

Factors influencing refugees' willingness to accept COVID-19 vaccines in Greater Sydney: a qualitative study

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The control of the SARS-CoV-2 pandemic remains an urgent public health priority as the disease continues to present significant adverse health outcomes and social and economic burdens. Achieving high vaccination coverage is one of the key strategies to limiting the spread of COVID-19 infection. Coverage requires the systematic implementation of strategies that ensure equitable access and distribution of the vaccines.¹ Given the global demand, vaccine supply was initially limited necessitating a risk- and aged-based approach to vaccination during the initial rollout as per the World Health Organization (WHO) and US Centers for Disease Control and Prevention (CDC) recommendations.² In Australia, as in other countries around the world, frontline health care workers along with medically at-risk individuals such as older adults and those with chronic comorbidities, and vulnerable groups were identified as priority vaccine target populations.²

A complex interplay between the social determinants of health and COVID-19 infection, compounded by a higher prevalence of chronic comorbidities and already existing barriers to accessing care among some ethnic minority groups in the USA, have been associated with increased susceptibility to COVID-19 infection and its associated complications.^{3,4} While there are limited published data on the impact

Abstract

Objectives: Achieving high vaccination coverage is a critical strategy to reducing the spread of COVID-19 infection. This study, undertaken before the Delta variant outbreak, aimed to understand potential drivers and barriers influencing COVID-19 vaccine uptake for refugees.

Methods: Four focus group interviews were conducted with 37 refugees from four language groups (Arabic, Dari, Dinka and Karen). Data were analysed thematically.

Results: Willingness to accept COVID-19 vaccines was associated with participants' perceptions of disease severity, and benefits such as increased immunity against COVID-19 disease and prevention of the spread of the disease. Cues for increasing individual willingness to get vaccinated included obtaining information from trusted sources and community engagement. By contrast, information gaps on vaccines compounded by misinformation on social media contributed to a reluctance to be vaccinated.

Conclusion: As this study was conducted before the Delta variant outbreak, participants' stance on COVID-19 vaccines may have changed. However, addressing vaccine literacy needs for this group remains an on-going priority. Health promotion initiatives must be tailored to the different socio-cultural contexts of each community.

Implications for public health: Engagement with refugee populations is critical for optimising access and uptake of vaccines to protect health, prevent death and ensure that control of the pandemic is equitable. This may also provide valuable public health lessons for other marginalised populations.

Key words: refugees, COVID-19 vaccines, vaccination drivers and barriers, Health Belief Model, qualitative study

of COVID-19 on refugees in Australia, they similarly face a multitude of barriers including language, cultural, financial and logistical barriers and a lack of familiarity with the health care system, which impede their ability to navigate health care services.^{5,6} These access barriers compounded by limited literacy and limited health literacy^{7,8} place

refugees at a disproportionately higher risk of COVID-19 related morbidity and mortality compared to the general population.⁹

As with any public health intervention, the support and engagement of communities are critical for the successful implementation of the vaccination program.¹⁰⁻¹² Refugees have been shown to be generally receptive

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towards vaccination.¹³ However, vaccine hesitancy poses a significant threat to uptake, particularly for new pandemic vaccines due to existing misinformation and conspiracy theories.^{14,15} This study was commissioned by the NSW Refugee Health Service to inform NSW Health about the COVID19 vaccination needs of recently-arrived refugees. The study was undertaken prior to the outbreak of the Delta variant in June 2021 and aimed to understand potential drivers and barriers influencing COVID-19 vaccine uptake for this group.

Methods

Study design

This descriptive interpretive qualitative study employed focus group interviews. The COREQ guidelines guided the study reporting.¹⁶

Study setting and target population

As part of its Refugee and Humanitarian Program, Australia resettles approximately 13,750 refugee and humanitarian entrants each year, 31% (4,300) of whom settle in NSW.¹⁷ Between 2006 and 2016, a total of 44,082 refugees and humanitarian entrants settled in NSW, with almost 75% of them initially settling in Greater Western Sydney and smaller but significant numbers settling in rural and regional areas of NSW. Iraq, Iran, Afghanistan, Syria, China and Burma were ranked as the top six countries of birth for refugees resettling in NSW during the same period.¹⁷

The study setting was communities in metropolitan and regional areas of NSW with a high proportion of residents of refugee

background. We aimed to target adults (18 years and over) from the four most common language groups among those of refugee background (Arabic, Dari, Dinka, Karen) and who had resided in NSW for three years or less. Arabic, Dari and Karen language groups were selected due to being among predominant languages spoken among the top six countries of birth for refugees in NSW. The Dinka language group was selected based on a needs assessment by the NSW Refugee Health Service.

Professional telephone interpreters for relevant language groups facilitated oral consent owing to concerns about the level of written English literacy among the participants. Participants were offered a \$30 gift voucher for their time. Ethical approval to conduct this study was obtained by the University of Technology Sydney Human Research Ethics Committee (UTS HREC Reference Number: ETH21-5967).

Participant recruitment

Purposive and snowballing sampling strategies were used to identify and recruit potential participants. Participant recruitment was facilitated through bilingual community educators (BCEs) and a Dinka community leader. BCEs are volunteers employed in the NSW health system and play an important role in connecting migrant and refugee communities with the health care system and other existing services and support systems.¹⁸ Recruitment strategies involved the BCEs contacting participants within their existing networks and sharing the research study details within social networks.

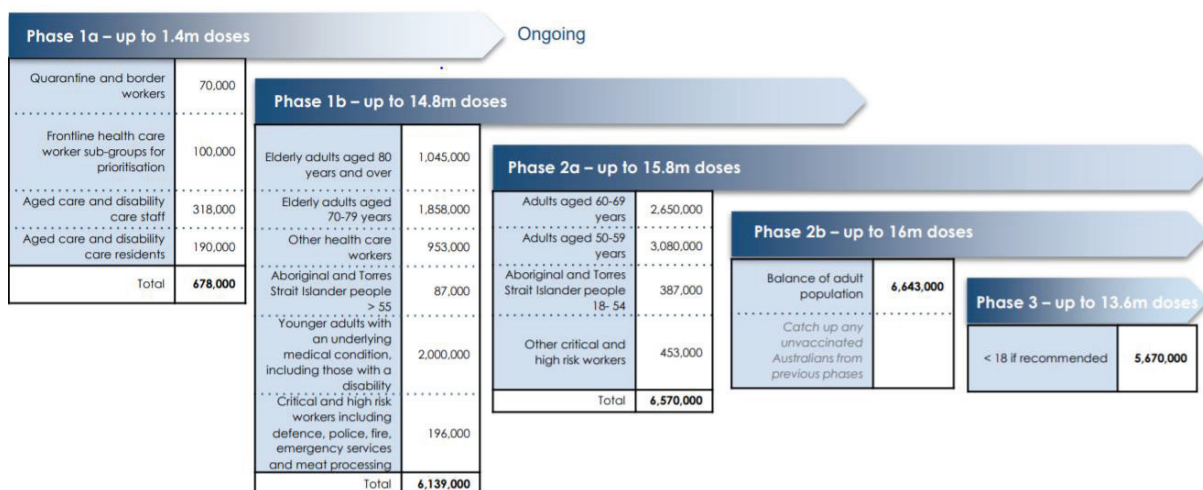
Data collection

Data were collected at a time when almost all participants were ineligible for vaccines except for some participants who were aged 70 years and over as per the vaccination rollout timeline (Figure 1¹⁹). This was deliberate as the research was intended to help inform the state health department about the needs and perspectives of these populations.

All BCEs were briefed on the purposes of the research project and were trained on how to run focus groups. This involved a general overview of focus groups, planning and organisation of the focus groups, and strategies to facilitate effective data collection.

Focus groups were held face-to-face, facilitated by the BCEs in the presence of one researcher (AM) in their respective languages, at a time and location convenient to participants. Two focus groups (Dinka and Dari) took place in a park while the other two took place at the residences of the BCEs. An interview guide that was professionally translated into the respective languages was used to guide the focus group interviews. All focus groups were audio recorded in the respective languages. The audio recordings were first transcribed verbatim (to text in the respective languages) and then translated to English by National Accredited Authority for Translators and Interpreters (NAATI). All the translated documents were double-checked by the BCEs for accuracy. All data including participant demographics, audio recordings and transcripts (translated & original) have been stored on STASH, which is UTS's research data management platform. Final transcripts

Figure 1: Australia's COVID-19 vaccine national rollout strategy.¹⁹



(English versions) were then imported into NVivo 12 software for data coding and management. At the beginning of each focus group, the BCEs asked the participants to complete the demographic questions. The BCEs completed the demographic questions on behalf of the participants who had limited literacy. The focus group interviews took approximately 90 minutes.

Interview guide

An interview guide, underpinned by the World Health Organization’s Behavioural and Social Drivers (BeSD) of COVID-19 vaccination framework²⁰ was developed and used to guide the focus group interviews. The interview guide explored refugees’ knowledge and perceptions towards COVID-19 infection and vaccines, their confidence and intention to vaccinate, the social drivers and potential barriers to vaccinating, their vaccine literacy, and other information needs and strategies to optimise uptake of the vaccines. The lead research investigator held a training workshop for the bilingual community educators and the Dinka community leader to ensure they understood the objectives of the research project and reviewed each question in the interview guide. Interview guides were professionally translated to the respective languages before the interviews.

Data analysis

Thematic content analysis²¹ underpinned by the Health Belief Model (HBM) and the World Health Organization’s Behavioural and Social Drivers (BeSD) of COVID-19 vaccination framework was undertaken. Both models incorporate aspects of disease risk appraisal (including perceived risk, fear and worry) and vaccine confidence (positive and negative attitudes toward vaccination) which have been shown to increase motivation to be vaccinated and in turn, lead to increased vaccination.²² This information was crucial in explaining individual willingness to accept the COVID-19 vaccines, and for developing tailored recommendations to improve vaccination uptake for this group.

The HBM predicts the likelihood of individual health-related behaviours based on various constructs including an individual’s perceived susceptibility to adverse outcomes, the seriousness of the health issue, the benefits and barriers of behaviour change and available cues to action to support the change.²³ It proposes that individual beliefs

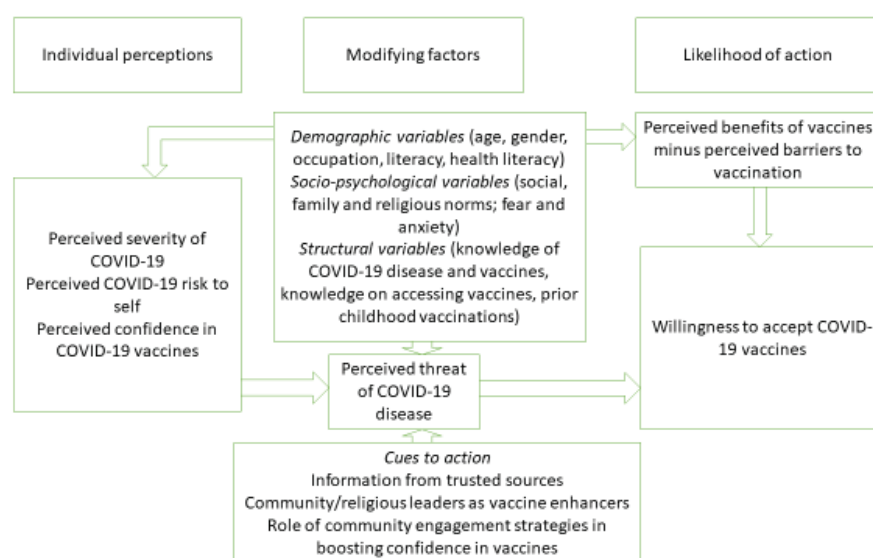
and thoughts about potential consequences on vaccination strongly influences their decision-making on vaccination.²² The BeSD of COVID-19 vaccination framework on the other hand considers measurable and modifiable factors that drive and shape vaccine uptake. These include 1) what people think and feel about vaccines; 2) social processes that drive or inhibit vaccination; 3) individual motivations (or hesitancy) to seek vaccination; and 4) practical factors that shape the experience of seeking and receiving the vaccination. Factors 1 & 3 of the BeSD COVID-19 vaccination framework are reflected in the HBM individual perceptions while factors 2 & 4 are encompassed in the modifying factors (Figure 2²⁴).

While useful, the HBM has several limitations including its inability to account for environmental or economic factors outside individuals’ control (for instance government policies, communication, social pressures, access to information) which may inadvertently prohibit or promote uptake of vaccines. The BeSD COVID-19 vaccination framework, which captures these factors, was used to augment the HBM and overcome some of its weaknesses providing richer data.

The analysis process involved organising data in a systematic and meaningful way by coding the transcript text according to the components of the HBM and BeSD. The HBM codes included individual perceptions (that is, perceived risk to COVID-19, perceived

severity of COVID-19, perceived confidence in COVID-19 vaccines and cues to action. The BeSD codes included thoughts and feelings (perceived risk to self, COVID-19 vaccine information, COVID-19 vaccine confidence), motivation (COVID-19 vaccine intention), social processes (COVID-19 vaccine decision process and social benefits of COVID-19 vaccines) and practical issues (strategies for making vaccine access easier). These codes were then merged into two overarching themes: individual perception and cues to action. These themes were specifically chosen as they provided an opportunity to conceptualise important aspects from both models (individual perceptions and cues to action); but also other structural, environmental and demographic factors, which are significant modifying factors influencing vaccine willingness (Figure 2²⁴). Researcher triangulation, which is essential in ensuring the credibility of the findings and interpretative rigour, was achieved through independent coding of data first by AM, then by two other researchers (MK and AD) followed by discussion. This discussion enabled consensus to be reached concerning the final themes. The themes were revised and verified after rechecking the transcripts. Trustworthiness of the interpretations was enhanced by providing direct quotes from participants. The NVivo12 software facilitated data coding and management.

Figure 2: Factors influencing refugees’ willingness to accept COVID-19 vaccines as underpinned by the Health Belief Model and the BeSD COVID-19 vaccination framework.



Adapted from Lasseter et al. (2020)²⁴

Results

Four focus groups each facilitated by trained bilingual community educators in the respective languages were conducted between April and May 2021. The Arabic, Dari and Karen focus groups were conducted during the Phase 1a vaccine roll out while the Dinka focus group was conducted during the Phase 1b rollout (Figure 1). Thirty-seven participants from four language speaking groups, namely Arabic (n=7), Dari (n=10), Dinka (n=10) and Karen (n=10) participated in the focus group interviews, the majority of whom were females (73%, 27/37). Of the 36 participants who provided their demographic details, five (14%) were aged between 18–34

years, 18 (50%) were aged between 35–54 years and 13 (36%) were aged over 55 years. Duration of living in Australia ranged from one–36 years, with a majority of participants (58%) having lived in Australia for more than 10 years and a smaller proportion (28%) having lived in Australia for less than five years. Of the 36 participants, 36% were college/university graduates, 14% were high school leavers, 11% were primary school leavers, 14% were English language learners and 25% had no formal education [Table 1]. Figure 2 presents the thematic mapping of the factors influencing refugees' willingness to accept COVID-19 vaccines based on the focus group interviews based on the HBM

model and the BeSD COVID-19 vaccination framework.

Individual perception

Perceived severity of COVID-19 disease

Participants from the Arabic, Dari and Karen-speaking groups cited benefits of vaccination in reducing the severity of COVID-19 disease as potential factors influencing their willingness to accept the vaccines. Participants in these groups cited increased immunity against COVID-19 disease and prevention of the spread of the disease due to reduced transmission in the community as perceived benefits of the vaccines:

It [vaccination] will give us peace of mind. And we know that we have had the vaccine, maybe the chance of getting the virus will be less. (Dari-speaking participant, female)

It [vaccination] is useful for the whole population. Instead of living in fear and lock down and bad economic situation, we should be more cooperative and take the vaccine so that it will help prevent spreading of the disease and then we can go back to our normal life. (Arabic-speaking participant, male)

If this vaccine is good then it will protect people, in case this vaccine is not good then, individual will suffer, like you got vaccinated for flu and if you got flu, it is not serious. (Karen-speaking participant, female)

On the contrary, participants from the Dinka-speaking group out rightly objected to the vaccines. This was due to perceptions that COVID-19 was a fabricated disease hence posing no significant threat, and conspiracy theories that the COVID-19 vaccines were not legitimate but rather aimed at wiping out the older generation of migrants:

This COVID-19 it's having liveability to malaria. Malaria gives you headache, fever, joint ache, lost of appetite and like coughing at times. This COVID-19 is like malaria and once you contract malaria, one get to heal from it ... The vaccine has also been brought from nowhere. It is a vaccine which did not exist before. Once one is injected with it, it causes blood to stop from flowing. (Dinka-speaking participant, male)

Perceived COVID-19 risk to self

Participants in the Arabic, Dari and Karen speaking groups demonstrated a good understanding of the risks of COVID-19, findings that correlated with overall high literacy and health literacy among the groups. They understood that risks were amplified among old-aged individuals, those with

Table 1: Demographic characteristics of study participants.

Participant	Gender	Age group (years)	Language group	Marital status	Highest level of education	Number of years lived in Australia
1	F	45 - 54	Dari	Married/Partnered	No formal education	6
2	F	35 - 44	Dari	Married/Partnered	No formal education	2
3	F	45 - 54	Dari	Married/Partnered	College/University graduate	21
4	F	55 - 64	Dari	Married/Partnered	No formal education	13
5	F	35 - 44	Dari	Married/Partnered	No formal education	3
6	F	45 - 54	Dari	Married/Partnered	High school	11
7	F	55 - 64	Dari	Widowed	High school	18
8	F	45 - 54	Dari	Married/Partnered	College/University graduate	18
9	F	25 - 34	Dari	Married/Partnered	High school	5
10	F	35 - 44	Dari	Married/Partnered	No formal education	2
11	M	18-24	Arabic	Never married	College/University graduate	7
12	M	>65	Arabic	Married/Partnered	High school	19
13	M	>65	Arabic	Married/Partnered	College/University graduate	25
14	M	>65	Arabic	Married/Partnered	College/University graduate	36
15	M	>65	Arabic	Married/Partnered	College/University graduate	16
16	M	>65	Arabic	Married/Partnered	College/University graduate	21
17	M	>65	Arabic	Separated/Divorced	College/University graduate	17
18	M	18-24	Karen	Never married	College/University graduate	16
19	F	18-24	Karen	Never married	College/University graduate	16
20	F	55-64	Karen	Married/Partnered	High school	15
21	F	55-64	Karen	Married/Partnered	English Language Learner	14
22	F	35-44	Karen	Married/Partnered	College/University graduate	2
23	F	35-44	Karen	Married/Partnered	Primary school	5
24	F	55-64	Karen	Widowed	Primary school	4
25	F	35-44	Karen	Married/Partnered	College/University graduate	4
26	F	35-44	Karen	Married/Partnered	College/University graduate	1
27	F	45-54	Karen	Married/Partnered	Primary school	9
28	M	45-54	Dinka	Married/Partnered	English Language Learner	6
29	F	25-34	Dinka	Never married	English Language Learner	10
30	F	45-54	Dinka	Widowed	No formal education	8
31	M	35-44	Dinka	Married/Partnered	English Language Learner	13
32	F	35-44	Dinka	Widowed	No formal education	16
33	F	35-44	Dinka	Married/Partnered	No formal education	5
34	F	>65	Dinka	Widowed	No formal education	12
35	F	45-54	Dinka	Separated/Divorced	English Language Learner	19
36	F	55-64	Dinka	Married/Partnered	Primary school	16
37	F	No details provided	No details provided	No details provided	No details provided	No details provided

pre-existing medical and/or other chronic conditions, those working in the frontline and women with young kids. Consequently, perceived COVID-19 risk varied significantly with participants with amplified risks perceiving a higher risk compared to those who were relatively younger, homebound with limited movements, otherwise healthy and those with better understanding of preventive measures for the disease:

For me I am very worried because I have diabetes. (Arabic-speaking participant, male)

We have babies, if we got this illness, worry for babies. This illness cannot be cured by taking medication, if the case is serious, you will end up in hospital, this will create problems for family and friends. (Karen-speaking participant, female)

I am not afraid at all... I am cautious and use methods of prevention of transmissions including masks, avoiding social gathering, social distancing, and frequent hand washing. (Dari-speaking participant, female)

Conversely, participants in the Dinka speaking group demonstrated limited or no fear of COVID-19 disease attributing this to not receiving any childhood vaccinations for vaccine preventable diseases, being relatively healthy to date and their strong religious beliefs:

I'm one person who loves her life at this old age and I have been so dependent on God for sustainability of my breath. God also a firm his control over my life by telling me that should not be scared of the happenings of this world. As we know, we are not putting God to test and I, therefore, believe in him. I'm not scared of COVID-19 as per now because I know God is with me also considering the fact that I can do little about it. No one is afraid of COVID-19. We have put God and Jesus Christ to intervene. (Dinka-speaking participant, female)

Perceived confidence in COVID-19 vaccines

Overall, the majority of the Arabic, Dari, and Karen-speaking groups had confidence in the COVID-19 vaccines. Participants cited factors such as freedom, calmness, peace of mind and being able to travel both interstate and overseas to see family, as some of the key motivators to vaccinate. Despite the positive attitude towards vaccines, almost all participants didn't see the urgency to be vaccinated and preferred to 'wait and see'. Factors that contributed to their reluctance included low uptake of vaccines in the community at the time that this study was undertaken, low number of cases at the

time, the political climate at the time, and concerns around the safety of the vaccines. Safety concerns were generally attributed to vaccines being developed too quickly, the time to test for vaccine safety being too short, limited safety data, and side effects particularly the blood clots linked to Astra Zeneca vaccine:

We think many people in the community want to take the vaccine, but they are worried in case there are bad side effects. For this reason, they prefer to wait for a while, till many other people take the vaccine and see if there are serious side effects or not then they will decide. (Arabic-speaking participant, male)

For me, I will not get this vaccine yet. If this illness does not get worse and if people are not forced to get it then I will not get this vaccine. (Karen-speaking participant, female)

Participants in the Dinka language group expressed little confidence in the vaccines. This was mainly attributed to knowledge gaps due to limited English and health literacy as reflected by the incorrect use of the terms 'vaccines', 'drugs' and 'injections'. More often than not, participants compared COVID-19 with diseases such as malaria and typhoid, arguing that they would normally get the 'injection' for these diseases only when they were sick and so did not see the need to be vaccinated as they considered themselves healthy. There was a general opinion that vaccines were drugs given for treatment purposes and not for prevention and so most did not see the need to be vaccinated against COVID-19. Vaccinating against COVID-19, in particular, was associated with injecting the virus that causes the disease and associated with death hence instilling fear among almost all participants and fuelling hesitancy and unwillingness to be vaccinated:

We are rejecting this vaccine because people are still suffering from COVID-19. The aged and even the youth are dying after being injected with the vaccine. We don't understand it anymore... There are people who have been injected and get it worst while they were not even COVID-19 positive. We are afraid of that. (Dinka-speaking participant, female).

Cues to action

Information from trusted sources and social media

Almost all participants cited the government, health authorities and health professionals (particularly general practitioners) as the most trusted sources of information on

COVID-19 vaccines. General Practitioners (GPs) were specifically highlighted as crucial in influencing vaccine decision-making. GPs were regarded as professionals who could effectively communicate risk-benefit analyses through conversations, particularly with individuals with pre-existing medical and chronic who questioned which vaccine would be the best option for them.

I usually get my information from my GP. We visit our GP at least once a month, so I usually ask him about COVID-19 and what is right or wrong. He answers my questions and I trust him. Also, the GP clinics may have pamphlets about COVID-19. I think GPs are good and trusted source if we ask them. (Arabic-speaking participant, male)

They say when you want to be vaccinated who should be asked, your husband, brother, or your doctor? I say your doctor because doctor is important. (Dari-speaking participant, female)

Despite their critical role, there were sentiments among some participants that GPs may not always be available (easily accessible) hence resorting to social media particularly Facebook, Whatsapp (language specific groups) and YouTube for information. Social media was reported to be a source of misinformation and despite participants being aware of this; they were caught up in a paradox of mistrusting it but still consuming it and realising its impact on their confidence in the vaccines. This lack of access to GPs and heavy reliance on social media impacted significantly on participants' vaccine reluctance and/or hesitancy:

We heard that they inject a chip or a genetic code, so they can control people from distance. There is a lot of talk about this on the social media and some people believe in that and it is the main reason why people did not want to take the vaccine. (Arabic-speaking participant, male)

The first instant we heard about COVID was in news. Much has been on social media platforms like Facebook where anyone can post and share anything. It's said that the COVID vaccine is not good. That it removes the DNA. It is also claimed that it clots blood in the body and causes anaemia. We heard from the TV and social media that the vaccine is out though in three different types. Doctors say that the vaccine has so many side effects and all these we get it from the media. (Dinka-speaking participant, male)

There was a rumour that vaccines make you last shorter and if you could age up to 70 years, you reach only to the age of 60; and these talks cause dependency among people

about vaccination. [Interviewer: Where did you hear that?] From people, Facebook, YouTube, and social media and this will cause fear amongst people. (Dari-speaking participant, female)

While the Dinka group similarly indicated health professionals and government authorities as the main sources of information about vaccination, these appeared to be sources of negative messages and incorrect information that caused fear and anxiety. The lack of consistent and trustworthy messaging from health professionals and government officials significantly contributed to high levels of vaccine hesitancy and outright rejection as depicted by the quote below:

People [doctors] who happen to know about the vaccine are the very people who have been saying all sorts of negative things related to COVID-19. There is no way I think we can tell the legitimacy of the vaccine. It might be good but we now have a clear indication that it is not 100% good for usage... The fear now is no longer the COVID-19 itself rather the vaccine. Now, we are not accepting to be vaccinated. (Dinka-speaking participant, male)

They say that the sickness was made by people and the medicine has now been made; how is it known that this medicine/vaccine, is the right one/match of the sickness/disease/virus? What makes people afraid is that 6 doctors spoke in the communities/homes. A person says that this medicine/vaccine is not good, I will not be vaccinated with it. Many people have also spoken. Each doctor says his part, speaks about the vaccine and says that this vaccine is not a vaccine (not good)... The reason why it is refuse is because the doctors refuse it, because they have checked it. (Dinka-speaking participant, female)

Finally, participants expressed concerns of voids of information around the vaccines themselves and access issues. Participants wanted more information on how vaccines work, vaccine safety and effectiveness, the relationship between breakthrough infections and COVID-19 vaccines, and COVID-19 vaccines and variants of concern. Participants wanted to know when they would be eligible for vaccines, how and where to access them particularly those whose general practitioners were not registered to offer vaccines. Such gaps contributed to fear and worry among the participants and may potentially be a barrier to uptake of vaccines:

I do not inject the vaccine, because it causes blood clots and reduce age longevity, and this is very harmful. No good about it, it is better for me not to have it. Perhaps I will be spared

and not get COVID-19 but vaccine will cause my blood to clot. (Dari-speaking participant, female)

Older people in the community are afraid of getting the vaccine... because they are having many medical problems and they are worried. (Arabic-speaking participant, male)

Community/religious leaders as vaccine enhancers

When asked about strategies to enhance vaccine uptake, participants affirmed the critical role community leaders, religious leaders, and other natural leaders played in engaging refugees to take up the vaccines. These leaders were reported to be important conduits for disseminating information on COVID-19 vaccines as they could speak in their vernacular and were viewed as vaccine enhancers due to their authoritative positions to influence communities to take up vaccines:

The imams in the mosques always encourage people to stick to the regulations and encourage them to get the vaccine. There is nothing in the religion against that. (Arabic-speaking participant, male)

Urgent need for community engagement strategies

Almost all participants reiterated the need for urgent community engagement strategies at the grassroots level to empower refugees with the knowledge to make informed decisions to take up the vaccines. Engaging with communities was argued to be the best way forward as it provides opportunities to conduct community education sessions, respond to individuals' questions and concerns, and receive ongoing feedback on the barriers and issues associated with the vaccination program. There were sentiments that individuals/families have different needs and circumstances and so the need for government to consider individualised and targeted approaches to meet their needs adequately. For instance, participants in the Karen and Dari speaking groups were mainly women with caring responsibilities so were mostly home-bound with limited access to information due to language barriers. Engagement strategies for such groups would need to consider this. For the Dinka speaking group, a recurring theme was knowledge gaps due to limited literacy and health literacy compounded by language barriers and so reiterating the urgent need for community leaders fluent in their vernacular to run information sessions at a family level.

For the Arabic group, misinformation via social media significantly impacted on their willingness to get vaccinated. Due to this, participants agreed on the idea of having health authorities countering misinformation in religious settings such as mosques and churches. For the Dari speaking group, community group meetings and other community centres where refugees gather were suggested as key settings to facilitate community engagement.

This program [focus group] I suggest that it does not stop here but you have to go to families. As you visit the families, you have to do the same thing like you are doing here. They will then make their own decision. I see this meeting here with a few of us can't help make any difference. We are not interested in getting the news from the TV. We suggest that you now do it at family level because as we are here, we are from different families. What you are doing here should be translated to family level. Each child, mother and the father will make their own decisions. (Dinka-speaking participant, female)

Large number of people usually go to mosques and churches and if the health officials send educators to Friday prayers in the mosques or to the churches to give a brief talk about COVID-19 vaccine, this will have a positive effect, and makes people change their opinion about the vaccine. (Arabic-speaking participant, male)

Participants suggested other potential strategies to improve access and uptake of vaccines including homegroup vaccinations, mobile vaccination clinics, role modelling and peer-to-peer story sharing within communities.

Discussion

Using the Health Belief Model and the BeSD COVID-19 vaccination framework, this study highlights variations in willingness to accept COVID-19 vaccines among refugees dependent on individual perceptions, concerns and socio-psychological factors. Perceived benefits of COVID-19 vaccines positively influenced participants' willingness to be vaccinated against COVID-19 to reduce the severity of COVID-19 disease. However, the likelihood of being vaccinated, for some participants was severely impacted by their limited understanding of COVID-19 disease and limited health literacy. Despite this variability, intermediary factors such as gaps in knowledge of vaccines and access, social and religious norms, misinformation on social

media, and low-risk perception at the time that this study was undertaken, contributed to vaccine hesitancy. Importantly, this study reiterates the need to urgently address existing COVID-19 vaccine literacy gaps to optimise access and uptake of vaccines among this group.

Our findings are echoed in a recently published report, which examined issues, barriers and perceptions about COVID-19 vaccines among culturally, and linguistically diverse (CALD) communities in NSW.²⁵ In their report, CALD communities similarly demonstrated a good understanding of COVID-19 (except among newly arrived refugees) however, knowledge gaps on vaccine access and/or misconceptions on vaccines were reported to be key barriers to vaccine uptake.²⁵ The study, also undertaken when the COVID-19 caseload was low, highlighted participants' preferences to delay vaccinations and alternatively take the 'wait and see' approach. While individuals' stances on COVID-19 vaccines may have now changed due to the Delta outbreak, refugees' vaccine literacy needs must be adequately addressed to optimise vaccine uptake and achieve the required vaccination coverage set by the government.

Social media was a source of misinformation with participants mistrusting it but consuming the information and later on realising its impact in generating fear and anxiety. The impacts of misinformation have similarly been cited elsewhere with individuals reporting confusion and feelings of distress resulting in decreased confidence in COVID-19 vaccines.²⁶⁻²⁸ Misinformation on social media compounded by limited access to accurate information significantly impacts reluctance to vaccinate due to fear generated from these sources. Moving forward, leveraging social media platforms such as Facebook, Whatsapp, etc. and other online platforms to counter misinformation on COVID-19 vaccines, and potentially using these platforms as an avenue for focused information generation, dissemination, and consumption may be a useful strategy. This study underscores the need for urgent multi-level health promotion strategies aimed at empowering refugees with vaccine-related knowledge to make informed decisions concerning the vaccines. At the individual level, this may include risk-benefit conversations facilitated by general practitioners or other health care providers at the patient-provider interface using tools

such as decision aids. Decision aids have been shown to reduce decision-making conflict related to vaccination and may be useful in addressing vaccine hesitancy.²⁹ At the community level, community leaders, key local opinion leaders and other natural leaders may be the gateway to disseminating information and reaching groups with trust issues with the government and limited literacy in their language.³⁰ These leaders will need to be adequately supported to ensure they are literate in COVID-19 infection and vaccines, but also acknowledged and reimbursed appropriately.³⁰ The COVID-19 glossary, available in over 30 languages, may be a useful resource to help facilitate such conversations.³¹

At a health system level, meaningful engagement with communities to understand their concerns or barriers to vaccination and co-developing tailored approaches to encourage uptake and rebuild trust will be critical in enhancing vaccine uptake.³² Vaccine implementation strategies will need to be adapted to meet the individual needs of refugees considering the multiple barriers they face when accessing the vaccines.³³ The WHO BeSD COVID-19 vaccination framework and Tailoring Immunisation Programmes³⁴ are useful people-centred evidence-based frameworks offering valuable insight into vaccination program design, implementation and evaluation targeted at high-risk communities. These programs reiterate the need for exploration of environmental and institutional factors, social and protective factors, personal motivation and health worker encounter factors, as a gateway to optimising vaccine uptake for under-immunised groups and should be integrated into policy planning at Federal and State-government levels.

Implications for public health

As this study was undertaken at a time when the COVID-19 caseload was very low, community views on COVID-19 infection and COVID-19 vaccines may have changed. Ongoing research is needed to monitor changes in refugees' perspectives around COVID-19 overtime and COVID-19 vaccine uptake. As the findings from the Dinka community were particularly concerning, we conducted follow-up focus group interviews with this group in September and October 2021. The follow-up focus

groups aimed to explore in more depth their perspectives on COVID-19 disease, their attitudes towards the COVID-19 vaccines and any changes in perspectives over time. While the findings were generally positive with high COVID-19 vaccine uptake rates, literacy gaps on COVID-19 disease and COVID-19 vaccines prevail. This may pose a significant challenge in the control of COVID-19 as the pandemic lingers on. With the emergence of newer variants (Omicron as an example) with varying levels of infectivity, pathogenicity, virulence and immune response characteristics, non-pharmaceutical public health prevention measures and booster vaccines will remain critical in reducing the spread of infection and in reducing the severity of disease and hospitalisation respectively. This urgently calls for tailored strategies aimed at enhancing COVID-19 disease and COVID-19 vaccine literacy, particularly for CALD communities with limited literacy, limited English literacy and limited health literacy. Community engagement strategies such as empowering community and religious leaders to run community education sessions, using vaccine champions to disseminate vaccine-related information, and engaging bilingual general practitioners have been proposed as key to reaching CALD groups.³⁵ In addition, enhancing communication through the dissemination of accurately translated and culturally appropriate documents delivered by trusted messengers, leveraging social media platforms such as Facebook, Whatsapp, etc. to counter misinformation on COVID-19 vaccines and potentially using the platforms as an avenue for information generation, dissemination and consumption, using culturally diverse forms of communication including storytelling, role modelling and visual (video animations, pictorials) arts may help engage CALD communities and ultimately enhance uptake of vaccines.^{36,37} Finally, sustaining effective communication necessitates that governments continue to partner and collaborate with CALD communities as the pandemic continues to evolve.³⁸

Strengths and limitations

The strengths of our study included using a qualitative method appropriate to our research question. Focus group interviews were chosen as they offer the potential to enrich and expand the breadth and depth of data, and are the quickest and most

convenient way to obtain data from several people simultaneously.³⁹ Hence, focus groups facilitated the timely gathering of data that was crucial in informing the COVID-19 vaccine program rollout for refugees. The HBM and the BeSD COVID-19 vaccination framework strengthens the analysis by providing valuable insight on the factors influencing individual's willingness to accept the vaccines. Data source triangulation was achieved through obtaining diverse viewpoints from four language groups. Researcher triangulation, which is essential in ensuring the credibility of findings and interpretative rigour, was achieved through independent coding of data followed by a group consensus on the themes.

However, this study is not without its limitations. It was based on the opinions of a limited number of people and can therefore not be generalised to all refugees in NSW. Secondly, as the recruitment strategy was purposive and was facilitated by the BCEs, it is likely that the participants were acquainted with the BCEs. Therefore, there is a potential for social desirability bias as participants known to the BCEs may have responded in a manner that is considered socially acceptable hence affecting the validity of the results. Finally, all the focus group interviews were run by BCEs, some with limited research experience and could have affected the quality of the data.

In addition, there were unforeseen challenges in recruiting participants from participants in regional NSW. Due to the time sensitivity of the study (the need to provide data to the NSW Health Department in a timely way) we were unable to achieve the desired sample size. Additionally, we opened participation to those who had resided in NSW, Australia for more than three years to increase the number of participants in each focus group. Our final sample was a convenience sample and included adults aged 18 years and over from four language groups who resided in Greater Sydney.

Conclusion

As this study was undertaken before the outbreak of the Delta variant in June 2021, the participants' stance on COVID-19 vaccines may have changed. However, addressing the vaccine literacy needs for this group remains an ongoing priority. Health promotion initiatives must be tailored to the different sociocultural contexts of each community.

As the COVID-19 situation is rapidly evolving, research on the barriers and drivers to uptake and community engagement strategies aimed at addressing health literacy gaps will be critical to optimising access and uptake of vaccines for this group.

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