

Research Article

COVID-19 vaccine acceptance among refugees in Bidibidi refugee settlement, Northern Uganda

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Background

We investigated the factors associated with people's acceptability to get the COVID-19 vaccine if made available among refugees in the Bidibidi refugee settlement.

Methods

Face-to-face interviews were used to collect data between 6 March and 9 April 2021. A binary logistic regression was fitted to examine the factors that determine acceptability of the COVID-19 vaccine.

Results

Most respondents (78%) accepted to get the COVID-19 vaccine. Results from the binary logistic regression model show that respondents that were uncertain whether the COVID-19 vaccine would stop transmissions were less likely to get the vaccine (adjusted odds ratio, aOR = 0.70; 95% confidence interval, CI = 0.51–0.96) than respondents that were not uncertain. Respondents who did not want to go to health facilities (aOR = 0.61; 95% CI = 0.44–0.84) were less likely to accept the COVID-19 vaccine than their counterparts who want to go to health facilities. The odds of getting a COVID-19 vaccine among respondents who sometimes put on a face mask (aOR = 1.77; CI = 1.26–2.49) are more than respondents who always put on a face mask.

Conclusions

The results inform the planning and implementation of COVID-19 vaccine promotion campaigns in humanitarian settings, particularly in LMICs in Africa that embody similar characteristics, contexts, and health systems challenges, as in northern Uganda.

Following the emergency of the COVID-19 in December 2019,^{1,2} vaccination has been suggested to be a good approach to reducing infection.³ Moreover, acceptance of the COVID-19 vaccine can help prevent transmission and infection of COVID-19.⁴ A number of COVID-19 vaccines – which provide adaptive immunity against diseases produced by Pfizer, Moderna, AstraZeneca, CoronoVac, Sputnik, EpiVacCorona, Covaxin among others⁵ have been approved for use. In Uganda, the Ministry of Health received the first batch of COVID-19 (AstraZeneca) on the 5th March 2021 to be used in a phased manner.⁶ Since then, the government has rolled out vaccination drives to essential people – believed to be at high risk – such as medical workers, teachers, security personnel, humanitarian frontline workers, and people who are older than 50 years.⁷ Mass vaccination is intended to prevent new infections, but also to facilitate the process of people or business returning to their full normal operations.⁸

Despite vaccination being underway in most countries, not all people would accept the COVID-19 vaccine.^{8–10} A significant number of people continue to be concerned about the side effects and effectiveness of the COVID-19 vaccine.¹¹ People may shun the vaccine due to fake news or conspiracy theories.^{12,13} The World Health Organization (WHO) considers vaccine hesitancy as a global public health concern with far reaching negative consequences.^{8,14,15} Vaccine hesitancy refers to the “delay or refusal to accept a vaccine, despite the availability of vaccination services.”^{16,17} That is, some would only accept to be vaccinated if they feel that the vaccine is safe.³ Moreover, efforts to address vaccine acceptability remain limited.¹⁸ Yet, to ensure equitable vaccine allocation, it is important to understand the factors that influence people to accept COVID-19 vaccines.³

A number of reasons may explain people's willingness to accept the COVID-19 vaccine. Drawing on the Health Belief Model (HBM), people's level of acceptance to get

the COVID-19 vaccine may be due to perceived benefits, perceived barriers, perceived susceptibility and perceived severity.^{19,20} According to the HBM, people may accept the vaccine if they think they are susceptible to disease (perceived susceptibility), if the disease will lead to negative consequences (perceived severity), if they think the vaccine will prevent them from contracting the disease (perceived benefits), or if they envisage a few negative consequences as a result of accepting the vaccine (perceived barriers).

Stakeholder engagement, social mobilization and equitable distribution of vaccines have been suggested to increase vaccine acceptance in low income countries.^{21–23} Vaccine acceptability may also depend on one's cultural background, attitudes, beliefs, perception, political, environmental, personal factors or compliance to face mask wearing guidelines.^{24–26} Acceptability of the COVID-19 vaccine may vary by socio-economic background. For example, males are expected to accept the vaccine more than females.⁵ Vaccine acceptance is likely to be low among people of low-socioeconomic background,^{21,27} low education attainment.²⁸ People may not accept the vaccine because they lack enough information regarding, transmission and prevention of COVID-19.⁸ Vaccine uptake is likely to be higher among medical practitioners than other professionals.^{16,29,30} Providing adequate information regarding COVID-19 vaccination can help people consider the uptake of the vaccine.

Despite a large body of evidence on COVID-19 vaccine availability and rolling out vaccination, there is little evidence on vaccine acceptability among humanitarian populations in low-income countries.^{8,31} This study therefore seeks to document the factors that influence people's acceptability to get the COVID-19 vaccine in Bidibidi refugee settlement. This is because vaccine acceptance determines vaccine uptake and control of infection.¹² We focus on humanitarian populations (Bidibidi refugees) because it is a marginalized population group that is susceptible to contracting COVID-19,^{32,33} with accessibility challenges to health services coupled with a weak health care system.³³ Refugees often live in crowded places that defeat upholding social distancing and good sanitation guidelines.³² Refugees may be deterred from getting the COVID-19 vaccine because of the cost that may be associated with accessing health care facilities, discrimination, fear of continuity, and mistrust.^{21,34} The results from this study may inform government to develop or align national COVID-19 vaccination programmes with humanitarian populations in order to increase uptake of COVID-19 vaccine.^{31,33} The overall objective of this study was to assess vaccine acceptance in humanitarian settings in order to inform policy and programming in relation to promoting COVID-19 vaccination.

METHODS

STUDY SETTING

The data used in this study comes from Bidibidi Refugee Settlement, which is located in the West Nile region of Uganda (part of the greater northern Uganda region). The study site was chosen for inclusion in the study because it is

the largest refugee settlement in Uganda. The settlement is home to over 270,000 refugees and it is the largest refugee settlement in Uganda.³⁵ The biggest source of livelihood in Bidibidi refugee settlement is subsistence agriculture and support from UNHCR and World Food Programme for their survival and livelihood.³⁶

STUDY POPULATION

This study targeted refugee populations living in Bidibidi refugee settlement in Yumbe district in northern Uganda. All populations interviewed were adult men and women aged 18 years and above.

SOURCE OF DATA AND SAMPLE SIZE

The data used in this paper come from a cross-sectional survey that collected quantitative data on COVID-19 acceptance in Bidibidi refugee settlement in Yumbe district, Uganda. Cluster sampling technique was used to select three zones to be included in the study. Three blocks were selected from each zone to give a total of nine blocks. A list of all households in each block was developed. Simple random sampling was then used to select respondents for interview from each block. Using the simple random sampling with proportions, $n = (pqz^2)/e^2$, where $P=0.085$, $q=0.915$, $Z=2.33$ and margin of error (e) = $\pm 2\%$ at 98% level of significance, we estimated $n=1056$. We achieved a response rate of 95% as we targeted 1005 refugees for the quantitative survey.

DATA COLLECTION AND ETHICAL CLEARANCE

Data collection was conducted by a team of well-trained research assistants using the Computer Assisted Personal Interviewing (CAPI) technology. Research assistants were trained for three days prior to data collection. Prior to data collection, a pre-test was conducted to test the suitability of the instrument, and comments arising from the pre-test were integrated in the revision of the final questionnaire. The main data collection exercise took place between 6 March and 9 April 2021 immediately after the pre-test.

Interviews were conducted in cognizant of the Standard Operating Procedures (SOPs), considering the ethical guidelines provided by the World Health Organization (WHO) to adhere to while conducting research during COVID-19, to ensure no harm to the participants.³⁷

ETHICAL CONSIDERATIONS

Ethical clearance to conduct the study was granted by Mild May Uganda Research Ethics Committee. Respondents were assured of their safety, privacy and confidentiality. All participants who were 18 years and above had to consent to participate in the study.

MEASUREMENT OF VARIABLES

DEPENDENT VARIABLE

Drawing on previous research,^{35,36,38} respondents were asked whether they would accept to get a COVID-19 vaccine if they had adequate information about the vaccine. A response to this question (would you accept the COVID-19 vaccine if you had adequate information about the vaccine) was either a 'Yes' or 'No'. This question was used as a dependent variable. The dependent variable is a binary variable because responses to the question were either Yes or No.

INDEPENDENT VARIABLES

Background characteristics of respondents included age which was collected in single years with the minimum being 18 years and maximum 63 years. We created 15-year age groups (18-32 and 33-47) and an open-ended age group (48+) from single year reported data. Respondents were asked to state their highest level of educational attainment. Education attainment is either no education, primary, secondary or tertiary. Respondents were either male or female. Respondents were asked about the frequency of wearing face masks, coded as: 1=always, 2=never or 3=sometimes. We argue that respondents who wear face masks sometimes are distinctively different from those who never wear face masks. While both categories are not always putting on face masks, those who wear a face mask sometimes could be doing so in circumstances they deem risky, for example being in a crowded place or public place.

Respondents were asked about the reasons for not intending to get a COVID-19 vaccine: concerned about cost, do not want to go to health facilities, general mistrust of COVID-19 vaccine, too busy to go for a COVID-19 vaccine, not concerned about getting infected and uncertain if the vaccine will stop COVID-19 transmission. Responses to each of the questions were either a 'Yes' or 'No'.

DATA ANALYSIS

Quantitative data analysis was performed using the Stata software version 15.³⁹ The distribution of respondents was presented at the univariate level of analysis. A Pearson-chi-square test was computed to test the association between selected background factors and intention to take the COVID-19 vaccine. A step-wise binary logistic regression model was fitted (because the outcome variable is binary) to examine the correlates of vaccine acceptability. Statistical significance was tested at $P < 0.05$.

RESULTS

DISTRIBUTION OF RESPONDENTS

[Table 1](#) shows the distribution of respondents in the study. Majority of respondents were males (62%), wore a face mask always (56%), and had tertiary level of education (27%). Most respondents (13%) were aged 58 or more years.

RELATIONSHIPS BETWEEN SELECTED BACKGROUND FACTORS AND THE INTENTION TO TAKE A COVID-19 VACCINE

[Table 2](#) shows that respondents were statistically significantly different by the intention to take a COVID-19 vaccine by the frequency of face mask wearing ($P < 0.05$), uncertain if vaccine will stop transmission ($P < 0.05$) and the status of wanting to go to health facilities ($P < 0.05$). Results in [Table 2](#) indicate that majority of respondents were intending to get a COVID-19 vaccine (78%).

FACTORS ASSOCIATED WITH THE INTENTION TO GET A COVID-19 VACCINE

[Table 3](#) presents odds ratios from a binary logistic regression model that predicted the intention to get a COVID-19 vaccine. Results in [Table 3](#) show that respondents that were uncertain whether the COVID-19 vaccine would stop transmissions were less likely to get the vaccine (odds ratio, OR=0.70; 95% confidence interval, CI=0.51-0.96) than respondents that were not uncertain. This pattern is similar to respondents who said that they do not want to go to health facilities (OR=0.61; CI=0.44-0.84). The likelihood to get a COVID-19 vaccine among respondents who put on a face mask sometimes is as likely as (OR=1.77; CI=1.26-2.49) respondents who put on a face mask always.

DISCUSSION

Our results on vaccine acceptability should be interpreted bearing in mind the context of particularly LMICs such as Uganda where the COVID-19 pandemic has continued to demonstrate the fragility of health services and public health systems.⁴⁰ It is also happening in the context where primary care facilities are being asked to step up and get involved in managing asymptomatic and mild COVID-19 cases, do community mobilization and raise awareness, provide support in several aspects related to testing, contact tracing, and referral of cases to secondary and tertiary care facilities.¹⁴ The news of the arrival of the COVID-19 vaccine was therefore received with enthusiasm given their role in prevention of transmission. Our results demonstrate that majority of respondents accepted that they would be willing to get the COVID-19 vaccine.

The results indicate good news in terms of the public health response to prevention and control of COVID-19 in humanitarian settings and should be perceived as an asset to the social mobilization of refugees in the study sites for COVID-19 vaccination. However, it should also be concerning that a considerable proportion (22%) depicted COVID-19 vaccine unacceptability. This is similar to other studies that show that COVID-19 vaccination acceptance is not universal^{8,14,15} and the worry could be that this number can keep growing given the misinformation about COVID-19 vaccination^{12,13} and the limited scale of efforts to mobilize and raise awareness of people particularly in humanitarian settings in low income countries about the COVID-19 vaccine and its benefits.

Table 1. Distribution of respondents.

Variable	Frequency	Percent (%)
Sex of respondent		
Female	381	37.9
Male	624	62.1
Age of respondent		
18-32	340	33.8
33-47	317	31.5
48+	348	34.6
Level of education		
No education	221	22.0
Primary	248	24.7
Secondary	264	26.3
Tertiary	272	27.1
Total	1005	100

Our results show that being convinced or certain about the efficacy of the COVID-19 vaccine to stop transmissions positively influences acceptance to get vaccinated by the COVID-19 vaccine. This implies that intensive social mobilization and awareness raising related to the COVID-19 vaccine may help facilitate vaccine acceptance³ among refugees in LMICs such as Uganda.

Results also demonstrate that the site of where the vaccination is provided matters in respect to people's choices to be vaccinated. For example, refugees who do not want to go to health facilities for vaccination were less likely to accept the COVID-19 vaccine than their counterparts who want to go to health facilities. This implies that innovations are required to increase the flexibility and choices of where people can get vaccinated. This may pose technological challenges especially given that most COVID-19 vaccines require being stored at temperatures that may not be feasible to manage outside facilities especially in humanitarian settings in LMICs such as Uganda. Some studies have shown that people (do not feel safe) fear that if they go to the health facilities, they may be exposed to a high risk of COVID-19 infection^{12,13} particularly if the infection prevention control procedures and facilities are not available or are perceived to be ineffective.

Wearing a face mask sometimes was positively associated with vaccine acceptance among refugees in Bidibidi settlement. This implies that belief in efficacy of face masks in preventing COVID-19 transmission⁴¹ may be a building block towards COVID-19 vaccine acceptance²⁴⁻²⁶ among refugees in Bidibidi settlement. Although we did not aim at doing comparative analysis to the settings from which the refugees originated and to where they may consider migrating to, we do note that most of our respondents are South Sudanese and migrated from South Sudan which is a country sharing a border with Uganda. It also has a relatively more fragile health care system compared to Uganda and is trying to emerge from decades of armed conflict that grossly affected the health care systems. Our interactions with the respondents as well as previous studies show that

quite a number of refugees keep going back and forth from the settlements to their villages in South Sudan and then again come back to the settlements.³⁷ This cross border mobility has implications for COVID-19 transmission, especially in a context where borders are porous and cross border coordination of health services including COVID-19 vaccination, testing and treatment is weak. There is therefore need to strengthen cross border coordination, epidemiological surveillance, and the preparedness of the health care systems to adequately control and prevent COVID-19 transmission.

LIMITATIONS AND STRENGTHS

This study helps to understand the perception of refugees towards COVID-19 vaccination. This can be helpful in planning for social behavioral interventions that accompany vaccination programmes, campaigns and sensitization.

Like any other study, this study has some limitations. First, the results generated in this study may not be generalizable. However, the results provide context of the factors that influence COVID-19 vaccine acceptability among vulnerable populations such as refugees. Second, the results reported may suffer from desirability bias. For example, we were unable to ascertain the information that was reported by respondents such as face mask wearing. Third, the cross-sectional nature of the present study limits our ability to measure causality.

CONCLUSIONS

Overall, our study demonstrates that vaccine acceptance may not be universal. The study shows an association between adopting other COVID-19 prevention mechanisms especially face mask wearing and COVID-19 vaccine acceptance among refugees in Bidibidi settlement in northern Uganda. The study also shows that myths and misconceptions about the COVID-19 vaccine exist among refugees and this needs to be addressed through innovative social

Table 2. Distribution of COVID-19 vaccine acceptance by background characteristics

Variable	Intend to take vaccine if given adequate information		Chi-square (P-value)
	No	Yes	
Sex of respondent			2.00 (0.157)
Female	24.2 (92)	75.9 (289)	
Male	20.4 (127)	79.7 (497)	
Age of respondent			2.24 (0.326)
18-32	19.1 (65)	80.9 (275)	
33-47	23.7 (75)	76.3 (242)	
48+	22.7 (79)	77.3 (269)	
Level of education			1.07 (0.785)
No education	21.2 (49)	77.8 (172)	
Primary	19.8 (49)	80.2 (199)	
Secondary	23.5 (62)	76.5 (202)	
Tertiary	21.7 (59)	78.3 (213)	
Not concerned about getting infected			0.93 (0.335)
No	21.2 (177)	78.8 (657)	
Yes	24.6 (42)	75.4 (129)	
Uncertain if vaccine will stop COVID-19 transmission			4.88 (0.027)
No	19.3 (111)	80.7 (464)	
Yes	25.1 (108)	74.9 (322)	
Concerned about cost			0.01 (0.943)
No	21.9 (61)	78.1 (217)	
Yes	21.7 (158)	78.3 (569)	
Do not want to go to health facilities			11.10 (0.001)
No	19.1 (137)	81.0 (582)	
Yes	28.7 (82)	71.3 (204)	
General mistrust of COVID-19 vaccine			0.02 (0.896)
No	22.0 (100)	78.0 (355)	
Yes	21.6 (119)	78.4 (431)	
Too busy to go for a COVID-19 vaccine			0.43 (0.511)
No	21.6 (211)	78.4 (764)	
Yes	26.7 (8)	73.3 (22)	
Concerned about side effects			0.00 (0.962)
No	21.8 (213)	78.2 (764)	
Yes	21.4 (6)	78.6 (22)	
Total	21.8 (219)	78.2 (786)	

behavioral change strategies that are aligned to the context of refugees in Bidibidi refugee settlement. This study offers lessons that can inform planning and implementation of COVID-19 vaccine promotion campaigns in humanitarian settings particularly in LMICs in Africa that embody the similar characteristics, contexts and health systems challenges like those in northern Uganda.

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INSTITUTIONAL REVIEW BOARD STATEMENT

Permission to conduct this study was granted by the Mildmay Uganda Research and Ethics Committee.

INFORMED CONSENT STATEMENT

Written informed consent and assent was obtained from all subjects involved in the study.

Table 3. Factors associated with the intention to take a COVID-19 vaccine.

Variable	Unadjusted odds ratio (95%CI)	Adjusted odds ratio (95%CI)
Sex of respondent (RC = Female)		
Male	1.25 (0.92-1.69)	1.27 (0.91-1.77)
Age of respondent (RC = 48+)		
18-32	1.24 (0.86-1.80)	1.23 (0.84-1.79)
33-47	0.95 (0.66-1.36)	0.90 (0.62-1.30)
Level of education (RC = No education)		
Primary	1.16 (0.74-1.81)	1.15 (0.73-1.82)
Secondary	0.93 (0.61-1.42)	0.90 (0.59-1.40)
Tertiary	1.03 (0.67-1.58)	1.02 (0.65-1.55)
Frequency of wearing a face mask (RC = Always)		
Never	2.70 (0.80-9.10)	3.08 (0.90-10.58)
Sometimes	1.55 (1.13-2.13)*	1.77 (1.26-2.49)*
Not concerned about getting infected (RC = No)		
Yes	-	-
Uncertain if vaccine will stop COVID-19 transmission (RC = No)		
Yes	0.71 (0.53-0.96)*	0.70 (0.51-0.96)*
Concerned about cost (RC = No)		
Yes	1.01 (0.72-1.41)	0.96 (0.66-1.40)
Do not want to go to health facilities (RC = No)		
Yes	0.59 (0.43-0.80)*	0.61 (0.44-0.84)*
General mistrust of COVID-19 vaccine (RC = No)		
Yes	1.02 (0.76-1.38)	0.83 (0.59-1.16)
Too busy to go for a COVID-19 vaccine (RC = No)		
Yes	-	0.81 (0.33-1.98)
Concerned about side effects (RC = No)		
Yes	-	1.33 (0.50-3.50)
Number of observations	1005	1005

Note: * = $P < 0.05$; Reference Category (RC) in parenthesis.

DATA AVAILABILITY STATEMENT

The datasets used in this study are available from the corresponding author on reasonable request.

FUNDING

None.

AUTHORSHIP CONTRIBUTIONS

All authors contributed to the manuscript.

COMPETING INTEREST

The authors completed the Unified Competing Interest form at <http://www.icmje.org/disclosure-of-interest/> (available upon request from the corresponding author), and declare no conflicts of interest.

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