Deployment of COVID-19 Vaccines for Refugees and Migrants in Nepal

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ABSTRACT

Background

The needs and determinants of COVID-19 vaccination uptake and coverage among refugees, migrants in regular situations (MIRS), and migrants in irregular situations (MIIS) remain undocumented. This hinders advocacy toward inclusive vaccination policies and ultimately undermines effective vaccine rollout.

Objective

To estimate vaccination coverage and produce evidence on the barriers and facilitators to COVID-19 vaccination for refugees and migrants in Nepal.

Method

Mixed-method study was conducted in Koshi, Bagmati and Gandaki provinces of Nepal. In total, 210 household surveys were conducted among the refugees and migrants, and eight key informant interviews were conducted locally among Nepal's major stakeholders of COVID-19 vaccination.

Result

A total of 210 participants were included in this study: 101 refugees, 66 MIRS, and 43 MIIS. Among them, 52.9% (111/210) were fully vaccinated with two or more COVID-19 doses, 43.3% (91/210) were partially vaccinated with one dose, and 3.8% (8/210) were unvaccinated. Inclusive vaccination policies were an enabling factor for wide access to COVID-19 vaccines among refugees and migrants. The availability of vaccines free of cost, timely information on vaccinations, and multiple vaccination centers facilitated COVID-19 vaccine uptake. However, barriers like requirement of identity documents, safety misconceptions, fear of side effects, and language challenges hindered access.

Conclusion

This study highlights the overlooked issue of vaccination uptake among refugees and migrants, emphasizing the lack of data on their needs and determinants. This gap hinders inclusive vaccination policies and rollout effectiveness. Tailored strategies are crucial to address their specific needs, alongside ongoing research and advocacy for inclusive policies and targeted interventions to overcome barriers.

KEY WORDS

COVID-19, Immunization, Migrants, Nepal, Refugees, Vaccines

INTRODUCTION

Although the immediate threat of COVID-19 has receded, it remains a major public health challenge due to its lasting effects on mortality, morbidity, and socio-economic stability. The burden of public health restrictions has been especially severe for marginalized groups, including refugees, migrants, and asylum seekers.[1,2] According to the United Nations, there are currently 281 million migrants and among them, almost 82 million are forcibly displaced from their homes.[3] Vaccination remains vital in addressing COVID-19. However, studies show refugees and migrants face structural barriers from disrupted health services and individual barriers like limited knowledge, attitudes, and practices.[4,5] Additionally, refugees and migrants often face difficulties related to their status and may encounter discrimination, further impeding vaccine accessibility.[6]

COVAX, a joint venture by the Coalition for Epidemic Preparedness Innovations (CEPI), Gavi, and WHO, was launched to facilitate equitable and systematic deployment of COVID-19 vaccines in low and lower-middle-income countries (LLMICs).[7,8] However, several LLMICs struggled to acquire enough doses for their citizens and prioritize high risk population for COVID-19 during the early vaccination phases.[9] Poor individuals and those in vulnerable situations, including refugees, migrants, and asylum seekers were at particular risk.[10] Limited data on COVID-19 vaccine coverage and socio-political factors affecting refugees, migrants in regular situations (MIRS), and migrants in irregular situations (MIIS) hampers inclusive policy advocacy and weakens rollout efforts. Addressing these gaps is vital to protect vulnerable groups and strengthen public health resilience. Nepal with 30.55 million population, has a long history of providing shelter to refugees and migrants.[11] At present, the country accommodates around 20,000 refugees, primarily from Tibet, Bhutan, and other regions. Additionally, it hosts approximately 479,625 migrants (foreign-born population), mostly from India and other states. The COVID-19 pandemic caused a devastating crisis for Nepal, partially due to the country's inadequate preparedness for the unprecedented situation.[12] Nepal began COVID-19 vaccination on January 27, 2021, but data on uptake among refugees and migrants are limited, hindering equitable access. This study aims to estimate vaccine uptake, assess inequities compared to the general population, and identify barriers and facilitators among refugees, MIRS, and MIIS. It also seeks to inform inclusive vaccination strategies. Similar studies were conducted in Ecuador, Pakistan, the Philippines, and Rwanda, coordinated by the University of Geneva, with global findings published elsewhere.

METHODS

We conducted a sequential mixed-methods study in selected municipalities of three provinces (Bagmati, Gandaki and Koshi) of Nepal, as many refugees and migrants reside there. The study was conducted from 30 March 2022 to 30 August 2022. The study was based on the WHO Health Systems Framework, incorporating its six system building blocks and the Behavioral and Social Drivers (BeSD) of the COVID-19 Vaccination Framework.[13,14] The study was conducted in two phases.

PHASE 1: POLICY ANALYSIS AND QUALITATIVE STUDY

In the first phase, we conducted a brief policy review of the National Deployment and Vaccination Plan for COVID-19 Vaccines (NDVP) developed by the Ministry of Health and Population (MoHP) Nepal.[15] The NDVP was the primary guiding document for the COVID-19 vaccination program in Nepal. We analyzed the NDVP for inclusiveness concerning refugees, MIRS, and MIIS in Nepal. Following the policy review, we conducted key informant interviews (KIIs) with stakeholders involved in the COVID-19 vaccination program to understand refugee and migrant vaccination status and describe barriers and facilitators of vaccination among refugees and migrants in Nepal.

Participants recruitment and sample size

A total of eight key informants (KIs) from the Nepali government and humanitarian non-governmental organizations (I/NGOs), all of whom had prior experience in the national COVID-19 vaccination program were purposively selected and interviewed (Table 1). The number of KIs was determined based on the principle of saturation.[16]

Table 1. Number and description of study participants in phase 1.

Key informant interviews		
Location	Participant	Total interviews
Kathmandu	Municipal Health Office	3
	International agency	4
	Department of Health	1
Total		**8**

The KIIs were conducted using a semi-structured interview guide from March to May 2022. The interview guide was prepared based on different international guidelines and validated resources.[4-6,17,18] The guide included questions regarding the barriers and facilitators of COVID-19 vaccination among refugees, MIRS, and MIIS. All the interviews were conducted on face-to-face medium in a closed environment (considering privacy). Interviews were audio-recorded, and field notes were obtained, with the consent of the participants. All interviews were transcribed in Nepali and translated into English by experienced, bilingual research assistants.

We used thematic analysis to generate the study findings. The data were analyzed using a combination of inductive and deductive approaches. We developed a codebook

deductively based on the interview guide. The additional categories and codes were added inductively from the data. The analysis was done manually on Microsoft Excel.

PHASE 2: QUANTITATIVE STUDY

Following the qualitative study, we conducted a survey to estimate the proportion of migrants and refugees covered by COVID-19 vaccination campaigns and measure the magnitude of inequity compared with the general population in Nepal. We administered an in-person survey to 210 refugees, MIRS and MIIS from the Koshi, Gandaki and Bagmati provinces of Nepal.

Participants were adults 18 years of age and above, self-reported belonging to the refugee, MIRS, or MIIS communities, and agreed to participate in the study by providing informed consent. In this study, refugees and migrants were fully informed about the study's purpose, procedures, and their rights before participation. Participation was entirely voluntary, and individuals had the option to opt out at any stage without any consequences. No participant was excluded based on gender, race, religion, or ethnicity.

Different outreach strategies were employed according to the distribution of the three study populations. Official registries constituted the starting point for identifying and recruiting refugees and MIRS. Refugees are commonly registered in official databases managed by the national government and relevant United Nations agencies, such as UNHCR. MIRS may also be found in official government databases or IOM records. In contrast, identifying and recruiting MIIS, who are often not included in official registries, required a different approach. Snowball sampling was used for the recruitment of MIIS.

The refugee population for our sample size calculation was used as data on refugees is more readily available than data on MIRS and MIIS. Our estimation was based on the following explicit assumptions: (i) the proportion of fully vaccinated refugees was assumed to be a quarter of that of the general population, drawing from Diphtheria, Tetanus, and Polio (DTP) vaccine coverage studies in Jordan and Lebanon, and this assumption was applied to all six countries, no matter their current COVID-19 vaccine coverage and age distribution; and (ii) the full-vaccination coverage in the general population was used as a proxy for full-vaccination coverage across all adult age strata within that population.[19,20]

The sample size was calculated using the formula $(z^2pq)/d^2$ with the information about COVID-19 vaccination coverage in Nepal. The COVID-19 vaccination coverage among the general population was 66.4% (February 2022). To estimate the sample size, the significance level was set to 0.05 and a power assumption of 95%. We assumed that the proportion of fully vaccinated refugees was one-fourth the percentage among the general population (drawing from Diphtheria, Tetanus, and Polio vaccine coverage studies in Jordan and Lebanon), and assuming a 5% non-response rate, we estimated a sample of 210.[19]

The survey was designed based on different guidelines and validated resources.[4-6,17,18] The questionnaires mainly involved sociodemographic characteristics, vaccination coverage, behavior and social drivers (including barriers and facilitators).

The data were collected by the trained research assistants using the online data collection tool Kobo Toolbox. We coordinated with the focal person for vaccination of respective provinces and camp coordinators to get information regarding refugees and migrants. The research assistants were trained on the survey tools before the data collection and field deployment. To capture MIIS, we performed snowball sampling. We first identified the shops operated by MIIS through informal sources and subsequently identified further respondents. The survey was conducted in July 2022. The study questionnaire took approximately 30 minutes to complete and was administered in Nepali language.

A descriptive analysis was conducted among the primary outcome variables. Descriptive data was analyzed and presented as frequency and percentage. We used STATA 13 for analyses and calculated the COVID-19 Vaccine Equity Index (CVEI), identifies and quantifies disparities in outcomes for each group and illustrates the potential impact of vaccine distribution on advancing equity.[21] We illustrated the potential impact of vaccine distribution on advancing equity. The CVEI was developed based on the Vaccine Equity Index (VEI) by Maul et al. and the CVEI by Pressman et al.[21,22]

For all subgroups, CVEI = P(Us)/P(Ut) with s = subgroup, t = total population, U=number of unvaccinated. If this ratio is > 1 for a given subgroup, that group receives unequal and less favorable treatment, whereas a value < 1 implies unequal but favorable treatment. A value of 0 means the subgroup has 0% of unvaccinated (or is entirely vaccinated).

The study received ethical clearance from the Nepal Health Research Council (NHRC) (ref. ID: 87-2022), the Institutional Review Committee of Kathmandu University School of Medical Sciences (IRC-KUSMS) (ref. ID: 149/22), and the University of Geneva. Furthermore, we obtained official permission from the respective municipal offices before contacting respondents. All the study participants (Phase 1 and Phase 2) were informed about potential risks, the use of the data, the publication of the results, and their rights to withdraw from the study at any time. We obtained written informed consent from the participants included in the study. We also obtained consent from the KIs to audio-record the interviews.

RESULTS

We reviewed the NDVP for COVID-19 vaccination developed by the MoHP.[15] The NDVP provided prioritization criteria for vaccination and guided the country's vaccination allocation plan. It also presented the country's plans to deploy potential COVID-19 vaccines and implement and monitor nationwide COVID-19 vaccination. The main objective of Nepal's COVID-19 immunization program, as envisioned in the NDVP, was to protect the citizens and reduce COVID-19-related mortality and morbidity. Operational guidelines for the COVID-19 immunization campaign were also developed based on this document.

Drawing on the NDVP, Nepal's contextual factors, and guidance from the WHO's Strategic Advisory Group of Experts (SAGE), population prioritization and vaccination phases were established and approved by the council of ministers. To ensure effective governance, coordination, and monitoring, committees were established at federal, provincial, district, and municipal levels.

Initially, the vaccination campaign in Nepal targeted frontline workers in healthcare and social sectors, encompassing healthcare workers, sanitation and waste management personnel, drivers of ambulances and mortuary vans, volunteers, and security staff at immunization centers. Additionally, individuals involved in handling deceased bodies, female community health volunteers (FCHVs), health workers at international points of entry, the elderly and their caretakers in old age homes, prisoners and prison staff were included. In the subsequent phase, vaccination priority shifted to individuals aged 55 and above, followed by those aged 40-54 with comorbidities, migrants, laborers, and refugees also with comorbidities. Nepal included refugees and migrants in its NDVP, with no eligibility restrictions for vaccination among MIRS.

Socio-demographic characteristics

A total of 210 participants were interviewed, of which 57.1% of the respondents were males and 42.9% were females. The majority of participants (88.1%) have been residing in Nepal for more than 5 years, 31.4% were MIRS, 20.5% were MIIS, and 48.1% were refugees. Only 18.1% had completed their secondary education, 34.3% had completed primary education, and a majority had no formal education (47.6%). Regarding COVID-19 vaccination, 52.9% of the participants had received their full dose of COVID-19 vaccination, having received two or more doses, 43.3% were partially vaccinated with a single dose of vaccine whereas 3.8% of the participants were unvaccinated. More proportion of refugees 71.3% (72/101) had received full dose of vaccination as compared to MIIS 58.1% (25/43) and MIRS 21.2% (14/66) (Table 2).

Vaccination coverage

Out of 210 participants, 202 (96.2%) were vaccinated with at least one dose of COVID-19 vaccine. The rate of vaccination was almost equal in both males (96.7%) and females (95.6%). MIRS had lower vaccination rate (92.4%) as compared to MIIS (97.7%) and refugees (98.1%). Participants of the age 65 years and more were more likely to be vaccinated (100%) as compared to younger age groups. Vaccination rate was higher in the participants who stayed in Nepal for more than 5 years (96.8%) (Table 3).

Table 2. Socio-demographic characteristics of the survey participants.

Characteristics	Overall (N=210)	MIRS (n=66) n (%)	MIIS (n=43) n (%)	Refugee (n=101) n (%)
Gender				
Female	90 (42.9)	20 (30.3)	19 (44.2)	51 (50.5)
Male	120 (57.1)	46 (69.7)	24 (55.8)	50 (49.5)
Age group				
18-29	46 (21.9)	18 (37.3)	19 (44.2)	9 (9.0)
30-49	65 (30.9)	29 (43.9)	15 (34.9)	21 (20.8)
50-64	52 (24.8)	14 (21.3)	5 (11.7)	33 (32.7)
65 or more	47 (22.4)	5 (7.6)	4 (9.3)	38 (37.6)
Duration of stay in Nepal				
< 1 year	11 (5.2)	9 (13.6)	1 (2.3)	1 (1.0)
1-5 years	14 (6.7)	8 (12.1)	6 (14.0)	0 (0.0)
More than 5 years	185 (88.1)	49 (74.2)	36 (83.7)	100 (99)
Education				
No formal education	100 (47.6)	27 (40.9)	19 (44.2)	54 (53.5)
Primary education (up to class 8)	72 (34.3)	30 (45.4)	16 (37.2)	26 (25.8)
Secondary education and above (class 9 and above)	38 (18.1)	9 (13.6)	8 (18.6)	21 (20.8)
COVID-19 Vaccination				
Vaccinated (full dose)	111 (52.9)	14 (21.2)	25 (58.1)	72 (71.3)
Vaccinated (partial dose)	91 (43.3)	47 (71.2)	17 (39.6)	27 (26.7)
Unvaccinated	8 (3.8)	5 (7.6)	1 (2.3)	2 (2.0)

Facilitators for COVID-19 vaccination

Adequate sources of information

The qualitative data revealed that the information campaigns used diverse methods to reach the target audience effectively. These included innovative approaches like ringtones on telephones for auditory reminders, and traditional advertising such as strategically placed advertisements, posters in public spaces, and mass media. Radio broadcasts reached remote areas, and TV commercials targeted a broad audience, ensuring widespread visibility and accessibility of the COVID-19 vaccination information. This multi-faceted approach maximized the campaign's effectiveness by catering to diverse population segments. Moreover, the local FCHVs also helped in disseminating the information in the community and refugee camps.

Table 3. Frequency and proportion of participants vaccinated with at least one dose against COVID-19 (including reason for vaccination, costs, and experience of side effects) (N=210)

Characteristics	Frequency (%)
Gender	
Female (n=90)	86 (95.6)
Male (n=120)	116 (96.7)
Migration status	
MIRS (n=66)	61 (92.4)
MIIS (n=43)	42 (97.7)
Refugee (n=101)	99 (98.1)
Age group	
18 - 29 (n=46)	44 (95.7)
30 - 49 (n=65)	62 (92.5)
50 - 64 (n=52)	49 (94.2)
65 or more (n=47)	47 (100)
Duration of stay in Nepal	
< 1 year (n=11)	10 (90.9)
1 - 5 years (n=14)	13 (92.9)
More than 5 years (n=185)	179 (96.8)
Education	
No formal education (n=100)	95 (95.0)
Primary education (up to 8 class) (n=72)	70 (97.2)
Secondary education and above (class 9 and above) (n=38)	37 (97.4)
Reason for Vaccination	
The vaccine is highly reliable	187 (92.6)
The vaccine is a government requirement	177 (87.6)
The vaccine protects my family, friends and community	193 (95.5)
The vaccine is a requirement to enter establishments	170 (84.2)
Getting vaccinated is my duty	171 (84.7)
I get vaccinated because it's safe	165 (81.7)
Cost	
Vaccine is free of cost	202 (100)
Experience of side effects	
No	127 (62.9)
Yes	71 (35.2)
Don't know	4 (1.9)
Total	**202 (96.2)**

"*The information campaign included about the importance of getting vaccines, where and when people could get the vaccines made the vaccine accessibility easier....*" (P3: Public Health Officer, Kathmandu Metropolitan City)

Participants reported receiving information more frequently from refugee camps' staff (34.3%) followed by social media (23.3%) and family/friends (19.5%). The major source of information among MIRS was family and/or friends of home country (50%) whereas for MIIS was NGOs (34.9%) and for refugees was from the camp staff (62.4%)

Table 4. Frequency and proportion of main sources of information on COVID-19 vaccination

Sources of Information	Overall (N=210) n (%)	MIRS (n=66) n (%)	MIIS (n=43) n (%)	Refugee (n=101) n (%)
Local newspapers, radio and/or television channels	67 (31.9)	21 (31.8)	11 (25.6)	35 (34.7)
Foreign newspapers, radio and/or television channels	41 (19.5)	13 (19.7)	6 (14.0)	22 (21.8)
Local authorities statements	34 (16.2)	12 (18.2)	7 (16.3)	15 (14.9)
Social media	49 (23.3)	22 (3.3)	7 (16.3)	20 (19.8)
Family and/or friends in home country	47 (22.4)	33 (50.0)	2 (4.7)	12 (11.9)
Family and/or friends in the country currently living	41 (19.5)	22 (33.3)	2 (4.7)	17 (16.8)
Camp staff	72 (34.3)	0	9 (20.9)	63 (62.4)
At your workplace	11 (5.2)	1 (1.5)	3 (7.0)	7 (6.9)
Internet and/or social networks	12 (5.7)	4 (6.1)	5 (11.6)	3 (3.0)
NGOs	19 (9.0)	0	15 (34.9)	4 (4.0)
Others	25 (11.9)	2 (3.0)	15 (34.9)	8 (7.9)

(Table 4). Nearly half of the participants (46.67%) believed that timely provision of vaccination information was major facilitating factors for COVID-19 vaccination process in the country (Table 8).

Targeted vaccination campaigns

The key informants mentioned that with the coordination of local government, health facilities and some voluntary organizations (Nepal Red Cross Society), several mobile vaccination campaigns were run in the specified refugee camps. The local government facilitated in providing necessary permissions and logistics, ensuring the mobile units had access to the camps and coordinated with health departments to allocate resources. Similarly, the local health facilities and voluntary organizations supported in provision of medical staff, vaccinators, community mobilization and raising awareness about the importance of vaccination.

"*We provided vaccine access to every ward, including those with refugee camps, and organized early morning campaigns at 7 AM to accommodate migrants' schedules. Additionally, we operated COVID-19 vaccination programs in shifts to ensure broad coverage among these community.*" (P8: Health Officer, District Health Office)

Majority of the participants (67.6%) that the national government's campaigns were successful. More refugees (72.3%) thought the campaigns were successful as compared to MIRS (60.6%) and MIIS (67.4%). 33.3% of the MIRS were more doubtful on the success of the government campaigns than MIIS (25.6%) and refugees (18.8%) (Table 8).

Multiple and accessible vaccination centers

The majority of the KIs mentioned regarding the availability of vaccination centers at the local wards and nearby hospital has been a facilitating factor for COVID-19 vaccination and majority of the refugees and migrant groups could access the vaccine easily. They also mentioned that FCHVs have been instrumental in disseminating information regarding the vaccination centers in the communities and camps.

"*On one hand, vaccination sites were set up in various designated local areas with support from the local government, and on the other hand, all hospitals, primary health centers, and health posts in the community also offered vaccination services.*" (P6: Vaccinator, Humanitarian NGO)

A significant proportion of the participants (69.5%) believed that the health centers set up for COVID-19 vaccination at the national level were accessible to the refugees and migrant community. Moreover, 30% of the participants believed that vaccination center at multiple sites were also the facilitating factors for COVID-19 vaccination process in the country (Table 8).

Political commitment

The majority of the KIs noted that Nepal's inclusive policy, that prioritized refugees and migrants as priority 2, had facilitated vaccine accessibility for these communities. Additionally, all key informants confirmed that COVID-19 vaccines were provided free of charge, allowing eligible individuals, including refugees and migrants, to receive the vaccine at no cost. Moreover, the smooth coordination and collaboration among the central, provincial and local government along with some organizations has also helped in vaccination process in the country.

"*As per the vaccine policy, the government provided vaccines at free of cost, no one can take money and people with nation's priority can get it respectively, taking a strong action for those who misuse it, the targeted groups should get it in time.*" (P5: Deputy Director, Nepal Red Cross Society)

All the survey participants that were vaccinated against COVID-19 reported receiving the vaccine at no cost (Table 3).

Other facilitators

Nearly half of the participants (46.7%) found that timely provision of information as major facilitators for COVID-19 vaccination process in the country (Table 8). Among those who received the COVID-19 vaccine, a substantial 95.5% stated that their motivation to receive the COVID-19 vaccine was to protect others, including their family, friends, and the community. In addition, 92.6% reported that vaccine was highly reliable (Table 3).

Barriers

Fear of side effects

Most KIs reported that the side effects after vaccination scared many people to get the COVID-19 jab. The lack of awareness and poor counselling by health workers on possible minor side effects following immunization affected the people's willingness to vaccinate. Due to the experience of adverse effects, people were reluctant to get the next vaccination dose.

"*They (immigrants) didn't understand that minor side effects are normal……. they should be taught about this; they don't understand it, and we also couldn't make them understand about the possible side effects following immunization*" (P4: Immunization section officer, MoHP)

After receiving the COVID-19 vaccination, 35.2% of participants reported experiencing side effects [Table 3]. Around14.3% of the survey participants reported being moderately concerned and 10.5% reported being very concerned about possible COVID-19 vaccine reactions [Table 8].

Misinformation regarding vaccines

Most of the KIs believed that the misinformation regarding vaccines was an obstacle to getting vaccinated against COVID-19. They observed that false rumors about the COVID-19 vaccines created a climate of fear and skepticism, leading many individuals to be hesitant or outright refuse to get vaccinated. This spread of misinformation was particularly widespread on online news portals and social media platforms such as Facebook and YouTube.

"*There was a spread of misinformation on Facebook…… It was up to the level where a person even spitted on our face and went away.*" (P7: Vaccinator, Humanitarian NGO)

In contrast, the quantitative findings from this study underscored the significant role of social media in disseminating information about COVID-19 vaccines. Out of the total participants, 23.3%, reported that social media was their main source of information regarding COVID-19 vaccines (Table 4).

Requirement of an identity document

The majority of the KIs reported that the major barrier to accessing COVID-19 vaccines for refugees and migrants was due to requirement of a national identity document in the initial phase of vaccination. Many migrants could not get vaccinated and were returned from the vaccination centers. However, the policy was amended later with no requirement of identity documents to get the vaccine.

"*Initially, refugees and migrants had trouble getting vaccinated due to the requirement for Nepalese citizenship or photo identity. However, with vaccines now readily available, they are being vaccinated without the need for any identity documents.*" (P1: COVID-19 vaccination focal person, Kathmandu Metropolitan City)

Table 5. Frequency and proportion of type of difficulties to access COVID-19 vaccine (n=210)

Type of difficulties	Overall n (%)
Nothing. It is not difficult	124 (59)
The COVID-19 vaccine is not available for a given group	3 (1.4)
They can't go on their own (they have physical limitation)	7 (3.3)
The vaccination site is too far away	7 (3.3)
Opening hours are inconvenient	3 (1.4)
People are turned away without vaccination	4 (1.9)
The waiting time is too long	9 (4.3)
It is difficult to register for vaccination	1 (0.5)
They do not have the internet or a smartphone to register for vaccination	1 (0.5)
Something else	66 (31.4)

A small but significant portion of the survey participants, 3.8%, reported being denied access to COVID-19 vaccination due to the absence of an identity document (Table 8).

Language barrier

Some of the KIs mentioned language barrier as another factor affecting the vaccine uptake among refugees and migrants. Likewise, they also highlighted that the vaccination related information was not understandable to many migrants and refugees as the information were delivered in Nepali language.

"*At vaccination sites in Kathmandu, Tibetan refugees they encountered difficulties in understanding the COVID-19 vaccines related information because of the language barrier*" (P2: Officer, Nepal Red Cross Society)

46.7% of the survey participants indicated that they received timely information about the COVID-19 vaccination process (Table 8). However, it is important to note that all the information provided was exclusively in the Nepali language.

Competing priorities

Some of the KIs mentioned that the daily wage migrant workers could not get vaccinated because of their work schedule requiring full day engagement. They noted that the timing for the vaccination was not appropriate for some of the migrant groups, so they could not get vaccinated.

"*In migrants, one thing might be a job, they have to work daily……. their time must be considered for including them in the vaccination program*" (P4: Immunization section officer, MoHP)

Few participants (4.3%) of the participants mentioned long waiting time as a barrier to access the vaccination. Additionally, 1.4% reported that the opening hours of vaccination centers were inconvenient to them (Table 5).

Table 6. Reasons for non-vaccination

Reasons for non-vaccination	Frequency (%) (n=8)
I don't need the vaccine: rarely/never sick, I don't belong to the priority group	3 (37.5)
Religious reasons	2 (25.0)
There is not much COVID-19 infection in the community	3 (37.5)
I do not need to protect myself	2 (25.0)
I am afraid of/do not like doctors/syringes	1 (12.5)
Risk of adverse reactions to COVID-19 vaccines	1 (12.5)
I am not comfortable with the new COVID-19 vaccine	2 (25.0)
Other	3 (37.5)

Table 7. CVEI by gender, migration status, age, duration in the host country and education

Characteristics	CVEI	N
Gender		
Female	0.752	90
Male	0.832	120
Migration status		
Regular	1.333	66
Irregular	0.708	43
Refugee	0.486	101
Age group		
18 – 29	1.296	46
30 – 49	0.798	65
50 – 64	1.147	52
65 or more	0.781	47
Duration in the host country		
< 1 year	1.668	11
1 - 5 years	1.311	14
More than 5 years	1.029	185
Overall	0.798	210

Other barriers

Among the unvaccinated participants, 37.5% stated that they did not believe they needed the vaccine. An equal percentage felt that there was not much COVID-19 infection in their community. Additionally, 25% indicated that they could not get vaccinated due to religious reasons, and the same percentage mentioned that they were not comfortable with the new COVID-19 vaccine (Table 6).

CVEI

Overall, the CVEI equals 0.798, suggesting that the immigrants had favorable access to the COVID-19 vaccine. Both males (CVEI = 0.832) and females (CVEI = 0.752) had greater access to vaccine than the general population. MIRS had less access to vaccine (CVEI = 1.333) than the general population. Refugees had greater access to vaccines than the general population (CVEI = 0.486) (Table 7).

Table 8. Frequency and percentage on several specific questions to the participants

Questions	Overall (N=210) n (%)	MIRS (n=66) n (%)	MIIS (n=43) n (%)	Refugee (n=101) n (%)
Facilitators for COVID 19 vaccination process in the country				
Timely provision of information	98 (46.7)	30 (45.5)	11 (25.6)	57 (56.4)
Vaccination centers have been set up in different areas of the city	63 (30.0)	14 (21.2)	14 (32.6)	35 (34.7)
Concern on serious reaction of vaccine				
Very concerned	22 (10.5)	9 (13.6)	5 (11.6)	8 (7.9)
Moderately concerned	30 (14.3)	9 (13.6)	5 (11.6)	16 (15.8)
Participants considering health centers set up at the national level were accessible in their community				
Yes	146(69.5)	42 (63.6)	33 (76.7)	71 (70.3)
No	22 (10.5)	8 (12.1)	2 (4.7)	12 (11.9)
Don't know	42 (20.0)	16 (24.3)	8 (18.6)	18 (17.8)
Participants who thought that the national government's campaigns had been successful in getting migrants to go to vaccination centers				
Yes	142(67.6)	40 (60.6)	29 (67.4)	73 (72.3)
No	16 (7.6)	4 (6.1)	3 (7.0)	9 (8.9)
Don't know	52 (24.8)	22 (33.3)	11 (25.6)	19 (18.8)
Participants being denied access to vaccination due to lack of having an identity document	8 (3.8)	3 (4.5)	2 (4.7)	3 (2.9)

DISCUSSIONS

This study aimed to estimate the proportion of refugees and migrants reached by COVID- 19 vaccination campaigns, and to identify the associated barriers and facilitators. Out of 210 participants, 202 (96.2%) received at least one dose of the COVID-19 vaccine, indicating extensive coverage. Among the vaccinated, over half completed the full vaccination regimen.

Refugee, immigrant, and migrant communities exhibit diverse experiences and attitudes toward vaccination. These differences can stem from a variety of factors, including cultural beliefs, levels of trust in government and healthcare systems, and previous experiences with medical services. Despite these challenges, Nepal's government policy prioritizing the vaccination of vulnerable groups, in alignment with WHO guidance, represents a significant achievement. This can be attributed to the effective coordination among the three tiers of government: central, provincial, and local. This collaborative approach ensured that the vaccination campaigns were comprehensive and inclusive. Moreover, the government implemented special initiatives to prioritize the vaccination of these groups, including outreach programs specifically designed to reach these populations along with multiple vaccination centers accessible to them. Our findings are consistent with high vaccination coverage observed among these groups. A separate study showed that Nepal had the highest COVID-19 vaccine acceptance rate compared to other lower-middle-income countries (LMICs), with an average acceptance rate of 80.3% among LMICs.[23]

The NDVP in Nepal outlines prioritization criteria for COVID-19 vaccination and guides the country's allocation strategy. Participants in our study reported that the vaccination was provided free of charge. Refugees and migrants in Nepal were not only included in the vaccination efforts but also granted priority access, preceding age-group eligibility in recognition of their increased vulnerability.[24] Participants expressed satisfaction with the government's pandemic response and demonstrated trust in government and national authorities regarding vaccination, consistent with findings from studies in Canada.[25,26]

Vaccine hesitancy, recognized by the WHO as one of the top ten global treats in 2019, has been reported at varying levels across previous studies, ranging from 20% to 40% of the surveyed population.[27-30] In our study, 3.8% of the participants reported non-vaccination, citing reasons such as lack of awareness regarding the importance of COVID-19 vaccination and religious barriers. Additional challenges included long waiting times for vaccination, fear of side effects and misinformation regarding vaccine safety. Addressing these issues requires continuous awareness campaigns, particularly targeting migrant groups who may be unavailable during typical vaccination hours due to employment obligations.

The effectiveness of national health systems in achieving COVID-19 vaccine coverage, including within-country vaccine equity, is crucial for global vaccine equity. Many countries, especially LICs/LMICs, will need international assistance, not only for vaccine supply but also for sustainable financial and technical support for their vaccination strategies, despite prior advocacy for strengthening national health systems.[31] While the primary focus is on immunizing at-risk populations, leadership and governance within the national health system remain equally critical.

Nepal's successful COVID-19 vaccination coverage among migrants and refugees was driven by the government's inclusive vaccination strategy, which prioritized vulnerable groups including migrants and refugees and featured strong coordination across all levels of government. FCHVs and other community health workers were instrumental in conducting outreach, while the provision of free vaccines and easily accessible centers also significantly contributed to the high uptake. Although a small number of people cited concerns on vaccines side effects and religious beliefs as reasons for not getting vaccinated, the campaign's overall success highlights the critical role of targeted outreach and government coordinated effort in ensuring equitable vaccine distribution.

A major limitation of our study is its timing in relation to different COVID-19 waves, which may have influenced participants' self-reported vaccination willingness. Conducted in March 2022, the findings may have evolved since then. Additionally, there is a risk of selection bias as refugees and migrants were not randomly selected but approached through refugee camps and local government coordination, using snowball sampling, potentially limiting generalizability.

CONCLUSION

This study reveals a high acceptance of COVID-19 vaccination among refugee and migrant populations, highlighting an often overlooked group in public health. The findings emphasize the need for data-driven, inclusive policies that address their unique barriers. Continued research, advocacy, and targeted interventions are essential to improve access, build vaccine confidence, and ensure no one is left behind strengthening the overall equity and effectiveness of vaccination efforts.

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