACV survey to the participating parent. This instrument identifies vaccine hesitant parents using 15 items under the domains of (a) Behavior, (b) Safety and Efficacy, and (c) General Attitudes. The tool has been validated in English [22] and re-created in Spanish to help predict underimmunized Hispanic/Latinx children [28]. The PACV focuses exclusively on the confidence component from the 4Cs and was designed using the health belief model framework [29].

At the end of research enrollment, we collected demographic and clinical information, including parent education level and child health insurance type [16,30–38].

2.3.1. Quantitative data analysis and interpretation

Descriptive statistics were performed on demographic, clinical, and PACV data. We interpreted the quantitative results in light of the qualitative findings and identified points of convergence and divergence. Additionally, we discerned similarities and differences between and within the three parent groups, with practical implications for communication and intervention programming.

3. Results

3.1. Qualitative results

Between October 2020-August 2021, we conducted interviews with 58 parents: 26 HS, 20 HE, and 12 WE. Mean parent age was 35.5 years (SD = 5.70, range: 33–51) and mean child age was 6.2 years (SD = 3.57; range: 0.7–12) (Table 1). Our coding generated 62 codes, which we grouped into 4 themes to align with the 4C framework. In this section, we sequentially describe the themes we discovered within the 4C framework and describe the between-group differences for relevant themes. Subthemes and codes are italicized. The parent group responsible for each quote is noted in parentheses following the quote.

3.1.1. Calculation

Multiple parents in our study reported that *community health promotion* was one of the motivators for parents themselves to receive the COVID-19 vaccine, but only a few parents mentioned the same motivation for their children to receive the vaccine: "For me and for every-one, for me and for my children, for the other people out there. Because maybe we can't do much, can we? But if we all put our little grain of sand and did the best we can, then we may get out of this [pandemic] faster." (HS) The HS parents identified *community health promotion* as an advantage of receiving the COVID-19 vaccine more often than HE and WE parents.

3.1.2. Complacency

The theme of complacency encompassed not only the attitudes pursuant to the vaccine, but also factors that may have influenced those attitudes. For example, *perceived susceptibility of getting the disease*, which refers to specific subpopulations (e.g., *older people, children*) at highest risk of getting infected, was reported in all groups. However, the only subpopulation listed by all parent groups as being more susceptible to COVID-19 were individuals with *high-risk medical conditions*. The WE parent group also identified *older people* as being more susceptible to COVID-19 infection. Only the HS parent group also listed children as being more susceptible to COVID-19 infection: "Well, because you know there's a lot of kids getting sick. And you know they're even landing in the hospital. I also knew a lady whose child was in the hospital for a week, and they needed oxygen and they were only 7 years old." (HS)

In addition, *perceived risk of disease*, which has been defined as a subjective evaluation of risk of illness [39] emerged when parents spoke about COVID-19 infection, with differences noted across groups. HS and HE parents were more likely than WE parents to note that COVID-19 increased their overall fear of illness: "I opted not to go to the ER because I felt like everybody that did go to the ER didn't come back out, so I didn't go." (HE) One WE parent even stated that COVID-19 had decreased their fear of illness. Furthermore, concern over the similarity between symptoms of influenza and COVID-19 and fear around confusing the two diseases was higher in HS parents compared to HE and WE parents: "I am a little worried because it's the same reaction. You don't know if you have the flu or if you have the virus." (HS)

3.1.3. Convenience

Convenience was identified as a barrier to COVID-19 vaccination for one HE parent: "I was just waiting for more easily available or accessible, you know, since I didn't have a car or transportation, you know." This was the only instance convenience was mentioned as a reason not to obtain COVID-19 vaccination.

3.1.4. Confidence

Increased perceived safety concerns and side effects of the vaccine were identified as reasons not to obtain COVID-19 vaccination. A similar yet overall small number of parents in each group mentioned *safety* as a concern to COVID-19 vaccination: "Just safety right now, just because they are doing it pretty fast." (WE) In addition to safety, *side effects* were another barrier to COVID-19 vaccination and mentioned most among HE and WE parents: "What are the long-term effects of it, even if it's been studied really, really well, I highly doubt they know the long-term effects already. It's only been out a couple months. And that's I guess that's what concerns me." (HE)

Perceived vaccine effectiveness was one of the most mentioned subthemes amongst all parental groups. Among HS parents, *vaccine effectiveness* was noted as being relevant to decisions regarding the COVID-19 vaccine for children. For the majority of these parents, COVID-19 vaccine effectiveness was a reason for vaccination: "...to keep him from getting sick again or from getting infected again. You get sick less compared to when you don't have the vaccine." (HS) This sentiment was echoed by many parents, but a small number did mention perceived *lack of effectiveness* of the COVID-19 vaccine as a reason not to have their children obtain vaccination: "I don't believe that it's something that will help to prevent the virus." (HE)

Protection of child or family via parent was identified as a reason for parental COVID-19 vaccination in only Hispanic/Latinx parents. Both HS and HE parents endorsed the idea of wanting the COVID-19 vaccine for themselves to protect their child or family when compared to WE: "So I know that if I can get the vaccine to avoid that difference then I'll do it so that in the future I won't be the reason the kids may get sick." (HS)

Increased beliefs in myths and misconception about vaccines were identified as barriers to COVID-19 vaccination. HE parents were the only group with some parents that believed *COVID-19 vaccination causes COVID-19* and HS parents were the only group with some parents that believed *influenza vaccination can prevent COVID-19 infection*. Some HE and WE parents believed that it was better to

Table 1
Demographics Across Study Groups, n (% of Group).

Demographics	Non-Hispanic/Non-Latinx English (n = 12)	Hispanic/Latinx English (n = 20)	Hispanic/Latinx Spanish (n = 26)	All Parents (n = 58)
Relationship to Child				
Mother	8 (67 %)	20 (100 %)	23 (88 %)	51 (88 %)
Father	4 (33 %)	0	3 (12 %)	7 (12 %)
Marital Status				
Married or Living with Partner	11 (92 %)	15 (75 %)	14 (54 %)	40 (69 %)
Single, Separated, or Divorced	1 (8 %)	2 (10 %)	8 (31 %)	11 (19 %)
Missing Data	0	3 (15 %)	4 (15 %)	7 (12 %)
Education				
No High School Diploma	0	1 (5 %)	13 (50 %)	14 (24 %)
High School Diploma or Equivalent	0	6 (30 %)	5 (19 %)	11 (19 %)
Some College	1 (8 %)	7 (35 %)	5 (19 %)	13 (22 %)
College Graduate	11 (92 %)	4 (20 %)	0	15 (26 %)
Missing Data	0	2 (10 %)	3 (12 %)	5 (9 %)
Primary Language at Home				
Spanish	0	10 (50 %)	25 (96 %)	35 (60 %)
English	10 (83 %)	9 (45 %)	1 (4 %)	20 (34 %)
Another Language or *Missing Data*	2 (17 %)	1 (5 %)	0	3 (5 %)
Household Size				
3 Members	2 (17 %)	4 (20 %)	1 (4 %)	7 (12 %)
4–6 Members	10 (83 %)	11 (55 %)	21 (80 %)	42 (72 %)
7 or More Members	0	4 (20 %)	3 (12 %)	7 (12 %)
Missing Data	0	1 (5 %)	1 (4 %)	2 (3 %)
Annual Household Income				
< $20,000	0	3 (15 %)	11 (42 %)	14 (24 %)
$20,000-$49,999	0	4 (?%)	7 (?%)	11 (?%)
$50,000-$74,999	1 (8 %)	1 (5 %)	1 (4 %)	3 (5 %)
$75,000-$99,999	1 (8 %)	3 (15 %)	0	4 (7 %)
≥ $100,000	7 (58 %)	1 (5 %)	0	8 (14 %)
Prefer Not to Answer	3 (25 %)	7 (35 %)	6 (23 %)	16 (28 %)
Missing Data	0	1 (5 %)	1 (4 %)	2 (3 %)
Child Sex, Male	5 (42 %)	15 (75 %)	17 (65 %)	37 (64 %)
ED Visit Acuity*				
Level 5 (Non-Urgent)	2 (17 %)	1 (5 %)	0	3 (5 %)
Level 4 (Semi-Urgent)	3 (25 %)	4 (20 %)	5 (19 %)	12 (21 %)
Level 3 (Urgent)	6 (50 %)	13 (65 %)	20 77 %)	39 (67 %)
Level 2 (Emergent)	1 (8 %)	2 (10 %)	1 (4 %)	4 (7 %)
ED Visits During Last 12 Months				
1	11 (92 %)	12 (60 %)	17 (65 %)	40 (69 %)
2	1 (8 %)	4 (20 %)	7 (27 %)	12 (21 %)
3 or More	0	4 (20 %)	2 (8 %)	6 (10 %)
Primary Medical Physician for Child, Yes	12 (100 %)	19 (95 %)	23 (88 %)	54 (93 %)
Missing Data	0	1 (5 %)	0	1 (2 %)
Child Health Insurance Status**				
Public	2 (17 %)	18 (90 %)	24 (92 %)	44 (76 %)
Private	10 (83 %)	1 (5 %)	0	11 (19 %)
None (Self-Pay)	0	0	2 (8 %)	2 (3 %)
Missing Data	0	1 (5 %)	0	1 (2 %)

* Acuity levels were from the Emergency Severity Index (ESI).
** Child insurance and parent groups were significantly associated ($p<0.001$); specifically, children in the non-Hispanic/non-Latinx White English-speaking parent group were most likely to have private insurance ($z=5.0$).

obtain *natural immunity from COVID-19 infection* than from the COVID-19 vaccine compared to no parents in the HS group.

Decreased knowledge about disease or vaccine was identified amongst all parental groups. Fund of knowledge is subjective but when examining the parental groups, HS and HE parents demonstrated less and/or incorrect knowledge about COVID-19 and COVID-19 vaccination compared to WE parents: "That for me it is not the time to get that vaccine, that is for those that are admitted, intubated, they have to give it to those who are in a hospital to help them improve. If one is healthy there is no need to get it." (HS)

3.2. Quantitative results

We examined the frequencies of COVID-19 vaccine intent to vaccinate as reported by parents for themselves and their children (Table 2). Although we did not find a significant association between the parent groups and the COVID-19 vaccination status of parents and children ($p = 0.88$), there were 8 (31 %) HS parents, compared with only 2 (10 %) HE and 3 (25 %) WE parents, who said they would vaccinate themselves and their children at the time of study participation.

Of the 58 parents we interviewed, 56 were able to complete the PACV; 2 did not finish due to time constraints. Each parent group had a median PACV score of less than 50, which is considered non-hesitant, but we found that HS and HE parents had higher medians suggesting greater vaccine hesitancy compared to WE parents (Fig. 1).

4. Discussion

Using a multi-methods approach guided by the 4C framework, we determined reasons for COVID-19 vaccine hesitancy among parents from three different groups: HS, HE, and WE. We identified possible facilitators and barriers to increasing uptake of COVID-19 vaccination in children. Overall, 54 % HS, 40 % HE and 42 % of WE parents stated hypothetical willingness to vaccinate their children.

Table 2
Parent and Child COVID-19 Vaccination Scenarios, n (% of Group).

COVID-19 Vaccination Scenarios	Non-Hispanic/Non-Latinx English (n = 12)	Hispanic/Latinx English (n = 20)	Hispanic/Latinx Spanish (n = 26)	All Parents (n = 58)
Parent and Child Vaccinated	1 (8.3 %)	0	2 (7.7 %)	3 (5.2 %)
Parent Vaccinated and Willing to Vaccinate Child	1 (8.3 %)	4 (20 %)	4 (15.4 %)	9 (15.5 %)
Parent Vaccinated, but Unsure about Vaccinating Child	0	0	1 (3.9 %)	1 (1.7 %)
Parent Willing to Vaccinate Self and Child	3 (25 %)	3 (15 %)	10 (38.5 %)	16 (27.6 %)
Parent Willing to Vaccinate Self, but Unsure about Vaccinating Child	1 (8.3 %)	2 (10 %)	1 (3.9 %)	4 (6.9 %)
Parent Vaccinated, but Unwilling to Vaccinate Child	0	1 (5 %)	1 (3.9 %)	2 (3.4 %)
Parent Unsure about Vaccinating Self and Child	1 (8.3 %)	2 (10 %)	0	3 (5.2 %)
Parent Unsure about Vaccinating Self and Unwilling to Vaccinate Child	2 (16.7 %)	1 (5 %)	0	3 (5.2 %)
Parent Unwilling to Vaccinate Self and Unsure about Vaccinating Child	0	0	2 (7.7 %)	2 (3.4 %)
Parent Unwilling to Vaccinate Self and Child	2 (16.7 %)	4 (20 %)	3 (11.5 %)	9 (15.5 %)
Parent Willing to Vaccinate Child; Missing Response for Self	1 (8.3 %)	1 (5 %)	1 (3.9 %)	3 (5.2 %)
Parent Unsure about Vaccinating Child; Missing Response for Self	0	1 (5 %)	1 (3.9 %)	2 (3.4 %)
Parent Unwilling to Vaccinate Self; Missing Response for Child	0	1 (5 %)	0	1 (1.7 %)

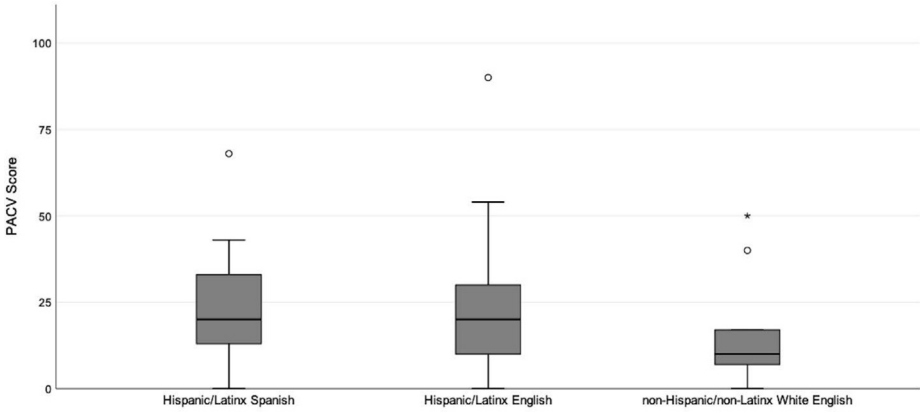

Fig. 1. Boxplots (Medians) of PACV Scores Across Parent Groups.

During the interviews, parents most commonly referenced themes related to Confidence from the 4C framework, which has been similarly described in a prior systematic review of vaccine hesitancy [40]. Specifically, many parents identified effectiveness and safety as perceived benefits and perceived risks of COVID-19 vaccination for their child, which aligns with recent literature [16,18,33,41]. There were similar concerns among all three parent groups about safety and side effects of the COVID-19 vaccination, which are likely more pronounced because the COVID-19 vaccine is new and yet to be authorized for children during most of our study timeline. It is also worth noting when referencing effectiveness, HE and HS parents were the only groups to identify *protection of child or family via parent* as a reason for parental COVID-19 vaccination. This could be explained by the concept of familismo, a core cultural value in the Hispanic/Latinx population, defined as the strong identification and attachment of persons with their nuclear and extended family [42]. This concept has been used in health promotion to describe the importance of family when defining obligation and making decisions [43–45].

Increased beliefs in myths and misconceptions and *decreased knowledge about disease or vaccine* were additional subthemes of Confidence identified in this study. There were more myths and misconceptions and overall lack of knowledge about COVID-19 and the COVID-19 vaccination amongst HE and HS parents. Relatedly, information gaps and lack of translated scientific resources was identified in a recent COVID-19 qualitative study of racial and ethnic minorities, including the Hispanic/Latinx population [46]. Additionally, a study by Voo et al. show that parents with higher education had a better knowledge of vaccination [47] and in our study, overall, education levels of HE and HS parents were lower than those of WE parents.

PACV scores in our study indicated overall low vaccine hesitancy amongst all parental groups, with mean scores well below the cutoff score of 50 conventionally considered to be vaccine hesitant. Still, WE parents had the lowest mean PACV score compared to HE and HS parents, and no parent from the WE group had a score above 50. This higher overall vaccine hesitancy in HS and HE parents converges with the qualitative results of this study that showed a higher *increased beliefs in myths and misconceptions*, and *decreased knowledge about the vaccine and disease* seen in these parental groups.

However, even with higher vaccine hesitancy, the HE and HS parental groups still had similar hypothetical willingness to vaccinate their children against COVID-19 compared to the WE parental group. This could be due to several factors. It has been shown previously with the H1N1 influenza vaccine and seasonal influenza vaccine literature that intention to vaccinate is significantly higher than actual vaccination rate [48,49]. This intention-action gap has also been noted in COVID-19 vaccination in adults [50]. Additionally, there is the Hispanic cultural value of *respeto*, which may include hesitancy to bring up concerns for fear of being disrespectful to the physician [51]. This was one reason postulated by Wil-

liams et al. on why parental vaccine hesitancy was not associated with undervaccination in Spanish speaking families in their 2021 study [52].

Complacency was the next most referenced C amongst all parental groups, specifically, *perceived risk of disease* and *perceived susceptibility of getting the disease* were identified. Prior literature has shown that parents who believe children to be at higher risk for severe disease with COVID-19 and more susceptible to COVID-19 infection have higher rates of intention to vaccinate their children against COVID-19 [43,53]. The lack of children being identified as susceptible could be related to the general portrayal in the news media of COVID-19 in children being less transmissible. Additionally, with the majority of our interviews, children were still not yet back in school, which may have contributed to parents feeling they were less at risk of becoming infected with COVID-19. Additionally, HS parents were most likely to have increased fear of illness and confuse influenza with COVID-19, which could contribute to their slightly higher willingness to vaccinate their children.

For Calculation, *community health promotion* as a reason for vaccination against COVID-19 was mentioned most by HS parents. This finding might explain some of why HS parents had a higher hypothetical willingness to have their child receive the COVID-19 vaccine compared to HE and WE parents. *Community health promotion* indicates a belief in the social benefit of the vaccine to protect others and not just themselves and falls under the concept of collectivism. Prior literature has shown this collectivist attitude of emphasizing the needs of the group over the individual to be associated with increased intention to vaccinate [32,54].

Of all the 4Cs, convenience was mentioned least by all parental groups, including HE and HS parents, with lack of transportation being mentioned as the only convenience barrier to COVID-19 vaccination. More recent literature has shown convenience barriers such as cost, lack of transportation, lack of internet, and lack of access to COVID-19 clinics have contributed to lower COVID-19 vaccine rates in the Hispanic/Latinx population [55]. This discordance may be due to the fact that the COVID-19 vaccine was not yet available to the general public during most of our study timeline, and at no point during the study was the vaccine available for children under 12 years old. As such, parents may not have even thought about convenience-related barriers to vaccination against COVID-19. As pediatric COVID-19 vaccination is now available to all children aged six months and older, the ED will be an important potential location for vaccination administration, particularly among underserved populations who lack easy access to a primary medical doctor or medical home, making the ED their most convenient point of contact with the healthcare system.

4.1. Limitations

Participant recruitment was only during daytime hours, thus we missed parents who came after hours and may have had different attitudes towards vaccination. Our study was performed in a single urban institution and thus, we did not assess rural or suburban parental groups, who may have differences in parental vaccine hesitancy compared to our study group. Additionally, the PACV has been used to evaluate general and influenza vaccine hesitancy but not COVID-19 vaccine hesitancy. Participation was voluntary and interviewers JP and JS were both affiliated with the hospital; thus, responses could have been affected by social desirability bias. However, physician interviewer bias was mitigated when interviewer JS introduced himself simply as part of the research team. Lastly, this study was performed over a period of time in which data on COVID-19 vaccination changed along with its authorization status.

5. Conclusions

Parental vaccine hesitancy is complex and multifactorial in nature, as attitudes of parents are shaped by contextual, individual, and group influences. The COVID-19 pandemic continues to disproportionately affect Hispanic/Latinx children in the United States. Though we found confidence and complacency to be the most common barriers to COVID-19 vaccination across all parent groups, there were important between-group differences, suggesting tailored education and interventions for subpopulations aimed at decreasing vaccine hesitancy and increasing vaccine uptake is warranted.

Data availability

Data will be made available on request.

Declaration of Competing Interest

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Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.vaccine.2022.10.046.

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