# Utilizing the Community Health Club Model to Improve COVID-19 Vaccine Confidence Amongst Latina Women

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## ABSTRACT:

BACKGROUND: COVID-19 vaccine hesitancy is a widespread issue, especially amongst communities of color. Latino/a communities have faced higher rates of infection, hospitalization, and death from COVID-19, while eliciting higher vaccine hesitancy rates. Utilizing Community Health Clubs (CHCs) established in the Lower Rio Grande Valley (LRGV), Community Health Workers (CHWs), along with a team of medical students and public health experts, developed and implemented a virtual Club-based platform aimed at inspiring confidence in the COVID-19 vaccine.

OBJECTIVES: Through a campus-community partnership, this project aimed to increase confidence in the COVID-19 vaccine among Latina women in the LRGV.

METHODS: A four-session vaccine education curriculum, informed by Club member concerns and co-developed by medical students and CHWs, was implemented over two months. The program was evaluated using a quasi-experimental design comparing outcomes amongst 62 program participants and a matched control group.

RESULTS: Participants had 2.33 times the odds of receiving at least one dose of the vaccine compared to individuals in the control group. Furthermore, 97% of participants felt confident or very confident in their ability to share learned information and 90% of participants reporting sharing information with 3 or more peers.

CONCLUSIONS: Collaboration amongst CHWs, medical students, and public health experts to develop an education curriculum aimed at addressing community identified needs has proven to be effective at improving trust in vaccinations and increasing self-reported vaccination rates amongst Latina women on the Texas-Mexico border. Adapting these Clubs to additional

vulnerable communities could be effective in aiding vaccination efforts and improving health literacy.

**KEYWORDS:** Vulnerable Populations, Public Health, Immunization Programs, Virus Diseases, Community health partnerships, Community-Based Participatory Research, Health disparities, Community Health Services, Health Resources

## INTRODUCTION

The COVID-19 pandemic has disproportionately affected racial and ethnic minorities in the United States that have historically faced health inequities (1). According to the Centers for Disease Control and Prevention (CDC), Latino/a individuals experienced a disproportionately high incidence of COVID-19 cases and a nearly doubled incidence of death compared to non-Latino/a white individuals during the summer of 2020 (2). This national trend can also be seen on a smaller scale in Texas' Lower Rio Grande Valley (LRGV), a region which is about 90% Latino/a (3) and had one of the highest per capita COVID-19 infection rates in the United States during this same time period (4).

This disproportionate impact of the COVID-19 virus in the LRGV is a direct reflection of the social inequities faced by those living in lower income areas. Using data from the Social Vulnerability Index, the LRGV is considered a highly vulnerable region (5), with over 26% percent of individuals in Brownsville living in poverty and almost 35% of the population uninsured (6). Cameron County, which includes Brownsville, had a vulnerability score of 0.98 in 2020, with a value of 1 representing the highest level of vulnerability (5). This area also has the highest rates of obesity and diabetes in Texas, with an even greater disparity among the Latino/a population (7). These conditions have been associated with increased risk of severe disease requiring intensive care unit (ICU) admission (8).

The development and distribution of the COVID-19 vaccines presented a new challenge for public health leaders in the LRGV as nationally, counties with high social vulnerability were associated with lower vaccination rates (9). In addition, almost 30% of Latino/a individuals in the U.S. were found to have COVID-19 vaccine hesitancy, compared to the national average of 22% (10). This hesitancy can be correlated with the increasing public distrust of physicians,

especially among minority populations who have experienced discrimination due to racial/ethnic background or language barriers (11). On average, Latino/a individuals are only half as likely to trust that their physician cares about them as Whites (12). Minority populations are much more likely to display distrust towards healthcare professionals due to discrimination and a history of medical experimentation conducted on marginalized populations (13). The issue of vaccine hesitancy was only compounded by the dissemination of false or low-quality health information through the internet and various social media platforms (14). Despite widespread vaccination campaigns, studies show that COVID-19 vaccine hesitancy remains high among adults and those with chronic diseases such as diabetes, suggesting tailored educational programs may be beneficial (15).

Since 2017, Community Health Clubs (CHC) located in the LRGV have strived to foster an environment that changes health norms and increases social capital. Clubs are peer groups dedicated to igniting behavioral change by providing education and utilizing the power of group norms to catalyze social change (16). The CHC model works by providing an environment for community members to communicate new social norms of health, foster relationships between Club members, and offer a safe space for open conversation. CHCs are run by trained Community Health Workers (locally, *promotore/as)* who offer a safe environment that fosters open conversation between community members and emphasizes the importance of a healthy community. The Club model utilizes principles of Community Based Participatory Research to build partnerships between community members, organizational representatives, academic researchers, and community leadership.

The combination of mistrust in healthcare and circulating misinformation led to the need to re-establish trust and disseminate accurate health information amongst Latino/a individuals

living in the LRGV. Using the proven infrastructure of CHCs (17–19) and successful virtual pivot to address COVID-19 myths and misinformation at the start of the pandemic (20), a participatory curriculum was developed to improve COVID-19 vaccine health literacy and increase COVID-19 vaccine confidence. An eight-week COVID-19 vaccine confidence building module was developed to address the specific needs and concerns of 62 Club members living in Brownsville, TX.

## METHODS

### *The Partnership*

This community-campus partnership involved seven medical students, a graduate fellow, a faculty mentor from UT Health San Antonio, and five CHWs from the LRGV Area Health Education Center (AHEC). The partnership between the LRGV AHEC and UT Health San Antonio has been enduring since its formation in 2017. Prior Club curriculums, as mentioned above, have been directly driven by community members themselves through repeated needs assessments performed by the academic team and the CHWs in tandem. As the COVID-19 pandemic spread across the United States, the community had increasing questions and concerns which led to the creation of the virtual COVID-19 myth busters curriculum (20). As this program came to an end, the Club members started to express concern regarding the imminent roll out of the COVID-19 vaccine. The CHWs and student team quickly recognized the need for a COVID-19 vaccine curriculum. Due to continued COVID-19 prevention protocols (e.g., social distancing, masking), a virtual Club was maintained with COVID-19 vaccine specific programming beginning on March 11, 2021. Spanish-language meetings were held bi-monthly via Zoom and broadcast on Facebook Live. Educational materials and resources were presented

exclusively in Spanish using principles of community-based participatory research and adult learning pedagogy. Medical students were paired with CHWs at the start of implementation to ensure direct communication between the campus and community throughout the program, and were immediately available via WhatsApp messaging in between meetings for any Club member concerns.

*The Education Cycle*

Content to address COVID-19 vaccine hesitancy and connect the community to vaccination resources and sites was developed and delivered through four virtual meetings using participatory education techniques. These meetings took place from early March to May 15th, 2021. The topics were derived from Club member concerns as assessed by the CHW team during their initial needs assessment and were delivered as follows: Myths and Truths about Vaccination, General and COVID-19 Specific Vaccine Education, How to Access the COVID-19 Vaccine, and Wrapping Up: Moving Forward with COVID-19 (Table 1). Each session incorporated community feedback from the prior session with the goal of tailoring materials to lingering questions and concerns. Medical students collaborated to create evidence-based, concise, and culturally appropriate materials that were reviewed and approved by the graduate fellow, CHW program manager, and faculty director. Weekly content meetings were conducted with the academic and community teams to ensure cultural relevance and directly address both CHW and Club member concerns that were raised at prior meetings and throughout the week. Spanish-speaking medical students, the graduate fellow, and CHWs were responsible for delivering content via Google Slides presentations that encouraged member participation. Each session incorporated dedicated time for engaging activities and small group discussions

facilitated by a CHW and medical student pair, ending with a large group feedback session to answer remaining questions and provide guidance for subsequent sessions. Small group breakout rooms remained constant across each educational session to promote a continued sense of common unity and safe space for discussion. The goal for each session was to increase participant confidence in knowledge of COVID-19 vaccines, encourage utilization of community resources, and promote participant engagement with their own community and families regarding vaccine hesitancy. In the time between sessions, CHWs and the medical student team provided virtual support for members via WhatsApp messaging groups and continued to gather member perspectives to inform this rapid needs assessment process.

*Evaluation Methods*

This program was evaluated using a quasi-experimental study design, involving a participant group of current CHC members and a control group of neighborhood-matched peers. A total of 78 Club members began the program by successfully completing the Spanish language pre-survey and attending the first educational session, while 46 individuals in the control group entered the study by successfully completing their pre-survey. Out of these initial 78 Club members, those attended at least three of the four sessions were eligible to complete the post-survey (n=62), while 42 individuals of the initial control group successfully completed the post-survey. All participants were consented in their preferred language prior to study enrollment and data collection. Club members were well-acquainted with the informed consent process from prior Club curricula and though they had no direct involvement in post-program evaluation, they were continually updated with new and emerging data that was discovered. Spanish-language pre- and post-surveys developed by bilingual members of the research team and were conducted

via the *Qualtrics Online Surveying* platform. Three multiple-choice questions were asked to assess vaccine knowledge on a 3-point Likert scale (Table 2). Individuals in both the participant and control cohorts that successfully completed both the pre- and post-surveys received a gift card for their participation. Data was stored on the encrypted, cloud-based institutional co-working platform, Microsoft Teams. This study was reviewed and approved by the UTHSCSA Institutional Review Board under protocol number HSC20210195N.

Survey domains for both participant and control cohorts consisted of standardized demographic data, individual and household vaccination status, as well as COVID-19 cases and deaths per household. General vaccination knowledge and intention to recommend COVID-19 vaccination to peers was assessed using items developed in-house. Vaccine attitudes were assessed using the validated *Vaccine Attitudes Examination (VAX) Scale*, a scale from -36 (fully vaccine-skeptical) to 36 (fully vaccine-accepting) (Table 3) (21). Club members were also asked to describe their level of satisfaction with the Club, their intention to recommend Clubs to others, their opinion of the usefulness of each session, their self-efficacy to mitigate against misinformation, and their confidence in sharing information with others.

Survey data was anonymized and aggregated for analysis using *Stata Statistical Software: Release 15* (22). Surveys with incomplete demographic information as well as those lacking paired pre- and post-surveys were excluded from final analysis. All continuous variables were screened for normality using Shapiro-Wilk testing. Using an alpha level of 0.10, normally distributed continuous variables were analyzed using Independent Sample T-Tests and non-normal variables were analyzed using Wilcoxon Rank-Sum Testing. Chi-Squared or Fisher's Exact Tests were used for categorical variables. For all outcomes demonstrating statistically

significant associations at post, odds-ratios for categorical outcomes and regression coefficients for continuous outcomes were calculated to determine statistically significant effect sizes.

## RESULTS

*Introduction*

A total of 62 participants and 42 members of the control group were included in this analysis. As summarized in table 4, gender varied slightly between study cohorts but there were no significant differences noted in other demographic categories. At baseline, the percent of people vaccinated, COVID-19 cases per household, and COVID-19 related deaths per household were not significantly different between participant and control groups (Table 5). Prior to program implementation, only 37% of participants and 50% of individuals in the control group had received at least one dose of the COVID-19 vaccine with 9% of participants and 12% of those in the control group reporting death of a household member due to the virus. However, baseline vaccine attitude scores using the *VAX scale* showed significantly greater vaccine skepticism amongst the participant cohort as compared to the control cohort ($p<0.10$). Results are presented as informed by pre-survey and post-survey data from both participant and control cohorts. An overview of participatory data and participant program satisfaction items are also provided to present final perspectives from Club members.

*Section I: Vaccine Status and Hesitancy*

As demonstrated in table 5, study participants increased their self-reported vaccination rate from 37% pre-program to 84% post-program, whereas members of the control group demonstrated a slight increase in vaccination rates from 50% to 69%. Participants had 2.33 times

the odds of receiving at least one dose of the vaccine compared to individuals in the control group following program implementation ($p<0.10$). Household vaccination status (binary, at least one member) also increased significantly from pre to post intervention among participants (56% to 95%, $p<0.10$), while no significant change in household vaccination status was observed among those designated to the control arm (71% to 93%, $p>0.10$). Unvaccinated individuals in both the participant and control groups had no significant differences at baseline or changes post-intervention in their intentions to vaccinate. Additionally, there were no significant differences in concerns regarding the safety, efficacy, and availability of the vaccine between the participant and control groups. Vaccine safety and efficacy were the primary concerns raised by both cohorts at both pre- and post-intervention.

*Section II: Vaccine Knowledge and Attitudes*

Participants increased their vaccine knowledge scores from 1.1 to 2.0 ($p<0.10$) and had significantly higher mean knowledge scores than individuals assigned to the control group post-intervention (2 vs 1.3, $p<0.10$) (Table 5). Participants had 4.48 times the odds of correctly answering the post-survey question about post-vaccination safe practice and 3.54 times the odds of answering correctly about vaccine development compared to those in the control group ($p<0.10$). *VAX Scale* scores at baseline revealed significantly greater vaccine skepticism in the participant cohort as compared to individuals assigned to the control cohort (4 vs 9 points, respectively, $p<0.10$). Vaccine acceptance amongst participants improved from 4 to 12 points ($p<0.10$), while no significant difference was found between baseline and post-intervention *VAX Scale* scores among members of the control group (from 9 to 7 points). While no change was noted in the control cohort in terms of intention to recommend COVID-19 vaccination to peers

(stable at 76%), participants significantly increased their intention to recommend COVID-19 vaccines from 68 to 89 percent (OR=2.46 vs control group to recommend, $p<0.10$).

*Section III: Participant-Only Outcomes*

Participant feedback from the program evaluation and participant satisfaction battery (Table 6) yielded a 100%-cohort response of satisfied/extremely satisfied with the overall program, likely/extremely to recommend future programs to peers, and effective/very effective in mitigating COVID-19 vaccine misinformation. Over 95% of participants indicated confidence/high confidence in their ability to share the information they learned with others. The majority of participants reported that they had shared information with five or more unique peers and 59% of participants reported having shared information with peers from three or more groups (e.g., Home-Family/Peers, Community Peers, Work Peers, Online Peers). Family and community peers were the most common types of peers with whom participants reported having shared information. In terms of session utility, 60% said that "Myths and Truths about Vaccination" was the most useful while 40% said that "How to Access the COVID-19 Vaccine" was the least useful session.

## DISCUSSION:

This study evaluated the impact of the Community Health Clubs, a peer-to-peer health promotion model, on COVID-19 vaccine confidence and health literacy amongst Latina women living on the Texas-Mexico border. We believed that group-level approaches through virtual engagement based on a proven CHC model within an established campus-community partnership would enhance trust in the COVID-19 vaccine throughout the community, and

ultimately lead to higher rates of vaccination compared to control groups. Our aims were to better understand the effectiveness of this this model at promoting vaccine confidence and to determine if this model can be applied to other scenarios for health promotion.

As utilized in this study design, group-level education in the setting of virtual CHCs is effective at increasing COVID-19 vaccine confidence amongst Latinas living along the Texas-Mexico border. The results of this study demonstrated that participants in a four-session virtual Club achieved significantly greater COVID-19 vaccination rates as compared to a matched control sample. Not only did participants show an increased level of confidence in vaccine knowledge, but most participants reported sharing this information with others outside the program as well. Additionally, household vaccinations rates increased significantly post-implementation in the participant cohort when compared to the control cohort. This suggests that our program may have expanded reach beyond the members involved in the program directly. Furthermore, participants expressed high levels of satisfaction with the program and indicated a high likelihood of recommending future programs to their peers.

Despite limited data on educational outreach as a means to reduce COVID-19 vaccine hesitancy, our intervention employed the use of a community-academic partnership to address specific concerns in minority populations through a virtual, community-tailored educational program. A systematic review conducted to determine best strategies for decreasing vaccine hesitancy highlighted the need for dialogue-based educational campaigns tailored to target populations and the context surrounding the community's hesitancy (23). Further, one HPV vaccine confidence study found that using language appropriate, group-level approaches are effective at increasing HPV vaccine uptake amongst Latina women on the Texas-Mexico border (24). Another HPV vaccine study found that using a community-based education program is

effective at increasing HPV vaccine uptake in similarly marginalized communities (25). While these studies affirm use of group-level education in vulnerable populations to establish trust and increase confidence, neither implements the program in the setting of a CHC. The CHC model employs a group-level approach that emphasizes creation of a shared social identity and utilizes participatory learning techniques. Not only does the Club create a shared identity and safe space for exploring health topics, but the curriculum is co-developed by public health experts, medical students, and CHWs and delivered in a culturally and linguistically appropriate manner to address specific community concerns. These key aspects make this program particularly unique in design and further promote trust within these vulnerable communities.

In addition, there is a well-documented need for virtual education platforms to combat COVID-19 vaccine hesitancy, specifically in minority populations (26). Due to the timing of implementation during a global pandemic and in accordance with highest safety standards, our educational platform was delivered virtually to CHC members. Previous studies and reviews have established that web-based education platforms are useful in combatting vaccine hesitancy in vulnerable populations (27,28). Furthermore, one California based study utilized a virtual community-campus partnership to address COVID-19 vaccine hesitancy in minority populations (29). The extensive participation emphasizes community interest for these types of programs in addressing health topics and the wide reach virtual platforms permit. Although each study serves to validate certain aspects of our approach, no study to date has evaluated exactly how vaccine attitudes are affected in Latina women on the Texas-Mexico border using group-level virtual education delivery in the setting of a CHC model. Combining these modalities into one likely led to the significant improvement in COVID-19 vaccine uptake in our population.

This program serves as an important trial utilizing a novel method to promote vaccine confidence among minority women. At a time when vaccine hesitancy remains high despite nation-wide vaccine campaigns, the implications of this study could have significant effects. The long standing and well-documented mistrust of the healthcare system by minority populations combined with the widespread misinformation regarding vaccines has contributed to a disproportionately low uptake of the COVID-19 vaccine by these communities (12,30). Being that these same communities are also experiencing the highest morbidity and mortality rates, it is more important than ever to re-establish trust, expand health knowledge, and promote confidence. This study reveals that using virtual education to deliver contextualized information in a culturally and linguistically appropriate manner in the setting of a CHC model is effective at increasing COVID-19 vaccine confidence in Latina women on the Texas-Mexico border. This intervention not only serves as an effective means to increasing vaccine confidence, but addressing other health issues as proven with prior Club curricula (20) by empowering members with accurate information and resource linkage to make informed health decisions in a supportive environment. Adapting this program and expanding to other communities could prove to boost vaccine confidence in other vulnerable populations. This is vital given the continued emergence of new, aggressive variants that pose significant risk to unvaccinated populations and persistent vaccine hesitancy across the United States.

Limitations to this study are centered on sample size, study design, and timing of the study. The generalizability of our findings is limited by the small sample size and lack of a priori power analysis. Our program included 60 participants out of the over 400,000 residents that live in the LRGV. Further, this was the first assessment of a novel intervention designed and implemented during a public health emergency amongst a non-randomized sample of Club

members and a convenience sample of a matched comparison group. A power analysis was not feasible due to the ongoing COVID-19 restrictions, the need for rapid dissemination of vaccine information, and a lack of a prior evidence about vaccine attitudes and hesitancy in this highly marginalized population. As a result, it is possible this evaluation was underpowered, limiting the validity of our observed results. However, our study maintains a statistically significant change in vaccine acceptance and uptake when compared to people assigned to a matched control group, giving us confidence that these results could be replicated in similar Latino/a communities across the LRGV. Although our study design lacked a randomized control, making it more difficult to determine the extent to which the program accurately produced the results, such randomization is not programmatically feasible given the pre-existence of Club networks. Further, the fact that each participant decided on their own accord whether to participate in the educational program may introduce selection bias. It may be that the Club members were more willing to change their views on the COVID-19 vaccine or be more receptive to new information from baseline, indicating a potential participant bias. Additionally, while the cohorts were matched demographically, participants were significantly more vaccine-skeptical than individuals in the control group at baseline (*VAX* Score 4 vs. *VAX* Score 7, $p<0.10$). This imperfect matching of cohorts could introduce further selection bias. With the wide dissemination of the educational information via intra- and inter-community communication and the Facebook Live online stream, it is difficult to determine whether individuals in the control group did or did not have access to program materials, introducing a potential contamination bias. However, we determined that the benefit of widespread information about the COVID-19 vaccine throughout this vulnerable community outweighed any potential risks of contamination. Finally, when this study was implemented in March of 2021, several participants were not yet

eligible or did not have access to the vaccine. As the vaccine became more widely available and members discovered an increasing number of people in their community obtaining the vaccine, this could have affected their beliefs and willingness to receive the vaccine themselves. However, our control group consisted of demographically similar women within the same community to attempt to mitigate any variable influence outside of the educational program.

Despite these limitations, it should be noted that overall participant confidence and satisfaction in the CHC as a means to deliver vaccine education serves to validate this model as an effective method for promoting vaccine confidence in minority groups. Furthermore, the high tendency of participants to disseminate educational information to others in the community highlights the wide reach this program obtained. While these results are not broadly generalizable, this study confirms our hypothesis at large and should be considered an effective method for reducing COVID-19 vaccine hesitancy within similar at-risk communities.

This study not only highlights the novelty of the CHC model, but the importance of community-campus partnerships in addressing health concerns in marginalized communities. The collaboration amongst CHWs, medical students, and faculty at UT Health San Antonio to develop a culturally appropriate curriculum aimed at addressing community identified needs and providing local resource linkage was critical to the success of the program. Stakeholders in public health should recognize the CHC as an effective means to disseminate health information and improve health literacy among vulnerable populations and aim to adapt the model to additional communities across the country.

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*Table 1: Vaccine Hesitancy Curriculum Overview*

| Session Theme | Topics Covered |
|---|---|
| Myths and Truths about Vaccination | Are COVID vaccines linked to infertility? |
| | Is there a 'better' COVID vaccine, and should I wait until I can get that one? |
| | Can the COVID vaccine give me COVID? Furthermore, will I test positive for COVID after receiving the vaccine? |
| | Is there a microchip in the COVID vaccine? |
| General and COVID-19 Vaccine Specific Education | How does our immune system fight off a virus? |
| | How do vaccines work? |
| | How is the COVID vaccine different? |
| | How long will immunity from the COVID vaccine last? |
| | Do I need to be up to date on all of my other vaccines in order to get the COVID vaccine? |
| | Why should I get vaccinated? |
| | Are vaccines safe? How can we be sure? |
| | Do pre-existing conditions or allergies affect if I should get the COVID vaccine? |
| | Does getting the COVID vaccine affect how and when I take my usual medications? |
| | If having side effects mean the vaccine is working, does it mean that the vaccine did not work for me if I did not have any side effects after the vaccine? |
| How to Access the COVID-19 Vaccine | Who is currently eligible to receive a COVID vaccine? What about children? |
| | Can I get vaccinated if I'm uninsured? |
| | Does my citizenship status affect if I'm able to receive the COVID vaccine? |
| | Is the COVID vaccine free anywhere I go? |
| | Where can I get vaccinated? |
| | How can I get vaccine availability information if I don't have Internet access? |
| | What if I forget or miss my second dose? |
| | Why was the J&J vaccine suspended in the US? |

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| Wrapping Up: Moving Forward with COVID | What does the future for our community look like after the COVID vaccine? |
| | Who began this program unsure of or against getting a COVID vaccine and has since decided to get vaccinated? Can you share what made you change your mind? |
| | Will you (program members) encourage others to get vaccinated? |
| | What is happening with the J&J vaccine? (Context: FDA had just ended the pause on J&J administration in the US) |
| | What are the CDC recommendations for those who are fully vaccinated? |

| *Table 2: Vaccine Knowledge Questions* | |
|---|---|
| **Question** | **Answer Choices** |
| How do vaccines work to protect us from infection? | Vaccines are chemicals that kill the infection against which they protect us. |
| | Vaccines are packed with antibodies that will remain in our body to fight a future infection. |
| | Vaccines tell our body to make antibodies that fight a specific infection and help prevent it in the future.* |
| | Vaccines do not protect us from infection at all. |
| | I do not know. |
| Which of the following can you do safely once you are vaccinated against COVID-19? | Go to public places that are full of people without a mask. |
| | Get together with other vaccinated people without a mask. * |
| | Get together with other unvaccinated people without a mask. |
| | None of the above |
| | I do not know. |
| How are vaccines developed or created for use in people? | The vaccines are manufactured by the government and their safety is not verified prior to use. |
| | The vaccines are manufactured by the government and checked for safety before use. |
| | The vaccines are manufactured by private companies / research organizations and are verified by the government for their safety before use.* |
| | The vaccines are manufactured by private companies and are not verified by the government for their safety. |
| | I do not know. |
| *Correct Answer | |

| *Table 3: Vaccine Attitudes Examination (VAX) Scale (Martin & Petrie, 2017)* |
|---|
| **Item:** |
| I feel safe after being vaccinated. |
| I can trust vaccines to stop serious infectious diseases. |
| I feel protected after getting vaccinated. |
| Although most vaccines appear safe, there may be problems that we have not yet discovered. |
| Vaccines can cause unforeseen problems in children. |
| I am concerned about the unknown effects of vaccines in the future. |
| Vaccines make a lot of money for drug companies, but they don't do a lot for ordinary people. |
| The authorities promote vaccination for financial gain, not for people's health. |
| Vaccination programs are a big scam. |
| Natural immunity lasts longer than a vaccine. |
| Natural exposure to viruses and germs provides the safest protection. |
| Naturally being exposed to disease is safer for the immune system than being exposed through vaccination. |
| **Responses: 6-Point Likert Scale: Strongly Agree-Strongly Disagree** |
| **Scoring: Strongly Disagree (-3) to Strongly Agree (+3)** |
| **Scale: Vaccine Skeptical (-36) to Vaccine Accepting (+36)** |

| *Table 4: Demographics Table of Participant and Control Cohorts* | | |
|---|---|---|
| *Alpha: 0.10* | Study population (n=104) | |
| **Factor** *p<0.10 | **Participant (n=62) (60%)** | **Control (n=42) (40%)** |
| **Gender*** | | |
| Female | 62 (100%) | 38 (90%) |
| Male | 0 | 4 (10%) |
| **Age** | | |
| Mean (SD) | 45 (11) | 42 (14) |
| **Race/Ethnicity** | | |
| Latino-White | 50 (81%) | 37 (88%) |
| Latino-Other | 12 (19%) | 4 (10%) |
| Non-Latino | 0 | 1 (2%) |
| **Civil Status** | | |
| Married | 43 (69%) | 23 (55%) |
| Never Married | 7 (11%) | 7 (17%) |
| Separated | 12 (20%) | 12 (28%) |
| **Employment Status** | | |
| Employed | 31 (48%) | 19 (45%) |
| Unemployed, Searching | 10 (16%) | 8 (19%) |
| Unemployed, Non-Searching | 22 (36%) | 15 (36%) |
| **Education Level** | | |
| No GED | 28 (45%) | 14 (33%) |
| GED | 21 (34%) | 15 (36%) |
| Higher Education | 13 (21%) | 13 (31%) |
| **Residence** | | |
| Cameron County, Texas, USA | 62 (100%) | 42 (100%) |
| **Household Size** | | |
| Mean (SD) | 4 (1.6) | 4 (1.6) |

| *Table 5: COVID-19 Outcomes Table of Participant and Control Cohorts* | | | | |
|---|---|---|---|---|
| | | Study Population (n=104) | | *alpha =0.10* |
| **Factor** | **Time** | **Participant (n=62) (60%)** | **Control (n=42) (40%)** | **P-Value** |
| **Vaccination Status (Binary, yes)** | *Pre* | 23 (37%) | 21 (50%) | 0.191 |
| *At least one dose of a COVID-19 vaccine received.* | *Post* | 52 (84%)* | 29 (69%)* | **0.074** |
| | *OR* | 2.33 (0.95-5.73) | | **0.074** |
| **Vaccination Intentions (If Unvaccinated)** | | | | |

| | | | | |
|---|---|---|---|---|
| Will Vaccinate | *Pre* | 21 (54%) | 11 (55%) | 0.510 |
| Will Vaccinate | *Post* | 4 (40%) | 4 (31%) | 0.568 |
| Will Not Vaccinate | *Pre* | 4 (10%) | 4 (20%) | |
| Will Not Vaccinate | *Post* | 3 (30%) | 2 (15%) | |
| Unsure | *Pre* | 14 (36%) | 6 (29%) | |
| Unsure | *Post* | 3 (30%) | 7 (54%) | |
| **Vaccine Hesitations (If Unvaccinated)** | | | | |
| Concern for safety of the vaccine (Binary, yes). | *Pre* | 30 (77%) | 15 (71%) | 0.563 |
| | *Post* | 7 (70%) | 8 (62%) | 0.673 |
| Concern for efficacy of the vaccine (Binary, yes). | *Pre* | 32 (82%) | 16 (76%) | 0.524 |
| | *Post* | 6 (60%) | 7 (54%) | 0.768 |
| Concern for availability of the vaccine (Binary, yes). | *Pre* | 18 (46%) | 8 (38%) | 0.652 |
| | *Post* | 2 (20%) | 5 (38%) | 0.340 |
| **Household Vaccination Status (Binary, yes)**[+] | *Pre* | 35 (56%) | 30 (71%) | 0.122 |
| [+]At least one member of the household or immediate family. | *Post* | 59 (95%)* | 39 (93%) | 0.621 |
| **Household COVID Cases (Binary, yes)**[+] | *Pre* | 30 (48%) | 17 (40%) | 0.443 |
| | *Post* | 31 (50%) | 17 (40%) | 0.286 |
| **Household COVID Deaths (Binary, yes)**[+] | *Pre* | 5 (9%) | 5 (12%) | 0.515 |
| | *Post* | 8 (13%) | 5 (12%) | 0.349 |
| **Vaccination Knowledge Scores** | *Pre* | 1.1 (0.9) | 1.4 (0.9) | 0.112 |
| (Mean (SD), of 3 Possible Points) | *Post* | 2.0 (0.9)* | 1.3 (1.1) | **0.002** |
| | *LC* | 0.84 (0.52-1.15) | | **0.000** |
| *How do vaccines work to protect us from infection?* ***Count Correct (%)*** | *Pre* | 19 (31%) | 18 (43%) | 0.202 |
| | *Post* | 30 (48%)* | 20 (48%) | 0.939 |
| *Which of the following can you do safely once you are vaccinated against COVID-19?* ***Count Correct (%)*** | *Pre* | 11 (18%) | 10 (24%) | 0.449 |
| | *Post* | 39 (63%)* | 11 (26%) | **0.000** |
| | *OR* | 4.48 (2.14-10.78) | | **0.000** |
| *How are vaccines developed or created for use in people?* ***Count Correct (%)*** | *Pre* | 39 (63%) | 31 (74%) | 0.245 |
| | *Post* | 52 (84%)* | 25 (59%) | **0.005** |
| | *OR* | 3.54 (1.49-8.47) | | **0.006** |
| **Vaccination Attitudes Score** | *Pre* | 4 (9) | 9 (11) | **0.029** |
| [Mean (SD), (-36 to 36 points, Hesitant-Accepting)] | *Post* | 12 (9)* | 7 (11) | **0.011** |
| | *LC* | 7.84 (4.71-10.96) | | **0.000** |

| | | | | |
|---|---|---|---|---|
| **Intention to Recommend Vaccine to Others when Available to Others (Yes)** | *Pre* | 42 (68%) | 32 (76%) | 0.605 |
| Categorical: (Yes, No, Unsure) | *Post* | 55 (89%)* | 32 (76%) | 0.227 |
| | *OR* | 2.46 (0.89-6.94) | | **0.090** |
| *: p<0.10 Intra-Cohort Pre-Post<br>OR: Odds Ratio of Positive Outcome; LC: Linear Coefficient of Participants | | | | |

*Table 6: Program Outcomes per Participant Cohort*

| | (n=62) |
|---|---|
| **Factor** | **n (%)** |
| **Overall Program Satisfaction** | |
| Extremely Satisfied | 44 (71%) |
| Satisfied | 18 (29%) |
| Unsatisfied | 0 |
| **Likelihood of Peer-Recommendation to a Future CHC Program** | |
| Extremely Likely | 40 (65%) |
| Likely | 22 (35%) |
| Unlikely | 0 |
| **Confidence to Share Learned Information** | |
| Very Confident | 41 (66%) |
| Confident | 19 (31%) |
| Not Too Confident | 2 (3%) |
| **Program Efficacy to Mitigate Misinformation about Vaccination** | |
| Very Effective | 36 (58%) |
| Effective | 26 (42%) |
| Not Effective | 0 |
| **Session Utility (Most Useful)** | |
| Session 1: Myths and Truths about Vaccination | 37 (60%) |
| Session 2: General and COVID-19 Vaccine Specific Education | 11 (18%) |
| Session 3: How to Access the COVID-19 Vaccine | 5 (8%) |
| Session 4: Wrap Up: Moving Forward with COVID | 9 (14%) |
| **Session Utility (Least Useful)** | |
| Session 1: Myths and Truths about Vaccination | 9 (15%) |
| Session 2: General and COVID-19 Vaccine Specific Education | 5 (8%) |
| Session 3: How to Access the COVID-19 Vaccine | 25 (40%) |
| Session 4: Wrap Up: Moving Forward with COVID | 23 (37%) |
| **Frequency of Peer-Dissemination of Information (Number of Distinct Peers)** | |
| 5+ | 33 (53%) |
| 5 | 7 (11%) |
| 4 | 8 (13%) |
| 3 | 8 (13%) |

| | |
|---|---|
| 2 | 3 (5%) |
| 1 | 2 (3%) |
| 0 | 1 (2%) |
| **Peer-Type of Dissemination of Information (Multiple Selection Item)** | |
| *Home-Family/Peers* | 36 (58%) |
| *Non-Home Family* | 48 (78%) |
| *Work Peers* | 17 (28%) |
| *Community Peers* | 40 (64%) |
| *Online Peers* | 17 (28%) |
| Strangers | 9 (15%) |
| Nobody | 0 |
| **Variety of Peer-Dissemination (Number of Peer-Types)** | |
| 6 | 1 (2%) |
| 5 | 4 (7%) |
| 4 | 10 (16%) |
| 3 | 21 (34%) |
| 2 | 6 (10%) |
| 1 | 19 (31%) |
| 0 | 0 |