

‘Getting control of Corona takes many angles’: COVID-19 vaccine knowledge, attitudes and beliefs among refugee/immigrant/migrant communities in four US cities

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Abstract

The objectives of the study were to (i) document refugee, immigrant and migrant (RIM) communities’ knowledge, attitudes and beliefs (KABs) related to the Coronavirus disease (COVID-19) vaccine and (ii) identify best practices for developing and disseminating culturally and linguistically responsive health messaging addressing those KABs. Thirteen online focus groups (OFGs) in 10 languages were conducted. Each OFG was conducted in the participants’ native language. OFGs were recorded, transcribed, translated and uploaded to qualitative software for coding. A thematic analysis was conducted. Results suggest that while there was some variation between different language groups (e.g. whether religious leaders were seen as trusted sources of information about COVID), there were also important commonalities. Most language groups (i) alluded to hearing about or having gaps in knowledge about COVID-19/the COVID-19 vaccine, (ii) reported hearing

negative or conflicting stories about the vaccine and (iii) shared concerns about the negative side effects of the vaccine. There continues to be a need for health messaging in RIM communities that is culturally and linguistically concordant and follows health literacy guidelines. Message content about the COVID-19 vaccine should focus on vaccine importance, effectiveness and safety, should be multimodal and should be primarily delivered by healthcare professionals and community members who have already been vaccinated.

Introduction

The COVID-19 pandemic has disproportionately impacted refugee, immigrant and migrant (RIM) populations [1, 2]. RIM populations often reside with large families in high-density housing and have jobs that are frequently low-paying or in essential industries [3]. These factors, in addition to residing in socioeconomically stressed

neighborhoods, are associated with an increased risk of COVID-19 exposure [2, 3]. Additionally, refugees have higher rates of chronic diseases [4–7], which increases risk for severe complications from COVID-19 [8].

COVID-19 vaccination is vital for reducing the pandemic's disproportionate burden on RIM communities, though successful provision of vaccines requires navigating numerous barriers [9]. Systemic factors, including barriers to health-care access and information in languages other than English, have led to lower immunization rates for some immigrant and migrant communities compared to non-immigrant and migrant communities [10]. Indeed, prior studies have highlighted that lack of vaccine information in one's native language is a barrier to vaccine uptake [11–13]. Furthermore, in the United States, RIM communities often experience problems accessing healthcare due to structural barriers; these can include issues related to affordability, limited services, difficulty navigating complex health systems, inadequate interpretation and poor cultural competency among providers [14]. Furthermore, social determinants of health, such as having adequate shelter, food and employment, often take priority over accessing non-urgent healthcare [15].

The decision to vaccinate is also influenced by contextual factors such as religion and culture. For example, RIM participants in one study mentioned trusting natural immunity or traditional medicines and raised concerns that because the vaccine was developed in the United States with White patients, which may not be as effective for non-White populations [16]. Other studies have suggested that experiences of state perpetrated repression, violence and persecution in their countries of origin, and discrimination in their host countries may lead RIM communities to distrust the health system, and thus vaccine hesitancy may be an expression of cultural alienation [17, 18]. Some research also suggests that refugees may be particularly vulnerable to 'conspiracy theories', causing suspicion about government intentions for public health campaigns [18, 19].

Given this evidence, it is not surprising that a lack of linguistically and culturally appropriate health messaging contributes to lower vaccination rates [20, 21]. Therefore, examining RIM community vaccine knowledge, attitudes and beliefs (KABs) is crucial to the development of interventions to effectively address vaccine hesitancy and promote vaccination for this vulnerable population. Unfortunately, there is a dearth of prior literature focused on COVID-19 KABs among such diverse populations with respect to race/ethnicity, native language, country of origin and geographic residence. Thus, we sought to understand RIM community members' KABs about the COVID-19 vaccine and facilitate the development of culturally and linguistically appropriate communication and messaging to help encourage vaccination and improve health outcomes.

Material and methods

Overview and study design

The objectives of the study were to (i) gain a nuanced understanding about RIM communities' KABs related to the COVID-19 vaccine and (ii) identify best practices for developing and disseminating culturally and linguistically appropriate health messaging explicitly addressing those COVID-19 KABs.

The Centers for Disease Control and Prevention (CDC)-funded Georgia State University Prevention Research Center (GSU PRC), headquartered at the Clarkston Campus at Perimeter College, works with community organizations, state and local governments, residents and other partners in Clarkston, GA, to develop, implement and evaluate culturally and linguistically appropriate interventions to address disparities and determinants of health for RIM communities, and to disseminate this work at the community, state and national level. The CDC-funded National Resource Center for Refugees, Immigrants and Migrants (NRC-RIM), headquartered at the University of

Minnesota and in collaboration with the International Rescue Committee (IRC), supports health departments and community organizations working with RIM communities that have been disproportionately affected by COVID-19.

In spring 2021, GSU PRC team and the NRC-RIM/IRC teams (hereafter IRC) decided to formally collaborate, in part, because the separate teams' objectives and methods were similar (e.g. both were planning facilitated, semi-structured focus groups in RIM communities) and both were planning to conduct focus groups with overlapping 'and' distinct language groups, providing a unique opportunity to complement and expand the reach of each other's work. At the start of collaboration, the GSU PRC team had already begun conducting Online Focus Groups (OFGs) and provided the IRC team with their focus group guide; the IRC team subsequently developed their OFG guide to align with the GSU PRC team guide. Using a collaborative approach, GSU and IRC staff and community stakeholders worked together on the planning, design and implementation of the OFGs.

Settings

Clarkston, GA (GSU PRC)

Clarkston, GA is one of the largest refugee resettlement sites in the United States. Between 2008 and 2012, nearly 75 000 refugees arrived in the US, and 12 164 of those refugees settled in Clarkston. These refugees hail from over 75 different countries, represent about 150 different ethnic groups and speak over 60 different languages. Approximately half (53.1%) of the city's 12 750 residents are foreign born [18].

IRC

IRC is a community-based organization with a long history of serving refugees and immigrants both in the United States and internationally. Annually, IRC provides services across 15 states to more than 48 000 individuals within a range of US immigration statuses.

Study participants

GSU PRC

We conducted seven OFGs with a sample of Clarkston RIM-identifying residents. Individuals were recruited by community health workers (CHWs) employed by the Refugee Women's Network in Clarkston, by CHWs working on other GSU Prevention Research Center projects or by current GSU students who were members of one of the target populations. These study staff shared information about the OFGs through their door-to-door work in the community verbally, through informational flyers and through SMS/text. In addition to English, recruitment information and the actual focus groups were offered in the following primary community languages: Somali, Karen, Arabic, Burmese, Swahili, Nepali and Amharic. Study staff recruited between 5 and 10 participants for each OFG. Recruitment took place between January 2021 and May 2021.

IRC

We conducted six OFGs with a sample of RIM community members living in the United States. IRC employees located in New Jersey, Texas and Washington identified and recruited participants using a combination of purposive and snowball sampling in communities whose primary languages included: Swahili, Arabic, Dari/Pashto and Ukrainian. We developed an optional script for employees to use when inviting participants. Employees were given autonomy to contact potential participants through any communication method they felt to be most appropriate and effective. Employees recruited 1–11 participants for each OFG. Recruitment took place between March 2021 and April 2021.

Focus groups

The OFGs took place through WebEx [22] (at the GSU site) or Zoom [23] (San Jose, CA) (at IRC sites); participants could join either by phone-only or through both audio and video using their computers or phones. Seven OFGs (one each in

the community's primary seven languages) were conducted at the GSU site and six OFGs were conducted at the IRC sites. The duration of the discussions varied, in part, due to differences in participant numbers, but all were <90 min and were recorded. Participants received compensation for their time via gift cards.

Each OFG was conducted in the participants' native language by a facilitator who was also a native speaker of that language. All facilitators were trained on the purpose of the OFG, their roles and responsibilities, safeguarding client confidentiality, obtaining informed consent and guidance for conducting the OFG including best practices for engaging participants and ensuring that all participants had opportunities to share their experiences and perspectives; they received a facilitator guide including the discussion questions prior to the OFGs. We drew on experience and resources from previous focus groups and assessments conducted by GSU and the IRC to develop our focus group structure, processes and guidelines. All materials were written in English and multilingual facilitators/note takers interpreted the discussion questions during the OFGs. Some of the focus group facilitators, who were identified as members of the same communities as GSU PRC and IRC's study participants, provided support with manuscript writing. They also reviewed the final manuscript to ensure that it faithfully incorporated their perspectives and accurately captured OFG discussions. These individuals also are co-authors.

Prior to beginning the discussion, the facilitator confirmed that all individuals understood the consent, answered any questions and asked for verbal consent to participate in the OFG and to being recorded. Participants were asked a series of open-ended questions related to KABs about the COVID-19 vaccine including how they or others in the community felt about the vaccine, stories or information that they or others in the community were hearing about the vaccine, what concerns or worries they or other community members had about the vaccine, what barriers might prevent them or others in the community from getting vaccinated

and what might encourage them or people in the community to get vaccinated or feel safe about getting vaccinated. Participants were also asked questions about how COVID-19 health messaging should be delivered (e.g. their preferred modalities, such as billboards, TV, radio, social media, phone, written information and spoken information) and who should be disseminating (e.g. sources that are seen as credible).

This research was considered 'not human subject research' by the University of Minnesota IRB (because we did not collect any information that would allow for re-identification) and was designated as 'exempt' by the GSU IRB.

Analysis

All focus groups were recorded, and audio files were professionally transcribed and translated into English; a focus group facilitator reviewed the transcripts and translations to ensure accuracy at IRC study sites. Transcripts were uploaded to NVivo (at GSU) [24] or to Dedoose (at IRC) [25] for coding.

We performed a hybrid thematic analysis incorporating both a deductive *a priori* template of codes and a data-driven inductive approach [26]. A shared codebook was created collaboratively using the interview guides as a template (deductive); however, the coding process allowed for iterative additions to the codebook as themes emerged (inductive), during which there was a slight variation between sites. At each site, three authors formed the coding team and met regularly to reconcile their findings, resolve any coding discrepancies and create analysis matrices for each transcript. These matrices were shared tables, organized by language groups that included the codes, themes and exemplary quotations; they were used by both sites to consolidate our findings and identify similarities and differences across sites. Representatives from both institutions met regularly to review the analysis matrices and identify emerging themes from across the focus groups. Findings were shared with the OFG facilitators and with a subset of OFG

Table I. Sociodemographics of the study population

Location of focus group		<i>N</i>	Language	Community represented	Gender composition
GSU PRC	Clarkston, GA	10	Arabic	Iraq, Sudan, Syria and Egypt	Both men and women
	Clarkston, GA	5	Swahili	Kenya, DRC and Uganda	Both men and women
	Clarkston, GA	8	Somali	Somalia	Both men and women
	Clarkston, GA	5	Karen	Myanmar	Both men and women
	Clarkston, GA	6	Burmese	Myanmar and, Bangladesh	Both men and women
	Clarkston, GA	6	Nepali	Nepal	Both men and women
	Clarkston, GA	6	Amharic	Ethiopia and Eritrea	Both men and women
IRC	Elizabeth, NJ	3	Arabic	Syria	Women only
	Elizabeth, NJ	5	Swahili (1)	DRC	Men only
	Elizabeth, NJ	11	Swahili (2)	DRC	Women only
	Seattle, WA	7	Ukrainian	Ukraine and Belarus	Both men and women
	Dallas, TX	3	Dari/Pashto	Afghan ^a	Men only
	Dallas, TX	1	Pashto	Afghan ^a	Women only

^aNot all participants may have been identified with this community.

participants to ensure that we accurately characterized the content.

Results

Overview of the study population/demographics

A total of 13 focus groups (in 10 languages) were conducted across 4 cities: Clarkston, Georgia; Seattle, Washington; Dallas, Texas; and Elizabeth, New Jersey; the total sample size was 76. While some language groups shared a country of origin (e.g. all participants in the Somali language group were from Somalia), other language groups had different countries of origin (e.g. multiple countries of origin were represented in the Arabic and Swahili groups; see [Table I](#)).

Domain 1. Knowledge/lack of knowledge about COVID or the COVID-19 vaccine

Participants had various degrees of knowledge on different topics related to COVID-19 ([Table II](#)). With regards to preventive measures, Dari/Pashto speakers showed detailed knowledge of masking and hand washing, whereas Swahili and Arabic speakers shared statements that suggested a gap in understanding. When discussing best practices

after vaccination, most language groups endorsed a need to continue preventive measures. However, Swahili and Ukrainian speakers showed some gaps in understanding about risks and best practices after being vaccinated, particularly concerning the need for masking after vaccination. For example, one Ukrainian participant asked, ‘If the vaccine really works, why keep wearing masks?’ Areas in which groups had gaps in vaccine knowledge were included but were not limited to safety, side effects and importance (including the impact of variants on vaccine efficacy). Areas of knowledge about the vaccine included side effects, a fundamental understanding of how the vaccine works and accessing the vaccine. Lastly, some Swahili, Dari/Pashto and Ukrainian speakers demonstrated a gap in knowledge within their communities about the COVID-19 disease itself. In the Swahili group, this included the difference between COVID and other diseases (e.g. malaria and the flu) and treating COVID. For example, one Swahili speaker said, ‘Ok, you know even in the hospital, they say this virus is not Coronavirus, it’s the flu.’ A Ukrainian participant indicated that ‘A lot of people in our Ukrainian- and Russian-speaking community have had the disease. And these people believe that they have antibodies and won’t get ill again, because it rarely happens.’

Table II. Knowledge/lack of knowledge about COVID or the COVID-19 vaccine (Theme 1)

Subthemes	Language group(s) where theme was present	Exemplary quotes
Knowledge about preventative measures	Dari/Pashto, Swahili, Burmese	'It is very important to wear the mask until there is an environment where everyone is safe from the virus.' —Dari/Pashto speaker
Lack of knowledge about preventative measures, best practices after getting vaccinated	Arabic, Swahili and Ukrainian	'People keep asking: "If people receive the vaccine, will they no longer be infected?" That's the first question they ask. If they can no longer be infected, why those who have been vaccinated have to continue wearing masks and avoid the crowd? Because once you receive the vaccine, you have nothing to worry about.' —Swahili speaker
Lack of knowledge about COVID	Dari/Pashto, Swahili, Ukrainian and Amharic	'Believe me when I say, there are women who are used to sit in the lawn outside; they don't even know what coronavirus is, and what it is not.' —Dari/Pashto speaker
Knowledge about the COVID vaccine	Arabic, Dari/Pashto, Ukrainian, Amharic and Karen	'The only side effect that this vaccine has, fever and headaches for a few days and it is different from person to person, depends on their state of health. I don't have much information in regard to any consistent side effect...' —Dari/Pashto speaker
Lack of knowledge about the COVID vaccine	Arabic, Dari/Pashto, Swahili, Ukrainian, Nepali and Burmese	'With all variants you just talked about, so how many kinds of vaccine do we have to get? If a vaccine can protect from one variant and not others, does it mean that we will have to continue getting different vaccines?' —Swahili speaker

Domain 2. Stories about COVID or the COVID-19 vaccine

Participants discussed their communities' experiences with COVID and shared positive, negative and conflicting vaccine stories (Table III). The impact and burden of COVID-19 for community members were explicitly mentioned by Dari/Pashto and Ukrainian speakers. Somali, Arabic and Dari/Pashto speakers shared hearing positive reactions to the vaccine, and that an elderly woman in the Dari/Pashto community who had been ill with COVID 'wished for a vaccine so that she might not have suffered this much.' Others shared stories that they felt were conflicting or confusing, with one Amharic speaker stating, 'Regarding the vaccine, for me, I feel confused about it when I look on social media'. Negative stories tended to be more predominant in Amharic, Swahili and Ukrainian OFGs, though many groups alluded to their presence in the community. Among the Swahili community, stories were shared about the physical effects of the vaccine (including stories about people turning into insects after being

vaccinated), videos seen on social media and stories about people who do not accept the vaccine (e.g. certain politicians or faith leaders). Swahili and Amharic speakers also shared stories about the origin of the virus and the vaccine, and both Swahili and Karen speakers relayed stories of incompetent vaccine administration. Both the Swahili and the Ukrainian community discussed concerns about people being coerced or pressured to get vaccinated. Ukrainian and Arabic speakers additionally shared stories about people who became ill or died as a result of being vaccinated. Among the Arabic and Dari/Pashto groups, participants reported hearing stories about the vaccine negatively affecting fertility.

Domain 3. Reasons why people may get vaccinated/motivations for vaccination

Participants discussed several reasons why they or their community members may receive the vaccine or plan to get vaccinated (Table IV). Across multiple language groups, participants shared how the desire to protect themselves and others, whether

Table III. Stories about COVID or the COVID-19 vaccine (Theme 2)

Subthemes	Language group(s) where theme was present	Exemplary quotes
Stories about the origin of the virus or vaccine, conspiracies about how the virus or vaccine originated	Amharic and Swahili	'There are things that are released on social media and it's a microchip—it's the gov't is the one doing this.' —Amharic speaker 'They said that the virus originated in China.' —Swahili speaker
Hearing conflicting or confusing information	Amharic, Arabic, Swahili, Ukrainian	'Some people get information from social media and others from news and everything we hear is very different because it is very, very difficult to know who is telling the truth.' —Amharic speaker
Hearing positive and/or encouraging information	Arabic, Dari/Pashto and Somali	'We also heard that it will prevent and eradicate Corona Virus. We are very excited about it and welcome the vaccine since it will save many people from the disease.' —Somali speaker
Hearing negative and/or worrisome information	Amharic, Arabic, Dari/Pashto, Swahili, Ukrainian, Burmese, Nepali and Somali	'My cousin was living in Kuwait and he took the vaccine. After four days he went to the hospital it was asthma and then he died. They said there that he died because of the vaccine May Allah mercy him. so, for me that is the main reason of my hesitation in taking the vaccine.' —Arabic speaker 'For example, some people say that this vaccine affects fertility quite a lot [...] I mean they say, "The numbers of our race might decrease a lot in the future".' —Dari/Pashto speaker
Hearing stories about being pressured to get vaccinated	Swahili and Ukrainian	'In our home country, the D.R. Congo, I was watching the news. I saw that student had to leave the school, jumping from windows, some having broken legs, only because students did not want to get the vaccine. They just heard that the vaccine was brought to schools in order to vaccinate students. Students left schools; parents went to pick up their children in hurry...' —Swahili speaker
Hearing stories about incompetent/ineffective vaccine administration	Karen and Swahili	'We heard that doctors were seeking help from retired doctors or even student in medical school. Fewer showed up because they were afraid of corona. With such an example, do you think those volunteers will do a good job? Do you think the will really take care of those who are sick? That is a big concern...' —Swahili speaker

their children or friends in the community, was a motivation for being vaccinated. There was also a discussion among many groups about how vaccination could facilitate a return to 'normal life', including returning to in-person schooling, socializing, not wearing masks and traveling. Distinct, but sometimes overlapping with a desire to resume a prepandemic lifestyle was a desire to feel less afraid of COVID-19. For example, one Arabic speaker noted that a benefit of getting the COVID-19 vaccine was, 'that life returns to normal, and we resume our lives as they were before without fear.'

While not discussed across OFGs broadly, Swahili speakers also shared how vaccination might restore a sense of peace, with one person saying, 'Vaccination is the right thing for us because it will help us live in peace.' While these motivations may be factors that encourage vaccination, many groups expressly mentioned how a vaccine decision ultimately rests with the individual's perception of risks and benefits. This was especially evident during the Ukrainian OFG, in which one speaker concisely said, 'Everyone has to decide for themselves.'

Table IV. Theme 3: Reasons why people may get vaccinated/ motivations for vaccination

Subthemes	Language group(s) where theme was present	Exemplary quotes
To protect self	Arabic, Burmese, Dari/Pashto and Somali	‘The infection is everywhere around us so we have to protect ourselves.’ —Arabic speaker
To protect family, friends and community	Arabic, Burmese, Dari/Pashto, Somali and Amharic	‘We are keen to get the vaccine as soon as possible so that the spread of the disease can be prevented and just that we should think about the safety of our other friends.’ —Dari/Pashto speaker
To feel ‘free’, safe and less afraid	Arabic, Burmese, Somali, Swahili, Ukrainian and Nepali	‘When you get the vaccine, you become free to do what you want, you can no longer be afraid of the disease you were vaccinated for.’ —Swahili speaker ‘The vaccine should just be made compulsory...Like students should take vaccines before going to school and teachers should do the same. That would make us feel safe. My people would obviously agree to take vaccines if they are told to. I think that everyone should take vaccine and feel safe rather than not taking it and feel unsafe.’ —Nepali speaker
Desire for things to return ‘normal’/to resume pre-pandemic activities	Arabic, Burmese, Dari/Pashto, Swahili and Ukrainian	‘The benefit: the infection ends and everything returns to a normal, and schools open... Social contact returns, and people mingle again.’—Arabic speaker

Domain 4. Reasons why people may not get vaccinated, including vaccine concerns

Participants also discussed myriad reasons why they or their community members have not received the vaccine or do not plan on getting vaccinated (Table V). Concerns about vaccine efficacy and negative effects were the most prevalent reasons why people might choose not to be vaccinated. This was noted across virtually all of the OFGs, with some explaining that factors related to vaccine novelty contributed to these concerns. Other groups relayed beliefs that the vaccine is unnecessary in the setting of natural immunity or illogical when new variants may cause infections despite vaccination. Some groups also raised concerns about vaccine promoters’ agendas. For example, the Ukrainian group described feeling pressured or coerced by the government, and the Swahili group felt that certain demographics (race, age) were being targeted for vaccination. At the time of the OFGs, some groups noted that the vaccine was religiously acceptable, although Dari/Pashto speakers explained that there was earlier confusion about whether the vaccine is halal.

In addition to vaccine concerns, most groups described logistical barriers to vaccination. These barriers included difficulty navigating registration and appointments, limited English and health literacy (the degree to which individuals have the ability to find, understand and use information and services [27]) and concerns about cost and transportation. Competing priorities, such as childcare or work, may also hinder vaccination (particularly when appointments were only offered during work-days) and were more frequently discussed during OFGs with women or in reference to women in the community. Barriers related to vaccine allocation and availability were also mentioned by Arabic and Dari/Pashto speakers who noted a willingness but inability or uncertainty of how or where to be vaccinated.

Domain 5. The best ways to reach people regarding the COVID-19 vaccine

Participants discussed several reasons they or their community members received the vaccine or planned to get vaccinated (Table VI). Face-to-face interaction (including virtual interaction through

Table V. Reasons people may not get vaccinated, including vaccine concerns (Theme 4)

Subthemes	Language group(s) where theme was present	Exemplary quotes
Concerns about vaccine efficacy	Amharic, Arabic, Dari/Pashto, Somali, Swahili and Ukrainian	‘But now we can’t talk about its effectiveness because it hasn’t been fully researched. For me, even a doctor’s opinion would not be an option, because he himself doesn’t know. I would understand his explanations on what this vaccine consists of, how it works, but no one can explain the consequences, how it affects the human body.’ —Ukrainian speaker
Concerns about negative effects	Amharic, Arabic, Dari/Pashto, Karen, Nepali, Somali, Swahili and Ukrainian	‘I mean from the Afghans we hear things that show they are afraid that the vaccine could create complications. Some are afraid of the nausea and the fact that one has headaches for a few days from the vaccine or that there may be pain, those sorts of concerns do exist, and these might be associate with all vaccines and not just this vaccine.’ —Dari/Pashto speaker ‘Many people are asking themselves: “What problem will we get if we receive this vaccine?” Because people have been saying that if you get vaccinated you will have some problems. Therefore many people are very concerned. You cannot predict, when you get the vaccine, how your body will react to it. You cannot tell whether it will work or not. Therefore many people, even myself, have real concerns about this vaccine.’ —Swahili speaker
Feeling as if vaccination is illogical or unnecessary for them	Ukrainian	‘Because if people who have been vaccinated don’t have to get tested, at the same time they can spread the virus and can be infected as well. Where is the logic, then. These are the kinds of things that are confusing. I think these are the factors that create a barrier, so that people don’t want to get the vaccine, they refuse to get it. There are times when people refuse to get the vaccine because they don’t see the logic, as you say.’ —Ukrainian speaker
Concerns about agenda of those promoting the vaccine (including coercion)	Amharic, Swahili and Ukrainian	‘Pharmaceutical companies...they may be selling their own medicine.’ —Amharic speaker ‘People feel pressure and it discourages them. If only it had been without pressure, but as it is, it’s alarming. Why are they so eager for us all to get vaccinated? Something’s not right there.’ —Ukrainian speaker
Religious considerations	Amharic, Dari/Pashto	‘In religion they often do not accept it, for example catholic faith does not accept it.’ —Amharic speaker
Practical/logistical barriers	Arabic, Burmese, Dari/Pashto, Karen, Nepali and Swahili	‘I’m not sure whether it costs money or is free.’ —Burmese speaker ‘People around us ask, have you gotten vaccinated and we say no, we are not aware where we can get it from? How it’s done? We know nothing.’ —Dari/Pashto speaker ‘We have transportation problems too. Not everyone have access to easy means of transport.’ —Nepali speaker ‘There is a barrier if someone has children here; you have nobody to watch them when you must go to get vaccinated.’ —Swahili speaker

platforms like Zoom) was the most preferred method for sharing information about COVID-19 vaccines. This preference was especially predominant in the Dari/Pashto and Swahili women’s OFGs. Other ideas included written material for easy reference and videos, which have an added benefit of overcoming literacy barriers. While

social media and WhatsApp were raised as options for information sharing by some groups, the Dari/Pashto OFG suggested that platforms like Facebook may be less helpful as some community members may not want their residence in the United States disclosed. When asked what content would be most helpful, participants identified

Table VI. The best ways to reach people regarding the COVID-19 vaccine (Theme 5)

Subthemes	Language group(s) where theme was present	Exemplary quotes
Preferred modalities: in-person/face-to-face (<i>virtually if needed</i>)	Amharic, Arabic, Burmese, Dari/Pashto, Karen, Nepali, Somali, Swahili and Ukrainian	‘Meeting is good, that people see each other and involve in the conversations so the people are informing each other. Wives together and husbands like that but if it is email or something it will not convince anybody.’—Arabic speaker
Preferred modalities: written materials	Dari/Pashto, Somali and Swahili	‘There should be pamphlets that address questions that are the most important and the things that people are most concerned about. Those should be developed and printed in Pashto and Dari and then given to people at their doors or they can be mailed. And we should get a confirmation that the people read the information.’—Dari/Pashto speaker
Preferred modalities: social media, SMS and WhatsApp	Amharic, Arabic, Burmese, Karen and Swahili	‘The best way to reach out to people will be Facebook, messenger, WhatsApp, ... But twitter or Instagram or email, those will be very complicated to our people. Those are for people who are advanced in computer and social medial platforms. It is also good to have short video on WhatsApp, YouTube, Messenger and Facebook. That will be very helpful.’—Swahili speaker
Preferred modalities: videos and audio	Dari/Pashto and Swahili	‘In my view, it will be better to record the video because, in the video, people will listen and watch. But through writing, others may read them. This is a problem so I see it as video is the method that makes it easier and sends the message more clearly.’—Swahili speaker
Recommended message content: explain how the vaccine works	Arabic and Nepali	‘People are only going to take vaccine after they fully understand how it works.’—Nepali speaker
Recommended message content: focus on safety of vaccine	Arabic, Swahili and Ukrainian	‘I think they have to explain to us the real importance of this vaccine and if it does not cause any harm.’—Swahili speaker
Preferred messengers: healthcare professionals	Amharic, Arabic, Dari/Pashto, Karen, Nepali, Somali, Swahili and Ukrainian	‘Somebody who we trust? Doctors of course.’—Arabic speaker ‘The doctor tells you it is good for your child to get the vaccine, for me, even if I am afraid, if I see other children getting it, I will let mine get it as well.’—Swahili speaker
Preferred messengers: teachers	Nepali and Swahili	‘When it is time to vaccinate our kids or even us parents, we want first to see all teachers gathering outside in order to receive the vaccine in front of parents. It is only when we see them receiving the vaccine that we will allow our children to be vaccinated and to be in class.’—Swahili speaker
Preferred messengers: others who have received the vaccine	Amharic, Arabic, Burmese, Karen, Nepali, Swahili and Ukrainian	‘If you just hand out booklets with some statistics, we all understand that not everyone will believe it, and it won’t be convincing for everyone. I think it would be good to hold such meetings with people who have been vaccinated and have had positive results.’—Ukrainian speaker
Preferred messengers: refugee agency, or IRC specifically	Arabic, Dari/Pashto and Swahili	‘But also, since we are all from Africa, most of the time most people have place managers or special units that help us. If possible, it is better to give lessons in all units. If it will be a seminar then, give the seminar unit’s IRC supervisor or another manager for another unit notification. For other people from Africa, like people like refugees, this will be better.’—Swahili speaker

information explaining how the vaccine works and describing vaccine safety.

Physicians and other healthcare providers were most frequently identified as the best messengers for sharing vaccine information. Even one of the most vaccine-hesitant Karen speakers stated, ‘If the doctors explained it really well then, I might get a shot.’ Resettlement agencies were additionally noted as potentially helpful sources for information. Swahili and Nepali OFGs also identified teachers as helpful, especially when the information references vaccination of children. Groups differed in their opinion of whether religious and community leaders were helpful as messengers. In the Swahili OFGs, this difference was noted by gender, with the men implying that religious leaders would be good messengers, and the women that they were not. Some, such as the Amharic group, felt religious leaders were well-suited, while the Ukrainian group mentioned that sharing vaccine information puts a religious leader’s reputation at risk, as this was not seen as their role. The Dari/Pashto group said that religious leaders were not preferred because they are not expected to understand vaccine science. Similarly, while some groups indicated that community members who received the vaccine were preferred messengers, others felt they may not be sufficiently informed.

Discussion

In this multi-site collaboration between the GSU PRC and the NRC-RIM/IRC, 13 focus groups were conducted in 10 languages across 4 cities: Clarkston, Georgia; Seattle, Washington; Dallas, Texas; and Elizabeth, New Jersey. This is one of the few studies to our knowledge that has explored COVID-19 knowledge, attitudes and beliefs among such diverse populations with respect to race/ethnicity, native language, country of origin and geographic residence.

While there was some variation between different language groups with respect to KABs regarding COVID-19 and the COVID-19 vaccine, there were also important commonalities. Most language

groups (i) alluded to hearing (or believing) inaccurate information about COVID-19/the COVID-19 vaccine, (ii) reported hearing negative or conflicting stories about the vaccine in their communities with respect to how and by whom it was developed and how it is being administered and (iii) shared concerns about the negative short- and long-term side effects of the vaccine. These findings are consistent with a prior study that included Congolese refugees which reported unwillingness among participants in this group to get the COVID-19 vaccine; this hesitancy seemed to be linked to exposure to misinformation about the vaccine after relocating to the United States [28]. However, our results are certainly not specific to RIM populations only: reported KABs in this study were very similar to those reported in prior studies with US-born populations [29, 30]. However, given that evidence consistently suggests that limited English proficiency and low health literacy present significant challenges to effective health communication [31], there is clearly a need for ongoing health messaging in RIM communities that follows plain language and other health literacy guidelines. This messaging should be action-oriented and concrete [32], answering the question, ‘What should I do?’, which is more likely understood and acted upon [33], rather than simply providing information, and should be developed ‘in close collaboration with’ members of the target community [9] and community-based organizations (CBOs) serving that community so that message content is culturally and linguistically concordant. Given that RIM communities often maintain social, faith-based, sporting, professional or service ties to others of similar language or cultural backgrounds through CBOs [34], partnerships with these groups may be particularly impactful when developing and disseminating public health messages. Indeed, in their expansion of McGuire’s Communication/Persuasion Model (CPM) [35], Kreuter and McClure highlight the role that culture plays in communication effectiveness [36]. The CPM identifies five factors known to influence communication effectiveness: source, message, channel, receiver and destination. Kreuter and McClure point out that

the first factor, source credibility, is fundamentally influenced by culture because when a person perceives an information source to be similar to him or herself with respect to demographic-type variables or perceived similarities with respect to interests, feelings, opinions, values or beliefs, that source is perceived to be more trustworthy. Similarly, they argue that the second factor, message, must also be informed by the culture(s) of the target population, as evidence suggests that communication that visually reflects their social and cultural world (including colors, fonts, pictures and in their dominant language) is more likely to be perceived as familiar, comfortable and consequently effective. Finally, the third factor, channel, refers to the mechanisms by which a message is delivered. Kreuter and McClure argue that cultural factors can be related to a group's access to a certain channel (e.g. internet access) but also can influence a group's perceptions of the credibility of a certain information channel [36]. The fact that our results did highlight some important differences within- and between-language groups (e.g. whether religious leaders were perceived as trusted and seen as appropriate sources of information about COVID) underscores the significant heterogeneity that exists both within and across RIM communities and that more tailored messages are often necessary. Indeed, there is evidence that culturally and linguistically responsive messaging is effective at increasing vaccine uptake in RIM populations [32, 37, 38].

Results from this study suggest that message content about the COVID-19 vaccine, specifically, should primarily focus on vaccine importance, effectiveness and safety (to address some of the most common reasons individuals have 'not' been vaccinated) and highlight the ways in which the vaccine can protect an individual and his/her community and can facilitate a return to 'normal' activities (to capitalize on some of the most common reasons individuals opted 'for' vaccination). Finally, in order to maximize accessibility and reach, our results emphasize that messaging about COVID-19 and the vaccine should be multimodal, utilizing face-to-face, written, audio-visual and web-based platforms.

Our findings also suggest that COVID-19 vaccine-related messaging should be primarily delivered by healthcare professionals and community members who have already been vaccinated and are willing to share their experiences, as these were the sources seen as most trustworthy by our participants. Thus, part of the solution lies in sufficiently resourcing trusted, local healthcare providers and other community leaders to work in the community to address concerns, counter misinformation and enhance vaccine confidence [39]. Furthermore, given that 'distrust' has been described as one of the most significant barriers to vaccine uptake [40], it is critical to understand the 'root causes' of distrust in diverse communities and incorporate that understanding into health communication messaging. For example, just as the Tuskegee Syphilis Project, the biomedical capitalization of Henrietta Lacks, and forced sterilization initiatives have contributed profoundly to African-American distrust of the US research and medical communities [41], RIM populations have their own unique experience that may exacerbate mistrust. In her article, M Ní Raghallaigh points to five primary causes of mistrust in RIM communities: (I) past experiences (e.g. experiences of betrayal, victimization and trauma); (II) being accustomed to mistrust (e.g. growing up in climates of mistrust due to ethnic or religious tension or totalitarian government regimes); (III) not knowing people well (e.g. as a result of having their social networks completely disrupted during migration and lacking the necessary cultural knowledge to trust people in their new communities); (IV) concerns about truth-telling (e.g. due to fears about the repercussions of telling the truth such as deportation); (V) being mistrusted by others (e.g. living in climates where RIM populations are viewed as 'fundamentally untrustworthy' and where discrimination is commonplace) [42]. Indeed, as medical historian Susan Everby stated in reference to the COVID-19 pandemic, 'it's not just the history, it's the lived reality of everyday life that people experience in racism that makes the hesitancy come through' [43]. Thus, we must approach health communication messaging with cultural humility—an ongoing

process involving community engagement, self-reflection, collaborative partnerships and iterative feedback and evaluation [44]—so that the messaging is optimally respectful of diverse communities' unique experiences.

It is also clear that there is much work left to be done with regard to increasing vaccine access in RIM communities: lack of transportation, work and childcare responsibilities and confusion about where, when or how to get vaccinated continue to be barriers for these populations. Our findings and recommended solutions echo those from prior studies which have similarly called for prioritizing convenient locations and 'bringing the vaccines to people, rather than people to vaccines' (including pop-up clinics, mobile vans or other community-based events), flexible timing and better coordination between resettlement agencies and local departments of health so as to address reported difficulties with navigating telephone and web-based appointment scheduling [9, 45].

This study has several limitations. Collaboration among research teams allowed for the study to take place in multiple RIM communities in multiple cities, but both teams had started their research independently of one another, collaborating after the data collection process had started for the PRC team. Future explorations of vaccine hesitancy in RIM communities would benefit from a similar approach taken in this study but with collaborative efforts beginning sooner. This would enable a more cohesive and standardized approach for data collection. Additionally, the focus groups were facilitated in each group's native language then transcribed to English for coding, possibly leading to overlooked cultural and linguistic nuances. Demographic information collected from participants only focused on geographic location and language groups. Future studies in this area could benefit from including additional demographic information to provide further insight into which messaging and intervention strategies to use in specific RIM communities. For example, we did not collect data regarding whether participants had legally sanctioned refugee or asylee status (or if they had immigrated legally to the United States for work,

etc.); individuals' knowledge, attitudes and beliefs could vary depending on the context of their specific migration experience. Finally, because this study employed qualitative methods and thus the goal was not to generalize about the distribution of experiences but instead to characterize the nature of these experiences, the findings do not necessarily represent the COVID-19 vaccine knowledge, attitudes and beliefs of others who speak their same native languages or come from similar cultures.

This study also has several important strengths. Using two research teams enabled this study to explore COVID-19 among diverse populations on an unusually large scale, providing ample insight into COVID-19 KABs in RIM communities and possible messaging strategies that may be quite effective in increasing trust in vaccines. The approach to data analysis was rigorous as we performed a hybrid thematic analysis that incorporated a deductive and inductive approach, used multiple coders and met regularly to reconcile findings and resolve coding discrepancies. Additionally, stakeholders and members of the communities in which focus groups were conducted were asked to provide support with manuscript writing and to confirm that their perspectives were accurately captured in the focus group discussions. Each of these approaches used lend to the strong credibility of the findings of this study.

Conclusion

In sum, there continues to be an urgent need for ongoing health messaging in RIM communities that follows health literacy guidelines and is developed in close collaboration with members of the target community and CBOs serving that community so that message content is culturally and linguistically concordant. Message content about the COVID-19 vaccine should primarily focus on vaccine importance, effectiveness and safety, should be multimodal and should be primarily delivered by trusted healthcare professionals and community members who have already been vaccinated. Strategies to increase access to and uptake of the

COVID-19 vaccine should prioritize convenient locations and flexible days and times of day, not require advance appointments and provide clear communication about cost.

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Conflict of interest statement

None declared.

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