A Webinar to Improve Parental COVID-19 Vaccine Hesitancy

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Abstract

COVID-19 is a deadly worldwide pandemic and has led to rapid vaccine development. Vaccinating children is a key step to ending the pandemic. The aim of this project was to determine if a 1-hour webinar improved parental COVID-19 vaccine hesitancy, using a pretest-posttest design. The webinar was streamed live and later posted to YouTube. Parental vaccine hesitancy was measured by an adapted version of the Parental Attitudes about Childhood Vaccine (PACV) survey for COVID-19 vaccines. PACV data was collected during the live session and from YouTube for 4 weeks after the original webinar air date. After calculating a

Wilcoxon signed-rank test to measure the change of vaccine hesitancy before (Mdn= 40.00) and after (Mdn=28.50) the webinar, there was a statistically significant difference (z = 0.003, p= 0.05). The webinar demonstrated improved vaccine hesitancy and provided scientific based vaccine information to parents.

Parental COVID-19 Vaccine Hesitancy

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), the virus responsible for coronavirus disease (COVID-19), is a worldwide pandemic that has devastatingly caused over 3 million deaths (World Health Organization, 2021). In addition to the devastating loss of life, COVID-19 has caused severe impacts to financial and social aspects of life (Anderson et al., 2020). In response to the severe respiratory illness, COVID-19 vaccines have been developed at record speed using mRNA technology with hopes to return the world back to its prior state. Safe, mass vaccination is a key step towards herd immunity and will help end this deadly outbreak (Anderson et al., 2020). At the time of this project, the Pfizer vaccine was available in the United States for children 5 years and older with trials underway for children 6 months and older (Pfizer, 2021). In addition, other companies such as Moderna had trials ongoing for children but was not yet approved by the FDA for children (Jenco, 2021; American Medical Association, 2022).

Background and Significance

Given the rapid pace of COVID-19 vaccine development, some parents were hesitant of the vaccine for a variety of reasons. Reasons for parental hesitancy may include the speed at which the vaccine was developed and/or if parents have received misinformation from social media sources (Pascucci, 2021). Vaccine hesitancy is defined as a “delay in acceptance or refusal of vaccines despite availability of vaccines” and is not a new public health phenomenon (World

Health Organization, 2019). Vaccine hesitancy differs from outright vaccine refusal and the World Health Organization (WHO) identifies vaccine hesitancy as a key threat to global health, especially in the context of the COVID-19 pandemic (World Health Organization, 2019).

Vaccinating children could be a key step in ending the pandemic. Children make up a notable proportion of the world population and many have returned to in-person schooling. Once in school, children have greater exposure to more people inside classrooms, which can lead to additional COVID-19 spread. Having a large portion of the population unvaccinated could perpetuate the risk of COVID-19 transmission.

In addition to public health concerns, there have been pediatric hospitalizations and deaths from COVID-19 (Centers for Disease Control and Prevention [CDC], 2022). Alarmingly, as of January 2023, 18% of all COVID-19 cases have consisted of children (American Academy of Pediatrics [AAP], 2023). Although children develop severe COVID-19 less frequently than adults, children can have several varying severe effects of COVID-19 (Centers for Disease Control and Prevention [CDC], 2022). Examples of reasons children are hospitalized with COVID-19 include sepsis, myocarditis, kidney failure, or coagulopathy (Centers for Disease Control and Prevention [CDC], 2022). Moreover, children who contract COVID-19 are at risk for developing Multisystem Inflammatory Syndrome in Children (MIS-C; Centers for Disease Control and Prevention [CDC], 2021). MIS-C is a "condition where different body parts can become inflamed, including the heart, lungs, kidneys, brain, skin, eyes, or gastrointestinal organs" (Centers for Disease Control and Prevention [CDC], 2021). Due to these severe consequences, pediatric vaccinations will be critical for saving lives (Anderson et al., 2020; Morello, Pepe, … & Curatola, 2022).

During the COVID-19 pandemic, the internet and social media have been sources of dubious news articles concerning the vaccine and virus, adding to the frenzy of misinformation. Several parental surveys report vaccine hesitancy as high as 54% in a national survey (Szilagyi et al. 2021) and 33% in a similar urban setting of Chicago (Alfieri et al., 2021). With many parents and caregivers turning to the web to find answers to vaccine questions, there is a role for digital interventions to halt the spread of misinformation and improve parental vaccine hesitancy with the distribution of scientific based evidence. Examples of prior digital interventions to combat vaccine hesitancy include websites, web-based tailored messages, interactive games, or webinars (Daley et al., 2018, Glanz et al., 2017, Glanz et al., 2020, Gowada et al., 2013, Kelkar et al., 2021, & Salmon et al., 2019). It is important to ensure that valid, reliable, and scientifically backed evidence is available to parents, as this information can influence decision making.

A 2019 study found that parents searching for vaccine information was necessary to their decision making and parents found interpreting online vaccine information difficult (Mossey et al., 2019). In addition, Ruiz and Bell found that if a parent looks for the risks of childhood immunizations online, they will find more websites that support vaccine myths rather than evidence-based information (Ruiz & Bell, 2014). A digital intervention such as a website or webinar that is tailored to meet the needs of parents can make it easier to readily update information on the COVID-19 vaccine as new information quickly becomes available.

As the COVID-19 vaccine is new, digital interventions regarding other childhood vaccines such as the Measles, Mumps, Rubella (MMR) or Human Papillomavirus (HPV) vaccine provide critical insights for addressing COVID-19 vaccine hesitancy (Table 1). The evidence surrounding these interventions, and the rapidly emerging literature on vaccine hesitancy regarding COVID-19 vaccination are discussed herein. Providing parents with accessible and up

to date scientific based evidence may help parents with uncertainty to make an informed decision on COVID-19 vaccination for their child.

Problem Statement

Given the presence of vast amounts of misinformation available on the internet, the question this project addresses is: Does providing education to parents (P) via a single 1-hour (T) webinar (I) improve parental COVID-19 vaccine hesitancy (O)? Vaccine hesitancy was measured using an adapted Parental Attitudes about Childhood Vaccine Survey pre-intervention and immediately post-intervention (Opel et al, 2013 & Ruggiero et al, 2021).

Methods

Setting

The webinar was hosted virtually at large urban children's hospital. The hospital is a 323-bed pediatric specialty teaching that saw over 200,000 patients in 2020. The webinar was hosted on Zoom and was subsequently posted on YouTube to collect additional streams. Data collection began early 2022 and proceeded for one month (30 days) after the live webinar. The Public Relations (PR) department advertised the event on their social media pages including Facebook and Instagram (www.facebook.com; www.instagram.com). The webinar had three different pediatric medical experts that gave brief 10–15-minute presentations. Following the presentations, there was a question-and-answer period for parents attending the live webinar.

Participants

Participants included in this project were the parents or guardians of children less than 18 years old and English-speaking adults. The Zoom capacity was over 1,000 computer screens. Participants were recruited through the hospital's social media pages. Given the virtual nature of this project, all participants were required to have access to the internet. Non-English-speaking

participants and participants without access to the internet were excluded. Participants without a child less than 18 years old were also excluded. Child age was collected as a part of the PACV survey.

Intervention

The project was an educational webinar for parents seeking information on the COVID-19 vaccine for children. The basis of the project was adapted from previous research using webinar and education videos to improve childhood vaccine hesitancy (Kelkar et al., 2021, Salmon et al., 2019, & Williams et al., 2013). Permission to use the PACV was obtained from the original author, Dr. Opel (Appendix A). Recruitment for this project took place on social media (Appendix B). In addition, during the COVID-19 pandemic, when large groups of people could not gather, a webinar allowed for a large amount of people to attend virtually without the risk virus spread.

The COVID-19 webinar addressed: (1) the social responsibility of herd immunity and benefits of vaccination, (2) the rigorous development of vaccine technology, (3) discussion on pediatric COVID-19 vaccine concerns such as ingredients, and (4) ways parents can begin discussions with vaccine hesitant peers (Appendix C). Parents registering for the webinar in advance had the opportunity to submit questions they would like addressed in the webinar by the medical experts. The project lead sorted through the submitted questions to identify themes of questions that could be addressed by panelists. A pre-test survey (i.e., PACV) link and QR code were displayed at the beginning of the webinar for 5 minutes. At the beginning of the survey, a consent statement was included. The consent statement consisted of, “by submitting this survey, you have agreed to be a part of this research project. It is voluntary with no expected direct benefit to you. This is a minimal risk survey.” A waiver for full consent was approved through

the Institutional Review Board. Following the three brief presentations on the above noted topics, there was a 30-minute panel discussion in which panelists answered questions submitted by attendees. The webinar was then posted to YouTube.

Project Implementation

Project implementation began in early 2022. The public relations department advertised the webinar on Instagram and Facebook two weeks prior to the live webinar date. Participants were able to pre-register for the webinar and received email reminders before the webinar. Pre-registered participants were also able to submit questions to the panelists via the registration webpage. A practice session took place where the project leader tested the survey links and sounds of the presentations with the speakers. During the first and last five minutes of the webinar, a QR code and hyperlink was displayed for parents to access and take the PACV survey. The post-survey link was also emailed to the Zoom registrants.

The live webinar was recorded and posted on YouTube with survey QR codes and pre/post survey links in the video description. PACV data from the recorded webinar was collected for four weeks after the original webinar date.

There were minimal costs with this intervention, as corporate Zoom accounts are provided for all hospital providers. A $50 Amazon gift card was raffled off to participants who completed both surveys to encourage survey completion.

Measures

The primary outcome variable of this project was vaccine hesitancy as measured by an adapted Parental Attitudes of Childhood Vaccines (PACV) survey, originally developed by Dr. Opel and colleagues (2013). The PACV was minorly changed to include questions regarding the COVID-19 vaccine as influenced by Ruggiero et al. (2021). For example, “Do you intend to give

your child the COVID-19 vaccine when it becomes available to their age group?" was added to the survey. This Doctor of Nursing Practice (DNP) project examined changes in parental COVID-19 vaccine hesitancy before and after the 1-hour educational webinar.

The original PACV is a 23-item self-administered survey that identifies vaccine hesitant parents (Appendix D; Opel et al., 2011). Four additional COVID-19 vaccine specific questions were added (Appendix E; Ruggiero et al., 2021). The tool is designed to read at a 6th grade level (Opel et al., 2011). The adapted PACV survey includes nine demographic items and 18 vaccine behavior items. The vaccine behavior items were given a raw score that was subsequently translated into a score 0-100 to account for missing response items. The higher the score, the more vaccine hesitant the responder is (Opel et al., 2011). For additional scoring information, please refer to Appendices F, G, and H for the PACV survey and scoring instructions.

For this project, some language in the survey was minorly altered to address specifically "COVID-19 vaccines" rather than "childhood vaccines" (Ruggiero et al., 2021). For example, item number 10 on the PACV survey reads "How concerned are you that your child might have a serious side effect from a shot?" (Opel et al., 2011). This was altered to read as "How concerned are you that your child might have a serious side effect from the COVID-19 vaccine?".

Demographic data was also collected from the survey. Information collected included, participant age range, relationship to child, educational level, children's age, marital status, race/ethnicity, and total household income level.

Data Management

Pre- and post-surveys were administered via QR codes and hyperlinks immediately before and immediately after the 1-hour webinar using REDCap as well as links in the YouTube description (Harris et al., 2009 & Harris et al., 2019). As part of the pre-survey, participants

created a subject ID by providing their email address or creating a subject ID. If participants did not want to provide their email address, there were given the option to create a subject ID using their initials and the last four digits of their telephone number. This allowed the data to be paired and tracked changes of vaccine hesitancy for each participant after the intervention.

The PACV tool allows for collection of ratio data as the items on the score are converted to a raw score. It is a 23-item survey with varying item responses with 5 point-Likert-scales and yes/no responses (Opel et al., 2011). A raw score of zero equates to the "least" vaccine hesitant, while a raw score of 30 is the maximum score and equates to the "most" vaccine hesitant (Opel et al., 2013). Since the raw score accounts for a zero score, the data is considered ratio data (Grove & Cipher, 2017). The PACV raw score was paired and matched using participant's email address or subject ID. The raw score is transformed to a converted score using the chart provided by the PACV author (Appendix G). Demographic data, including age range, total household income, and education level were collected as ordinal data.

Data Management Plan

The PACV pre- and post-surveys were collected in REDCap. REDCap is kept secure with a password and username. Only the project lead and site lead had access to the PACV results and participant emails. De-identified data was exported from REDCap to an Excel spreadsheet, which was stored in a folder on the hospital's drive, only accessible by the project leader. Surveys without a matching pre/post survey or surveys missing 4 or more items not included in the analysis. The data was subsequently transferred to Statistical Package for the Social Science (SPSS) to complete the analysis. The excel database will be destroyed by May 2024, based on the hospital's research policies.

The exported data was cleaned by the project lead. The database was validated by inputting five test subject pre/post survey responses by the project lead. Data was cleaned in SPSS by conducting a missing value analysis and detecting and removing outliers.

Database Organization and Data Dictionary

The database was organized by columns and rows. The database included several fields such as pre/post survey status, and PACV survey responses. The data dictionary included variables for each response in the PACV survey. Data collected was ordinal or nominal. PACV responses are coded by a 0, 1, or 2 and matched a response in the PACV such as "yes", not sure", or "no". Some PACV responses are coded 0-4 and matched a response for "strongly agree", "agree", "not sure", "disagree", or "strongly disagree".

Analysis Plan

SPSS was used as statistical software to complete the analysis. The PACV collects demographic data as ranges, allowing for non-identifiable information to be gathered. Participant gender and age categories were reported as frequencies and percentages. This allowed the data to show the most common selection in the participant pool (Grove & Cipher, 2017). Marital status, race/ethnicity, first born child (yes/no), and relationship to child were collected as nominal data and reported as a frequency/percentage. Total joint household income, children in household, and educational level were collected as ordinal data and reported also using frequency/percentages. Frequencies and percentages are used to report information in nominal and ordinal data (Grove & Cipher, 2017).

Analytic Procedures for Project Question

The project aim determined if a webinar impacts parental COVID-19 vaccine hesitancy as measured by the PACV. Since the sample size was small, the Wilcoxon signed-rank test was

used to determine the differences between two observations of the same group (Grove & Cipher, 2017). Further, random selection was not used since the participants were a convivence sample, further justifying the use of non-parametric tests. The Wilcoxon signed-rank test is a non-parametric test that is useful when the assumptions are not met for a paired-samples t-test, such as in this project (Grove & Cipher, 2017). The PACV converted score ranges from 0-100, creating continuous data. To analyze for differences in pre- and post PACV score, the Wilcoxon signed-rank test was used and assumptions of the data for this test were met.

Per request of the site IRB, a Power Analysis was conducted. Using G*Power, a sufficient sample size of 118 participants was determined (Faul et al., 2007). Data used to conduct the power analysis stemmed from the Williams et al. study, which used similar methods to determine effectiveness of an educational intervention for vaccine hesitant parents (2013).

As previously noted, specific COVID-19 vaccination questions were added to the validated PACV to collect data on vaccine status/intention. The original PACV was found to be valid and reliable by Dr. Opel and colleagues (2011). For the updated COVID-19 questions, such as “Do you intend to give your child the COVID-19 vaccine when it becomes available for their age group?”, frequencies and percentages are reported. The percentage of the yes/no answers were displayed and demonstrated if the number of yes/no answers on these items changed after the webinar.

Ethical Considerations

The University of Pennsylvania IRB determined this project to be qualified as exempt category II in January 2021. The project site’s IRB considered this project as quality improvement in January 2021. Both IRBs were notified of each determination.

Results

Sixty individuals registered to attend the webinar and 23 individuals attended the live webinar. The YouTube video that was posted had 1,300 additional streams. Four-hundred and thirty-five surveys were received in total. Only surveys that had matching pre/post surveys were included in the analysis to determine if vaccine hesitancy improved after watching the webinar; Twenty-eight matching surveys were included in the analysis. Most participants identified their race as White (61%; n= 17), marital status as married (93%; n= 26), and annual income as $30,000-50,000 (32%; n=9; Table 2). While most participants reported their source of vaccine information as the internet (25%; n= 7), 21% (n= 6) of participants reported receiving their vaccine information from medical providers. Ten (36%) participants reported that were worried about the safety of the COVID-19 vaccine.

The participants' pre and post PACV scores ranged from 0 to 67 points. There was a decrease in PACV scores between baseline (Mdn= 40) and post (Mdn=28.5), and this difference was statistically significant (z= 0.003; p=0.05; Table 3). Overall, PACV scores decreased by 11.5 points, which reflected clinical significance in that participants became less hesitant of the COVID-19 vaccine after viewing the webinar. Moreover, 2 participants who reported they did not intend or were not sure whether to give their child the COVID-19 vaccine before the webinar, changed their answer to report they did intend to vaccinate their child against COVID-19 after viewing the webinar (Table 4).

Project Adaptations

The data collection was extended to account for a delay in the webinar being uploaded on to YouTube. In addition, many surveys were received without a matching survey, or before/after surveys were returned in a timeframe that was shorter than the 60-minute webinar. These surveys were not included in the analysis.

Discussion

Summary

This education strategy did successfully improve parents' attitudes toward vaccines. The asynchronous format allowed for more viewers than the live session. The median hesitancy score improved by 11.5 points after viewing the webinar, indicating that parents were less hesitant. Two of the 28 parents changed their decision to vaccinate their child after viewing the webinar.

Strengths and Limitations

A strength of this project was its ability to provide accessible, up-to-date, evidence-based information to hundreds of parents. Asynchronous viewing of the webinar allowed parents to access this information at a time convenient for them and resulted in much higher numbers of viewers than the live session. Additional strengths of this project included the ability for parents to have specific questions answered in real time using the Q&A feature and providing parents with a point of contact for follow up questions they may have. A benefit of the webinar is the accessibility of provider vaccine information virtually. Further, this project is one of the few published Quality Improvement projects to specifically address COVID-19 vaccine hesitance among parents of children, providing important data on this topic.

This project is not without limitations, however. The majority of individuals who viewed the webinar, did not fill out the PACV, which prevented measurement of vaccine hesitancy and may represent volunteer bias. Perhaps, a larger monetary incentive would aide in conversion rate of webinar viewers to survey participants. Alternatively, allowing the opportunity to complete the surveys days/weeks in advance of the webinar and within the week after the seminar could allow for more flexibility on participants use of time. Moreover, the project was not able to collect enough pre/post surveys to achieve the minimum number of 118 participants as

determined by the previously described power analysis. Lastly, this project was limited to measuring self-reported intention to vaccinate instead of actual vaccination rates.

Implications

With more parents feeling confident in the COVID-19 vaccine, this project has important implications for practice, such as the potential for improved vaccination rates. There was also a portion of the webinar where "vaccine hesitancy" itself was addressed with the hopes of empowering parents with non-medical backgrounds to begin conversations with peers who may identify as vaccine hesitant. With scientifically based vaccine information available, parents may be more eager to vaccinate their children as well as disseminate the information learned in the webinar to their peers. Though a direct measure of vaccination rates was not possible for this project due to time constraints, the hope is that parents feel empowered and informed to make a decision to vaccinate their child. With more children vaccinated against COVID-19, herd immunity can be achieved as well as reduce the rate of hospitalizations of COVID-19 in adults and children. Parents viewing the webinar may feel empowered to discuss their concerns with their pediatrician.

Conclusion

What we are learning now about COVID-19 information dissemination can be applied to future pandemics and public health concerns. We have learned how to rapidly collect, develop, and disseminate disease information during the pandemic. Current available childhood vaccine research supports that digital interventions can improve parental vaccine hesitancy, which can be applied to the COVID-19 vaccine. This project demonstrated that a webinar can attract, educate, and create conversation on vaccines on a large scale. Vaccine hesitancy outreach can begin even before the vaccine is available. Applying these learned lessons can lead to more vaccinated

individuals and is an important step in battling parental vaccine hesitancy now and for future pandemics and viruses.

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Table 1

Table of Evidence

Author, Year, Title	Vaccine/ Intervention	Setting, Sample	Design	Measures	Key Findings
Cates, et al., 2020, Developing a Serious Videogame for Preteens to Motivate HPV Vaccination Decision Making: Land of Secret Gardens.	HPV/Videogame	Setting: 36 doctor offices in North Carolina Sample: 55 dyads of pre-teen and parent	Randomized Control Trial	HPV vaccination records. Vaccination Self-efficacy and decisional balance scales surveys	Vaccination rate: 22% vaccinated, vs 15% in control group, p=0.31
Chadwick et al., 2021, Online Social Endorsement and COVID-19 Vaccine Hesitancy in the United Kingdom.	COVID-19/ social media	Setting: United Kingdom Sample: N=5,114 adults	Observational survey design	Encouragement–Discouragement scale	33% of subjects plan to use social media to encourage COVID vaccination; 40% neutral, and 10% intend to discourage people from COVID vaccination. 18% of subjects did not know yet how they would use social media
Daley et al., 2018, Addressing parents' vaccine concerns: a randomized trial of a social medical intervention.	Childhood vaccines/Website & social media	Setting: Kaiser Permanente Colorado (KPCO) Sample: N=1,093 women	Randomized Control Trial	Parental Attitudes about Childhood Vaccines (PACV) screening tool	Social media arm had improved attitude (0.4 on Likert 5-point scale) and reduced concerns (-.60) on a 5-point Likert scale.
Glanz, et al., 2017, Web-based social media intervention to increase vaccine acceptance: a randomized control trial.	Childhood vaccines/ Website and social media	Setting: Colorado 2013-2016 Sample: N=888 infants of 1093 pregnant women.	Randomized Control Trial	Immunization records from the EHR, PACV survey	Mean ranks for days under vaccinated were 438.5 for the VSM, 443.0 for the VI, and 465.4 for the UC. A lower mean rank for days under vaccinated was noted in the VSM arm rather than the UC arm (difference = −26.9*; p*=.02)
Glanz, et al., 2020, Web-Based Tailored Messaging to Increase Vaccination: A Randomized Clinical Trial.	Childhood vaccines/Web-based tailored messaging and website	Setting: KPCO in Denver and Boulder, CO Sample: N=824 parents	Randomized Control Trial	Immunization records from the EHR, PACV survey	The percentage of infants who were up to date at age 200 days were 91.4% for the VAYB arm, 92.9% for the UT arm, and 92.3% for the UC arm. Infants in the VAYB were not more likely to be up to date than infants in the UC arm (OR = 0.89; 95% CI, 0.45–1.76)
Gowda, C, et al., 2013, A pilot study on the effects of individually tailored education for MMR vaccine-hesitant parents on MMR vaccination intention.	MMR vaccine/tailored web-based messaging	Setting: Waiting room of Pediatrician's offices in Michigan, June- December of 2011 Sample: N= 79 parents of children less than 6 years old	Randomized Control Trial	Assessed using an 11-point scale. Vaccine records	Parents in the tailored group had a greater magnitude of change in vaccination intention (1.08 vs. 0.49 points). p = 0.22 58% of parents in the tailored arm vs 46% of parents in the untailored arm had positive vaccination intentions.

Table 1

Table of Evidence

Kelkar et al., 2021, Vaccine Enthusiasm and Hesitancy in Cancer Patients and the Impact of a Webinar.	COVID-19/webinar	Setting: Webinar created by Florida Cancer Organizations Sample: N= 264 participants (including 20 caregivers), recruited through e-mail and social media.	Cohort study	Pre and post surveys	No statistically significant predictors of vaccine hesitancy, 3 out of 97 participants became accepting of the COVID-19 vaccine.
Salmon et al., 2019, MomsTalkShots: An Individually Tailored Educational Application for Maternal and Infant Vaccines.	Childhood vaccines/Web-based app and web video	Setting: Patients in OB offices in Georgia and Colorado Sample: N= 1,103 pregnant women	Cohort study	Parent Attitudes About Childhood Vaccine survey (PACV-SF), Also used a 4-point Likert scale to assess how parents usable they found the app	72% who did not have enough vaccine information, reported having enough education post intervention. 95% of subjects reported app helpful; 94% found app was trustworthy; 99% found app easy to understand.
Schoeppe, et al., 2017, The Immunity Community: A Community Engagement Strategy for Reducing Vaccine Hesitancy.	Childhood vaccines/social media, website	Setting: Washington state Sample: N=54 subjects and 80 interviews were conducted over 3 years.	Cohort Study	PACV survey	Decrease in subjects identifying as vaccine hesitant by 8.6%. Increase in subjects concerned about other parents vaccinating their children increased by 7.4%
Williams et al, 2013, A randomized trial to increase acceptance of childhood vaccines by vaccine-hesitant parents: a pilot study.	Childhood vaccine/ web-video	Setting: Two primary care sites in Tennessee Sample: N =369 parents presenting for their two week well visit	Randomized Control Trial	Immunization records from the EHR, PACV survey	6.7 points less vaccine hesitant than the control on the PACV. IQR −13.3 to 33.3; $p = .049$ No difference in vaccine rates between intervention and control. p = 0.864

Note. This table is the table of evidence used to support this project.

Legend:

HPV- Human Papilloma Virus
PACV- Parental Attitudes about Childhood Vaccine Survey
OB- Obstetrician
EHR- Electronic Health Record
VSM- Web site with vaccine information and social medical components
VI- Web site with vaccine information
UC- Usual Care
UT- Un-tailored messaging inside "Vaccines and Your Baby" web intervention
VAYB-Web-based tailored messaging "Vaccines and Your Baby" intervention

Table 2
Demographic Data

Characteristic	Frequency n (%)
Relationship to Child	
Mother	17 (61 %)
Father	11 (39 %)
Other	0 (0 %)
Age (years)	
18 - 23 years old	1 (4 %)
24 - 28 years old	4 (14 %)
29 - 32 years old	8 (29 %)
33 - 37 years old	10 (36%)
38 - 40 years old	4 (14 %)
41 - 49 years old	0 (0 %)
50 years or older	1 (4 %)
Highest degree completed	
8th grade or less	0 (0 %)
Some high school, but not a graduate	1 (4 %)
High school graduate or GED	6 (21 %)
Some college or 2-year degree	9 (32 %)
4-year college degree	4 (14 %)
More than 4-year college degree	7 (25 %)
Unanswered	1 (4 %)
Marital status	
Single	0 (0 %)
Married	26 (93 %)
Living with a partner	2 (7 %)
Widowed	0 (0 %)
Separated	0 (0 %)
Divorced	0 (0 %)
Household income	
$ 30,000 or less	1 (4 %)
$ 30,000 - 50,000	9 (32 %)
$ 50,001 - 75,000	5 (18 %)
$75,001 - 100,000	6 (21 %)
$100,001 - 200,000	5 (18 %)
$200,001 - or more	2 (7 %)

Table 2 (Continued)

Demographic Data

Characteristic	Frequency
Number of Children	
1	17 (61 %)
2	10 (36 %)
3	1 (4 %)
Race/Ethnicity	
White	17 (61 %)
Black or African American	4 (14 %)
Hispanic/Latino	4 (14 %)
Asian	3 (10 %)
Native Hawaiian or other Pacific Islander	0 (0 %)
American Indian or Alaska Native	0 (0 %)
Other	0 (0 %)
Age Ranges of Children	
Birth to 6 months	2 (7 %)
7 months to 4 years	16 (57 %)
5 - 10 years	12 (43 %)
11 - 17 years	3 (11 %)

Table 3

Hesitancy Score

	Pre-Intervention	Post-intervention	Z value*	P value
Average Hesitancy (Median) Score	40	28.5	0.003	0.05

Notes. *Wilcoxon Signed Rank Test; $p < 0.05$

Table 4
Vaccine Intentions

	Pre-Intervention	Post-intervention
Do you intend to give your child the COVID vaccine when it becomes available to their age group?	Yes 25 (89 %)	Yes 27 (96 %)
	No 2 (7 %)	No 1 (4 %)
	Unanswered 1 (4 %)	Unanswered 0 (0%)

Ethical statement

Martha K. Swartz, PhD, RN, CPNP, FAAN

Editor-in-Chief

Journal of Pediatric Health Care

Dear Dr. Swartz,

We have no conflicts of interest, and this paper is the authors' own original work. This paper has not been submitted to other journals and is not under consideration for publication elsewhere. The article is a small section of a larger DNP manuscript that will be submitted to the University of Pennsylvania Library, named, Scholarly Commons, as a part of the DNP Program. The paper reflects the authors' own research. This article has been approved for submission by me, Dr. Boogaard, and Dr. Strohm-Farber. This project received funding from the project site organization's Department of Nursing Research and The Division of Infectious Diseases to support advertising for participant recruitment.

Thank you for your time and consideration.

Sincerely,

Dr. Arrigoni, Dr. Boogaard, and Dr. Strohm-Farber