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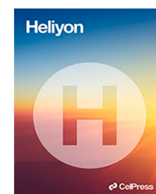

Research article

The experiences of community health workers when communicating with refugees about COVID-19 vaccines in Syracuse, NY: A qualitative study

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ABSTRACT

Background: Refugees are among the most health-vulnerable members of society. Despite the importance of vaccination to mitigate the risks associated with COVID-19 infection, ensuring adequate access and uptake of the COVID-19 vaccine remains a pressing concern for refugee populations. Research has suggested that community-oriented approaches and open communication with trusted individuals are essential to address this challenge. Vaccine outreach efforts were performed in Syracuse, NY, by Community Health Workers (CHWs) as trusted refugee community members. This study explored CHWs' experiences during vaccine outreach and perceptions about COVID-19 vaccine hesitancy and acceptance among refugees, including barriers and facilitators to vaccination.
Methods: A qualitative study was performed using thematic analysis following six semi-structured interviews with CHWs.
Results: Four main themes supported by 16 sub-themes were extracted. CHWs described the (1) diverse beliefs and attitudes of refugees by ethnic group, with most having low vaccine acceptance at first. (2) Barriers included contextual barriers, lack of awareness, misinformation, and withdrawal when forced from vaccine mandates. However, CHWs also identified numerous (3) facilitators to vaccination, including the internal processing and eventual vaccine acceptance, supported by external messaging by CHWs and time. Culturally sensitive intervention strategies occurred through (4) CHW team efforts and their provision of reliable information to refugee clients, with openness and over time. The team efforts of CHWs significantly contributed to refugee acceptance and uptake of the COVID-19 vaccine.
Conclusions: This study revealed how the refugee population changed their belief towards the COVID-19 vaccine through trust, time, and reliable information provided by CHWs and describes culturally sensitive strategies for vaccine uptake by refugees. CHWs' reflection on COVID-19 vaccine hesitancy and acceptance among refugees during outreach efforts is an essential perspective when implementing future public health interventions.

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1. Introduction

Refugees are one of the most health-vulnerable members of society. Vulnerabilities stem from a myriad of barriers that refugees face upon resettlement, with systemic social, political, and economic constructs all impeding access to optimal health [1]. The under-immunization of refugees in the United States (U.S.) has been identified in an abundance of studies as one major factor contributing to the poor health of this population [2,3]. A systematic review of barriers to immunization among newcomers (refugees, immigrants, and migrants) in the U.S. found that cultural factors, knowledge barriers, insufficient access to healthcare, and vaccine hesitance contribute to low vaccination uptake [2].

The COVID-19 pandemic has only exacerbated existing vulnerabilities and health-related risk factors that refugees face in the U.S. Language barriers, lack of transportation, poor understanding of the health system, stigma, discrimination, cultural differences, and mistrust of authorities worsen refugees' access to health and healthcare [3–7]. These factors disproportionately influence and compound risks to refugees' health status because of COVID-19 [3]. Moreover, additional elements, including crowded households, unprotected occupational conditions, and increased prevalence of comorbidities, place refugee populations at greater risk of developing COVID-19 [8].

The Centers for Disease Control and Prevention (CDC) identifies the "achievement of widespread COVID-19 vaccination coverage" as one of the essential strategies to protect individual and community health [9]. However, despite the importance of vaccination to mitigate the risks associated with COVID-19 infection, ensuring adequate access and uptake of the COVID-19 vaccine remains a pressing concern for refugee populations. Previous studies and the CDC suggest that community partners or community leaders should lead education and outreach efforts to increase access and uptake of the COVID-19 vaccine for refugees. The dissemination of vaccine information is an important strategy [10], and community partners should tailor messages to the communities they serve [3,6,11–16]. For such practical strategies for vaccine outreach to the refugee population, community health workers (CHWs) play an essential role.

The American Public Health Association (APHA) defines a CHW as "a frontline public health worker who is a trusted member of and/or has an unusually close understanding of the community served" [17]. In Syracuse, NY, CHWs, also commonly referred to as health navigators, are employed by local resettlement agencies and are vital to the refugee experience upon arrival [18]. Syracuse is one of the highest intake cities of refugees in the U.S., welcoming over 7000 refugees in the past ten years [18,19]. Upon arrival, refugees are paired with a culturally and linguistically congruent CHW who provides continuous support to help new refugees adjust to the healthcare system in the U.S.. Many CHWs in Syracuse are former refugees who understand the lived experience and barriers refugees face. Extending beyond traditional case management services for new arrivals, CHWs play an integral role in the intersection between community and healthcare [20,21]. Supports include providing reliable health information to improve refugees' healthcare access through culturally sensitive approaches [22]. This close relationship helps to build trust and rapport between the refugee clients and CHWs, with the goal of improving health knowledge and self-sufficiency [17,18,22,23]. Given that CHWs serve as an essential link who facilitate advocacy and access to healthcare resources for refugees, it is crucial to understand the experiences of CHWs in this role. Such experiences and perspectives can help to explore challenges and to identify key strategies to improve healthcare access for refugee populations, including vaccine acceptance and uptake.

CHW's perspectives on refugee outreach programs have been an important yet sparse voice in literature. One study found that CHWs working in the refugee community are highly motivated based on their experiences as refugees [22]. However, the study also revealed that CHWs need additional professional training and support systems to mitigate frustrations and help them succeed [22]. Another study inquiring about CHWs' perception in the beginning stages of the COVID-19 vaccine distribution found that CHWs realized the importance of community-based vaccine clinics located within refugee communities and with support from trusted CHWs [3].

However, there is still scant qualitative data regarding CHW's perspectives on COVID-19 vaccine outreach, and how CHWs navigated vaccine hesitance and acceptance during vaccine outreach and community-oriented interventions. CHW's reflections are essential given their unique status in the community and how that plays a role in their ability to provide outreach to difficult-to-reach populations for all healthcare-related services, including the COVID-19 vaccine.

A vaccine outreach initiative titled "*Take your shot, Syracuse!*" was the main program where the research was centered. CHWs, most of whom also worked at one of the local non-governmental refugee resettlement agencies (Catholic Charities Refugee Resettlement Services (CYO)), were hired as outreach coordinators to educate and facilitate access for low–uptake populations in Syracuse, NY, to receive the COVID-19 vaccine. The initiative began in July 2021 with other community partners, including a long-standing community-clinic partnership between CYO and SUNY Upstate Medical University. During COVID-19 vaccine outreach, CHWs visited clients' homes and several community centers to provide reliable vaccine information with flyers, presentations, brochures, and repeated dialogue with the clients. Reliable vaccine information came from trusted sources, such as the CDC and medical and public health faculty at SUNY Upstate Medical University. CHWs translated flyers into 11 languages. If the client accepted the vaccination, they were encouraged to attend a vaccine clinic held at CYO.

Outreach efforts culminated with four vaccine clinic events, held every three weeks, from February 20, 2022, to April 24, 2022. At each vaccine clinic event, refugees received support from CHWs (translation, guided directions, explanation about potential side effects, etc.) and members of the community-clinic partnership. As a result, about 320 people received the COVID-19 vaccines at vaccine clinic events. Based on the outreach efforts of CHWs that prompted many refugees to receive the COVID-19 vaccine despite the initial hesitancy, researchers felt it was important to reflect on CHWs' outreach efforts to understand refugee clients' perceptions during outreach better and identify effective strategies for future outreach.

To accomplish this, researchers conducted one-on-one interviews with CHWs reflecting on their vaccine outreach efforts to identify

effective approaches to improve COVID-19 vaccine access and uptake in the refugee population. Interviews and analysis focused on three study objectives from the perspective of CHWs: (1) to explore refugee perceptions and beliefs about the COVID-19 vaccine; (2) describe barriers and facilitators that affect attitudes toward COVID-19 vaccine uptake in the refugee population; and (3) to identify culturally sensitive intervention strategies, information, and public health messaging to address vaccine uptake, access, and outreach resources for the refugee population.

2. Materials and methods

2.1. Study location

Syracuse, located in Onondaga County of Central New York, has a long history of embracing refugees and immigrants in their resettlement to the U.S. Erie (Rochester) and Onondaga (Syracuse) counties resettled 91% of all refugees resettled in New York State in 2022 [24]. In the past decade, Syracuse has welcomed over 7,000 refugees from 24 different countries [18,19]. Between 2016 and 2020, 13.4% of the city's residents were foreign-born [25]. In Syracuse, there are several refugee resettlement agencies to support newly resettled refugees. CHWs from each agency collaborate when necessary, such as the COVID-19 pandemic. One of the local non-governmental refugee resettlement agencies, Catholic Charities Refugee Resettlement Services (CYO), and the local academic medical center (SUNY Upstate Medical University) have established a community-clinic partnership to provide outreach, community education, and clinical services and provided continuous communication to improve the health and healthcare access for the refugee population in Syracuse.

2.2. Methodology and theoretical framework

This study used a phenomenological methodology with a social constructivist framework. Phenomenological studies hope to "describe the common meaning for several individuals of their lived experiences of a concept or phenomenon" [26]. A social constructivist framework was utilized to create the participant semi-structured interview guide. According to Creswell and Poth, broad questions in the interview guide allow the participants to construct their meaning of how they live and work in an effort for researchers to unearth the historical and cultural facets of participants [26]. The study methodology also supports social constructivism, where researchers and participants join in on the co-construction of knowledge [27].

2.3. Participant recruitment and sample

Researchers used a purposeful method of snowball sampling, in which research participants assist in enlisting other participants [28] to recruit CHWs working on the vaccine outreach program to participate in semi-structured interviews about their experience. First, the researchers explained the aims and concepts of the present study, showing the interview guide to the vaccine outreach project leader. After obtaining the approval of the leader, the vaccine outreach project leader contacted all CHWs who were employed on the vaccine outreach team via email, phone-call, or face-to-face. There were eight CHWs on the vaccine outreach team at the time of the study, from April to June 2022. Six of the eight (75%) agreed to participate in the study. Two team members who declined were not available due to their schedules. Researchers only met with CHWs who agreed to be interviewed at the interview venue.

Four participants were female, and two participants were male. All participants were aged between 20 and 40 years old. Four CHWs were previous refugees themselves, and one was an immigrant, all hailing from regions in Africa, the Middle East, or Asia. One CHW was US-born. The ethnic communities in Syracuse, NY, served by the diverse CHWs of this study included Congo, Somalia, Burundi, Ethiopia, Eritrea, Afghanistan, Syria, Iraq, Myanmar (Karen), and Burma.

2.4. Data collection

Semi-structured interviews with six CHWs were conducted in person by M.K. and C.C. between May 3, 2022, and June 20, 2022. All interviews were conducted in the closed room at CYO with only one interviewee and two interviewers (M.K. and C.C.). All three authors (M.K., A.S., and C.C.) developed the interview guide (see Appendix B) through repeated team discussions. In the interview guide, researchers started with an open question about their refugee clients' attitudes when outreach began in July 2021. The participants were then asked the following questions to remind them of their experiences during vaccine outreach: "If an individual was hesitant, what did you say or do to inform them about the vaccine?"; "What are some barriers you faced in outreach and recruitment efforts?"; and "Was there a particular message that seemed to benefit the outreach efforts?". M.K. and A.S. knew all the participants before the interview. C.C. knew two of the participants before the interview. Researchers' backgrounds, including belongings and motivation for the research, were shared at the beginning of the interview. Interviews ranged from 30 to 60 min per interview. After receiving verbal consent, interviews were recorded and transcribed with Otter.ai (version 3.0.0) installed on both M.K. and C.C.'s tablets [29]. M.K. reviewed the draft of the transcription automatically created by Otter.ai. Then, she corrected where the software misrecognized, as she repeatedly checked all recorded audio data and the transcription draft. After M.K. reviewed and corrected the transcription, C.C. reviewed the transcription a second time for quality control. Researchers did not conduct a repeat interview.

2.5. Data analysis

After each interview, the first author (M.K.) created a reflexive memo and discussed it with the last author (C.C.). The reflexive memos included short summaries of each interview as they related to research questions and researcher impressions. Memos were utilized to identify codes, develop themes, and confirm data saturation during analysis. A thematic analysis was conducted [30] after completing all interviews. M.K. and C.C. independently coded transcripts and developed coding schemes using an emergent coding approach using the software Atlas.ti for desktop (version 22.2.2). After both authors became familiar with the data as they repeatedly reviewed the transcription, M.K. and C.C. independently generated initial codes. Then, both authors developed themes and sub-themes. Codes were consolidated into one shared codebook to merge both ideas and refine themes and sub-themes. M.K. and C.C. continued regular dialogue to get agreement on themes. It was determined after the first round of theme generation and review of the reflexive memos by the two researchers that data saturation was achieved based on the model of inductive thematic saturation [31]. Therefore, additional efforts to recruit the two remaining CHWs who were unavailable to be interviewed initially were not pursued. Findings were presented to the community after all analyses by authors and discussed among authors and CHWs.

2.6. Ethics statement

The research was reviewed and approved as an exempt project by the SUNY Upstate Medical University Institutional Review Board (IRB), project number 1875500-1. This research received no specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

2.7. COREQ criteria

For this study, the consolidated criteria for reporting qualitative studies (COREQ) [32] was complied with and is provided as Appendix A. Researchers reviewed the 32 items of COREQ to report this study explicitly and comprehensively [32]. Only two items (23 and 25) were checked as not applicable.

2.8. Researchers' background

The first author, M.K., was a student in the of master's of public health program in Syracuse, NY, with experience as a family physician in Japan and training in qualitative methodology. M.K. is currently a project lead for the community-clinic partnership between CYO and Upstate Medical University and initially participated as a student volunteer during the four vaccine clinic events. The second author, A.S., is a practicing physician in internal medicine and pediatrics, primarily treating refugees in the Syracuse area. A.S. is the faculty project leader of the community-clinic partnership between SUNY Upstate Medical University and CYO. The last author, C.C., is a public health instructor and researcher who is one of the faculty coordinators of this community-clinic partnership. C. C. has her master's in public health and is currently earning a doctorate focusing on qualitative and mixed methods research in global health education. A.S. and C.C. have established a trusted relationship with CYO over the past several years prior to the COVID-19 pandemic. M.K., A.S., and C.C. continue to provide weekly medical and public health outreach programs in collaboration with CYO. The researchers are female, and all are interested in refugee health and community health.

3. Results

Researchers identified four main themes supported by 16 sub-themes from the analysis: (1) refugee's diverse beliefs and attitudes, (2) barriers to vaccination, (3) facilitators to vaccination, and (4) CHW's team efforts (Table 1).

Table 1
Identified themes and sub-themes by study aim.

Study Aims	Themes	Sub-Themes
Explore refugee perceptions and beliefs about the COVID-19 vaccine	1. Refugee's diverse beliefs and attitudes	Low acceptance at first
		Acceptance came over time
		Differences between people & groups
Describe barriers and facilitators that affect attitudes toward COVID-19 vaccine uptake in the refugee population	2. Barriers to vaccination	Contextual barriers
		Lack of Awareness
		Misinformation
		Withdrawal when forced
	3. Facilitators to vaccination	Internal processing of refugees
		External messaging
		Time
Identify culturally sensitive intervention strategies, information, and public health messaging to address vaccine uptake, access, and outreach resources for the refugee population.	4. CHW's team effort	Importance of time and trust
		Equipped with reliable information
		Openness
		Comfortability for clients
		Networking
		Outreach

3.1. Refugee's diverse beliefs and attitudes

Analysis of study aim 1 to explore refugee perception and beliefs about the COVID-19 vaccine revealed one main theme and three sub-themes. The main theme and sub-themes found that refugees' beliefs and attitudes towards the COVID-19 vaccine were diverse from the levels of both individual and ethnic groups and have changed from hesitancy to acceptance over time.

3.1.1. Low acceptance at first

Most participants said the acceptance of the COVID-19 vaccine was relatively low in the initial rollout of vaccine distribution after the Food and Drug Administration (FDA) approval. One participant described, "*The first time hesitate, most of them hesitate*" (C 3:08).

3.1.2. Acceptance came over time

Beliefs and attitudes changed from hesitancy to acceptance over time as refugees carefully scrutinized the information around them and observed others' behavior.

> *"When from the beginning, when we started comparing to now, you can see the acceptance rate changing."* (A 1:07)

3.1.3. Differences between people and groups

Despite most refugees having a low acceptance of the vaccine initially, researchers found that many refugees accepted the COVID-19 vaccine in time. However, approval depends on individuals and ethnic groups. CHWs said that some ethnic groups tend to follow the vaccination mandate by employers or agree quickly with recruitment by CHWs. In contrast, some ethnic groups are more defensive compared to other groups.

> "*It was really interesting to see that like different groups and refugees had different acceptance rates.*" (D 0:41)

For example, CHWs revealed that Karen and Karenni populations were more willing to follow employer mandates immediately. And when approached by CHWs, most of them had already received the vaccine. In contrast, Somali populations were the most hesitant and refused the vaccine altogether.

3.2. Barriers to vaccination

Aim 2 hoped to understand barriers and facilitators that affected attitudes toward COVID-19 vaccine uptake in the refugee population. All CHWs described that refugees face numerous barriers and indicated that those barriers related to and compounded each other.

3.2.1. Contextual barriers

Contextual barriers are expressed through their background as refugees, including language barriers, transportation issues, healthcare system knowledge gaps, religious norms, cultural differences, lack of literacy, lack of trust in the federal government, and anxiety about unknown environments. An example that highlights many contextual barriers discussed by CHWs was the New York State vaccination site that was organized in Syracuse, NY. To book an appointment at the vaccination site, one needed to be literate in English, have access to a computer and the internet, and have transportation to the site. The vaccination site was five miles away from the center city of Syracuse, where most refugees reside. These were all significant barriers to vaccination before the CHW vaccine outreach program at CYO.

> "*Most of our population, the refugee population are illiterate about, especially technology and social media, so even though you give them a link, they won't be able to do it …*" (B 21:42)

Another tragic barrier was "military presence." The main vaccination site in Syracuse, NY, was organized and facilitated with the assistance of the Army National Guard [33]. The Army National Guard's contribution to the vaccination initiative was significant; however, it reminded some refugee populations of military conflicts.

> "*Somebody's army uniform. It's taken us some time bad memories from our client.*" (B 26:10)

3.2.2. Lack of awareness

Some CHWs pointed out that some populations are unaware of the COVID-19 vaccine, which can be interpreted as a lack of interest and/or knowledge. A participant mentioned lack of awareness could cause skepticism about vaccines; *"There were some doubts. And that could be because of the lack of awareness about vaccines among the community."* (A 0:23).

3.2.3. Misinformation

Misinformation and conspiracy theories affected refugees. Contextual barriers also compounded misinformation. For example, language barriers often limit information sources available to refugees. As a result, some refugees only access social media groups within their community who speak the same language [3]. Therefore, refugees tend to believe parts of the information provided by those limited sources.

"Social media is easy to access to find everything. It's a mix of a lot of things like good and bad and depend on how you process those information." (B 2:24)

"I think one big barrier was the information … where they were getting information. So, a lot of refugees received information from WhatsApp groups or Facebook group. So, they were getting misinformation, and we're doing door-to-door outreach. In the beginning, people are saying, "I heard from people that I will die in a few years if I get the vaccine." (D 4:54)

3.2.4. Withdrawal when forced

CHWs pointed out that refugees became defensive against the COVID-19 vaccine when forced to receive it by the federal government, the authorities, or employers.

" *"Why are they forcing me?" So that made them to become hesitant."* (E 8:21)

" *I think with anything in life, it's not that healthy, or it's not the best approach to force someone or push someone too much … because I think that often fails and people go the opposite direction of what you want them to."* (D 10:39)

3.3. Facilitators to vaccination

There are both internal and external aspects of refugee individuals that facilitate their receiving the COVID-19 vaccine. We found that time also affected both internal and external aspects.

3.3.1. Internal processing of refugees

Many CHWs mentioned that refugees' internal change was more important than external approaches by CHWs. Internal change means spontaneous change, as refugees knew that their neighbors received COVID-19 vaccines, and the severe side effects were rare. The participants described their internal change by gathering information:

"But they have seen their colleagues, their neighbors who came here and to the vaccine. So, we saw some changes within the community." (E 11:25)

"Besides us, they, some of them, have gone down because they are the one that trying to find." (B 2:24)

3.3.2. External messaging

Accurate information in refugees' languages provided by CHWs was an essential facilitator. More details of approaches by CHWs are described in the following theme (4).

3.3.3. Time

The pandemic timeline is an important consideration when evaluating our research results. At the time when vaccine clinics were opened and research interviews were conducted, almost two years had passed since the pandemic began. There had been one year since vaccines were widely available for community distribution. This time frame allowed refugees to think slowly and collect information, and enabled CHWs to reach out repeatedly. One participant described refugee change provided by internal and external factors with a time frame:

"Trying to understand after our conversation, we give them some tips or some knowledge, some information, and they go and look for themselves, since they already have the one about conspiracy theories." (B 2:24)

3.4. CHW's team effort

The final study aim was to identify culturally sensitive intervention strategies, information, and public health messaging to address vaccine uptake, access, and outreach resources for the refugee population. Researchers identified six sub-themes supported by one overarching theme: CHWs team efforts. CHW team efforts in the vaccine outreach program emerged as an essential theme in the study. They were vital to understanding culturally sensitive intervention strategies in the refugee population.

3.4.1. Importance of time and trust

As described in the study methods, most CHWs have worked not only for recruitment in the vaccine outreach program but also for refugee resettlement agencies to support refugee families after arrival in the U.S. Main case management support included transportation such as picking up the families at the airport upon arriving in Syracuse, assistance completing social services paperwork, transport to activities of daily living like grocery shopping and healthcare visits, among others. For one year, CHWs support newly resettled families and serve as a primary point of contact for any concerns they may have or assistance the new families may need. Because CHWs are usually from the same countries or ethnic groups as refugees, the relationship continues after their official support has ended. One participant mentioned,

"*"You are not a stranger to them." They can develop that trust. "We know this person." So that's also helped us a lot.*" (E 16:56)

3.4.2. *Equipped with reliable information*

One of the essential tasks performed by CHWs during outreach efforts was providing accurate information to refugees who might have believed misinformation. To obtain reliable information, CHWs explained that they have searched for vaccine information from the CDC, World Health Organization (WHO), Health Resources and Services Administration (HRSA), and other reliable organizations as information sources. Moreover, the knowledge and information provided by a trusted doctor from a local hospital and members of the community-clinic partnership were essential. The information from doctors and healthcare professionals from local hospitals made CHWs confident in their messaging.

> *"We have Upstate (Medical University team) along the CDC and HRSA."* (B 20:41)

> *"We also have the medical staff working with us, Upstate (Medical University team), every time we have a weekly meeting… If there was any update on the vaccines or any information, we will ask and get the information from them, some medical stuff. So, that's one of our sources to get the COVID-19 information."* (A 9:06)

3.4.3. *Openness*

Most CHWs shared a similar attitude and mantra when they recruited refugees to the vaccine clinics. "Do not force". They kept their open and neutral attitude towards COVID-19 vaccines and left the decision-making to the refugees. CHWs decided to start a conversation by asking about their needs and then passed on the vaccine information they came equipped with. It was not a negotiation or persuasion but a discussion, as one participant said:

> *" "Take your time."(…) Our goal was to discuss, at least know why they hesitate, know why they want to take the vaccine. And our goal was not to force. It was not an obligation because that's how we start our conversation with any client or any person we encounter. We're not there to force people get the vaccine. Be there to just discuss they have concern or not and tell us why and why not.(…) At the end, if they choose to get the vaccine, it's good for us. They say "no", it's not a big deal too, because it's a personal choice."* (B 15:29)

3.4.4. *Comfortability for clients*

Vaccine clinics were offered at a local refugee resettlement agency rather than the New York State site as part of the vaccine outreach program. The location of the resettlement agency (CYO) was familiar to refugees, as their case management and support are organized at this location after resettlement. The location was also centrally located in the community where many refugees live. Even after the conclusion of resettlement case management, the location is used for job assistance, language classes, and children's summer school and after-school programs. Compared to the public New York State vaccine site, local pharmacies, and healthcare clinics, this location provided psychological safety for refugees to receive the vaccine.

> *"I think it was just a lot more comfortability, because everybody knew here. We work directly with the community. And people are more comfortable coming here. They knew that there were going to be people here who could speak their language. But if you go to pharmacies, you're only speaking with one pharmacist who probably won't know your language. So, I think that was a big comfortability for them. And a big reason why they came … they knew they would have someone as a translator, they knew people who were here. They felt comfortable taking their family, and they've been to a lot of programs, like summer programs for kids."* (F 33:40)

Moreover, this comfortability was enforced by CHWs' efforts, organization, and language assistance. Some CHWs shared their ideas to make their clients who came to the vaccine clinics more comfortable, such as providing coloring books and candies for children. CHWs saw many refugees come to the clinic with their large families, as one participant indicated:

> *"One of our community health workers, she had the amazing ideas of bringing like little coloring sheets for the kids. And we just wanted to make this clinical as easy and as quickly and as accommodating as possible. So, like by having, like drinks, then the candy for the kids things that would keep the kids busy to not agitate their parents. That seems like it isn't stressful."* (D 29:21)

3.4.5. *Networking*

Vaccine outreach success was partly due to the strong relationships the CHWs have built with local organizations and community leaders. Not only CHWs of CYO but also CHWs of other refugee resettlement agencies collaborated with outreach and vaccine clinics.

> *"I love that how the other teams and organization are coming together, it makes them better. We can have better outcome, and we all learn together and working on this project."* (A 20:38)

Also, a significant collaborator in the vaccine outreach efforts were the healthcare and public health professionals who are part of the community-clinic partnership. Most CHWs described how the accessibility to healthcare professionals from a local hospital team was helpful, as described in the sub-theme "Equipped with reliable information". The relationship and collaboration with a local hospital team brought medical knowledge and tools to build confidence in CHWs when facilitating the outreach program and providing the vaccine clinic events.

> *"We have Upstate (Medical University team). (…) We have some student, resident (doctors) that came along, because she (a doctor of a local hospital team) attempts to address to assist us to our endeavor."* (B 20:41)

3.4.6. Outreach

CHWs provided outreach and recruitment efforts to the refugee community by visiting homes and through staffed tables at community events. CHWs facilitated outreach efforts through open discussions with refugees and by providing them with accurate information about the vaccine translated into each ethnic group's language. Outreach efforts were strengthened by CHWs coming together for regular meetings to share their progress and discuss their difficulties in implementing the program. The CHW meetings facilitated meaningful dialogue to enhance the team's outreach and outreach efforts.

> *"First time they refuse. We try the second time, they refuse, we try this … At the end of the day, they say "Oh, I think this man …." When they see you're trying to come back and come back and come back and try to explain to them at the end of the day. You see them coming to the clinic."* (E 16:11)

4. Discussion

This study aimed to understand refugees' perspectives and beliefs about the COVID-19 vaccine, to describe barriers and facilitators that affect attitudes towards COVID-19 vaccine uptake in the refugee population, and to identify culturally sensitive intervention strategies, information, and public health messaging to address vaccine uptake, access, and outreach for the refugee population through the perspective and reflection of CHWs. CHWs who participated in the semi-structured interviews reported refugees' diverse beliefs and attitudes changed over time. CHWs also noted barriers and facilitators affecting COVID-19 vaccine uptake and their team efforts used to strengthen their outreach. This research is the first qualitative study describing refugees' beliefs towards the COVID-19 vaccine and potential culturally sensitive strategies for vaccine uptake identified through interviews with CHWs. It is an important contribution to the literature, given that the perspectives of refugees and immigrants are often left out of crucial conversations when considering public health interventions.

4.1. Importance of tailoring messages depending on diverse groups and changing minds over time

First, our findings revealed that most of the refugee population eventually accepted the COVID-19 vaccine despite low acceptance at the beginning of the vaccine distribution. The rate and process of acceptance varied depending on the individual's thoughts, race, and ethnic group. The present study CHW participants described some ethnic groups (e.g., Karen group) that might be more comfortable towards vaccine uptake and some groups (e.g., Somali group) that might show antipathy to the vaccine. One study targeting ethnic minority parents of adolescents in the U.S. described that the Somali group also showed vaccine hesitancy compared to other groups [34]. "Ethnic minorities" are often not classified into detailed groups in national-level surveys [35,36]. However, the present study indicated different acceptance and hesitancy in different ethnic groups, which implied the importance of tailoring approaches with the specific ethnic minority group in mind. Factors affecting the attitude changes among refugees identified as barriers and facilitators, which are described below.

4.2. Barriers to Vaccination among Refugees

Second, barriers to COVID-19 vaccine uptake were identified. Contextual barriers are based on cultural background and how refugees interact with each other. For example, language barriers, lack of transportation, and different religious norms keep refugees from accessing health care. The lack of system literacy and health literacy can worsen health outcomes. Discrimination may connect to a lack of trust in the government. These underlying barriers can make refugees anxious about unknown environments such as pharmacies, public vaccine sites, and clinics. Also, those contextual barriers can compound other barriers. For example, lack of vaccine awareness can be worsened by language barriers. Moreover, the language barriers, lack of health system literacy, and digital literacy can deepen mistrust of the government and misinformation [15,37].

It was previously reported that information sources about COVID-19 and COVID-19 vaccination among refugees were limited [3,15]. Limited information can easily cause misinformation, compounding vaccine hesitancy among refugees [3,15]. The final barrier identified in this study was a defensive, withdrawn attitude driven by vaccine mandates. CHWs described that this occurs when the authorities, including the federal government or employers, force refugees to receive the COVID-19 vaccine. This protective reaction is common among individuals with vaccine hesitancy [14,38]. However, refugees, in particular, tend to be more defensive because of their prior mistrust of the authorities and due to misinformation [6,39]. Compared to other vaccines, the COVID-19 vaccine was approved by the FDA and rolled out rapidly [40]. Rapid approval, although necessary given the consequences of the pandemic, may be unacceptable for the population with limited trust in federal authorities. Research has shown that vaccine policies and mandates should not be pushed forward without efforts to lessen the fear, hesitation, and uncertainty of those with defensive attitudes toward vaccines [41]. Facilitators and culturally sensitive strategies discussed below can help diminish the opposition among hesitant individuals.

4.3. Role of time and internal processing

Third, facilitators were identified in the analysis that addressed barriers faced and discussed the attitude change process for refugees. A change in attitude over time toward COVID-19 vaccination was previously reported among both the general public [42] and the refugee population [3]. Voices from the CHWs in this study were consistent with those previous studies showing that hesitancy can

shift to acceptance over time. Internal processing, that is, the ability of refugees to think about and accept new concepts in their own time, of refugees was an important facilitator. Most CHWs mentioned that "*there was no special message (from CHWs)*." "*Time was important*," which indicated that time flow contributed to attitude change for refugees. Several previous studies assumed the time frame would affect people's mind shift and recommend that the public health sector should monitor that change cautiously [42–45]. In the present study, attitude change over time was observed among the refugee population, too. CHWs described that refugees observed others' behavior and collected reliable information individually helping them understand that severe side effects are rare and prevention is vital for COVID-19. Another facilitator was external messaging by CHWs. Reliable information from trusted CHWs and their open attitude when disseminating the information contributed to the attitude change among refugees.

4.4. Trusted relationship and locations

Last, the study identified some CHWs experiences that can be put into practice when implementing culturally sensitive strategies for COVID-19 vaccine uptake. Most of the participants indicated the importance of time and trust. The trust between CHWs and refugees has been strengthened by their usual support and repeated visits in their outreach. One participant mentioned the private connection between refugees and CHWs increases the chances of communication. CHWs' efforts beyond work as trusted community members contributed to building further trust and accepting information. Moreover, CHWs speak their native countries' or communities' languages [3,46], which aids in communication with refugee clients. CHWs deeply understand their community [47] and establish rapport via both private settings and through their work [48]. For newly resettled refugees, encounters with people who speak the same language and share the same culture facilitate smooth communication [46], helping to reduce anxiety about new places and improve comfort. Hosting the vaccine clinics at the local resettlement agency (CYO) in their community also mitigated stress and anxiety. Previous research by the study team found that implementing medical clinics within the refugee community that are easily accessible is an effective strategy to address vaccine uptake [3]. The present study revealed that the vaccine clinic in the community, rather than the New York State site, was effective for both refugees and CHWs. Other research has shown that comfortability made by a safe place and trusted people is vital to improving vaccine uptake [3,6,7,11,15,39]. CHWs continually evaluated their outreach strategies and the environment of temporary vaccine clinics to enhance clients' comfort. Their professionalism in providing a safe environment helped refugees who might have felt hesitant or anxious about the vaccine.

4.5. Effect of obtaining reliable information

It is also essential that CHWs are equipped with reliable information. CHWs continuously updated their knowledge about COVID-19 and the COVID-19 vaccine throughout outreach. CHWs had access to reliable information sources throughout multiple educational sessions with a physician's team from the community-clinic partnership. Repeated opportunities to learn about the vaccine and the strong relationship between CHWs and the local hospital team helped not only to provide trustworthy information to the community but also to improve the confidence of CHWs for vaccine outreach. A previous qualitative study exploring CHWs' perspectives on refugee health found that CHWs are motivated to seek training and educational opportunities [22]. Such continuous and accessible learning opportunities about health with clinical partners improve CHWs' self-assurance in their efforts.

4.6. Impact of communication with CHWs

In addition, the communication skills used by CHWs were critical to their outreach. They kept an open attitude with refugee clients without enforcement. This approach is echoed by guidelines published by the Icahn School of Medicine at Mount Sinai [49]. The guidelines suggest clinicians approach vaccine-hesitant patients with an open attitude, without judgment, and provide information if patients are interested. This approach can help to increase patients' trust [49]. Researchers found that the attitude and communication skills shared among CHWs also adhered to these guidelines. However, CHWs in the present study were not provided with specific guidelines for communication with vaccine-hesitant populations before outreach. CHWs describe that they communicate and act flexibly depending on each client's cultural context of health. This knowledge is derived from a shared community, culture, and history between CHWs and their refugee clients [46]. Therefore, successful communication skills with vaccine-hesitant populations might have been acquired naturally through the vaccine outreach team discussions and previous CHW work. Discussions between CHWs at team meetings enabled CHWs to individually tailor messaging for clients and take into consideration their changing attitudes toward vaccination.

4.7. Internal processing encouraged by culturally sensitive strategies

The importance of time and trust were repeatedly mentioned by most of the participants. CHW participants emphasized that they supported refugee clients' decision-making processes with an open attitude and reliable information. We identified "time," "internal processing," and "culturally sensitive strategies" as significant and connected components of behavior change and beliefs of refugees in vaccine acceptance and uptake. When approached consistently with reliable information and openly by CHWs, over time and without enforcement, refugees were more likely to accept the COVID-19 vaccine through their internal processing. Vaccination clinics at familiar and trusted local community sites offered refugees a safe place to obtain the vaccine with cultural support. CHWs continually evaluated outreach efforts to help refugees feel comfortable and give them reliable information.

Overall, culturally sensitive strategies continuously provided by the CHW participants, such as utilizing languages of each ethnic

group, repeated community outreach by trusted people, keeping an open attitude without enforcement, conveying reliable information when refugee clients need it, and providing easily accessible and supported vaccine sites, have encouraged refugees' internal processing to make a decision to accept vaccination over time. Such findings of CHWs' culturally sensitive strategies may be applied to other disproportionately affected groups and vaccine-hesitant communities when implementing public health interventions.

4.8. Limitations

The present study has some limitations. First, the participants of this study were only CHWs. The voices of the clients' side, that is, refugees, were not collected. Although most CHWs were originally refugees and have worked with refugees for many years, not including current refugee clients may have limited the depth of our findings. Future research can explore refugee reactions to vaccine outreach and how they have changed or not changed their minds. Second, CHW participants were recruited from one resettlement agency through snowball sampling, which means that not all voices of CHWs working for refugees in the community are included. However, we concluded we could achieve a triangulation through careful inquiries and analysis. Third, it is understood by researchers that six participants are a small number for a qualitative study. However, 75% of the CHWs on the vaccine outreach team at the time of the study participated. Researchers felt that data saturation was achieved from the six interviews, so additional recruitment was not pursued. Fourth, there is a possibility that the distinct ethnic groups of refugees might have more specific cultural contexts, and/or geographical influence, as barriers towards vaccination that the researchers did not identify. Future research with interviews with the refugee or ethnographic approaches are warranted. Fifth, we might not have been able to extract the themes from CHWs and distinct refugee communities with weak relationships. This study encompassed a variety of ethnic communities, such as those from Congo, Somalia, Burundi, Ethiopia, Eritrea, Afghanistan, Syria, Iraq, Myanmar (Karen), and Burma. Nonetheless, it is possible that other ethnic groups in Syracuse were not included. However, the researchers are of the opinion that the study did, in fact, represent the vast majority of ethnic communities residing in Syracuse. This limitation caused by selection bias could make the present findings overly generalizable. To address this point, future research recruiting various refugee communities and CHWs is needed. It is essential to note that although some populations (i.e., Somali) continue to be vaccine-hesitant, they still have close relationships with CHWs for other health-related matters.

5. Conclusion

The present research is the first qualitative study describing refugees' beliefs towards the COVID-19 vaccine and potential culturally sensitive strategies for vaccine uptake identified through interviews with CHWs. The analysis found that time and internal processing were significant components of behavior change and beliefs for refugees in vaccine acceptance and uptake. CHWs' communication based on trust and rapport with clients combined with easily accessible and supported vaccine sites is vital when implementing culturally sensitive strategies for vaccine uptake and acceptance among refugees.

Ethics statement

The research was reviewed and approved as an exempt project by the SUNY Upstate Medical University Institutional Review Board (IRB), project number 1875500-1. This research received no specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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Data will be made available on request.

Additional information

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CRediT authorship contribution statement

Moe Kuroda: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Andrea V. Shaw:** Writing – review & editing, Validation, Project administration, Conceptualization. **Christina D. Campagna:** Writing – review & editing, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix C. Supplementary data

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