

BMJ Open Perspectives on the COVID-19 vaccine uptake: a qualitative study of community members and health workers in Zambia

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ABSTRACT

Objective Since introduction of the programme in April 2021, COVID-19 vaccine uptake has been low at less than 20%. This study explored community members' and health workers' perspectives on the COVID-19 vaccine uptake and its influencing factors in Zambia.

Study design A qualitative study employing focus group discussions (FGDs) and in-depth interviews (IDIs).

Study setting Sixteen primary healthcare facilities selected from Lusaka, Copperbelt, Central and Southern provinces.

Participants A total of 32 FGDs comprising local community members and 30 IDIs including health workers, traditional, religious and civic leaders (n=272). FGDs were separated based on age (youth and adults), sex (male and female) and place of residence (urban and rural).

Results Both FGD and IDI participants agreed that vaccine uptake was low. Limited knowledge, access to information, myths and misconceptions, negative attitude, low-risk perception and supply in remote areas affected vaccine uptake. Overall, FGD participants expressed limited knowledge about the COVID-19 vaccine compared with health workers. Further, FGD participants from urban sites were more aware about the vaccine than those from rural areas. Health workers perceived the vaccine to be beneficial; the benefits included prevention of infection and limiting the severity of the disease. Moreover, FGD participants from urban sites expressed a negative attitude towards the vaccine. They believed the vaccine conferred no benefits. By contrast, participants from rural communities had mixed views; they needed more information about the vaccine benefits. Participants' attitude seems to have been influenced by personal or family experience with the COVID-19 disease or vaccination; those who had experienced the disease had a more positive attitude. In contrast, most young people believed they were not at risk of the COVID-19 disease. Misinformation from social media influenced their attitude.

Conclusion These results provide starting points for future policies and interventions for increasing COVID-19 vaccine uptake.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Purposive sampling of participants comprising health workers and community members with different demographic and socioeconomic characteristics (sex: male and female; age; place and province of residence: urban and rural settings) allows for comparing and contrasting of participant views, which in turn provides an in-depth understanding of the subject under investigation.
- ⇒ Use of different data collection techniques (focus group discussions and in-depth interviews) as well as data sources allow for triangulation of findings and increases internal validity of the study.
- ⇒ Training data collectors and use of an inductive approach to data analysis increase the internal validity of study findings.
- ⇒ Conducting the study at the beginning of the COVID-19 national mass vaccination when the programme was still new in the country may have affected the views of the participants.
- ⇒ Use of the qualitative design affects external validity and limits generalisation of the study findings.

INTRODUCTION

SARS-CoV-2 has spread to most parts of the world, including Zambia.^{1 2} As at the end of August, 2022, a total of 332, 058 cases and 4016 deaths had been reported in the country.³ To prevent further spread of the virus and increased mortality in the country, the Zambian government enacted the public health statutory instrument number 22,^{4 5} which instituted preventive and control measures—restricting social gatherings (ie, work places, church services, weddings, kitchen parties, casinos, funerals), local and international travel, and closing public institutions such as schools and markets.⁶ In addition, the Zambian government implemented a national mass vaccination campaign⁷



following approval of the COVID-19 vaccines in developed countries.^{8–10} Initially, the COVID-19 national vaccination programme targeted the health workers and persons aged above 65 years.¹⁰ The criteria were later revised to include all persons aged 18 years and above.¹⁰ A second revision was made to include children aged 10 years and above. Three types of COVID-19 vaccines have been administered: Oxford/AstraZeneca, Sinopharm, John and Johnson and Pfizer vaccines. Access to the COVID-19 vaccine is voluntary and free in the country; people do not need to pay anything.¹¹ To be protected, one needs to receive two doses of the Oxford/AstraZeneca vaccine—8 weeks apart. On the contrary, only one dose of Johnson & Johnson vaccine is needed to be fully immunised.^{12 13}

Over the centuries, vaccines have been shown to be an effective way to combat outbreaks and the only efficient and reliable method for disease prevention.^{14 15} COVID-19 vaccines—with an efficacy ranging from 70% to 95%, have been shown to provide protection against the virus¹⁵ by preventing its spread in the community, mitigating the severity of the disease and reducing mortality among the infected people.^{16 17} Studies and ongoing clinical trials^{18–22} have shown that COVID-19 vaccines offer the best means to control the ongoing pandemic. They are effective in preventing a wide range of COVID-19-related outcomes, reduce symptomatic cases, hospitalisation, disease severity and death among the infected individuals. Nevertheless, national reports show that the vaccine uptake has been low in the country. At the end of August 2022, a total of 5 576 827 have been fully vaccinated with the AstraZeneca, Sinopharm and Johnson & Johnson vaccine since the commencement of the programme in April 2021. This represents a national vaccine coverage of 52.9% of the eligible population.²³

Limited supply and vaccine hesitance—the delay in acceptance or refusal of vaccination despite availability of vaccination services²⁴—have been attributed to the low vaccine coverage in the country. Vaccine hesitance has been reported both in Zambia and other countries, and has been shown to be an important obstacle to the fight against COVID-19.^{25–27} For example, in their recently published article, Mutombo *et al.*²⁸ observed that the gradual effort to distribute COVID-19 vaccines to low-income and middle-income countries (LMICs) is threatened by the ubiquitous vaccine hesitancy, especially in Africa, where it undermines efforts to fight the COVID-19 pandemic. A qualitative study²⁹ using focus group discussions (FGDs) with mothers who brought their children for measles vaccination in southern Zambia a few months before the COVID-19 national vaccination programme was implemented, reported that, although parents were willing to allow their children to receive the vaccine, majority expressed substantial uncertainty and hesitancy about receiving the vaccine themselves. The study also revealed beliefs around COVID-19 risk and severity, as well as vaccine safety and effectiveness affected the participants' intention to be vaccinated. However, vaccine

hesitance is not peculiar to the COVID-19 vaccine. For example, Garcia and others³⁰ reported low levels of Cholera vaccine acceptance among community members and health workers in the slums of Lusaka, Zambia. The authors also showed that religious beliefs and distrust towards western medicine, fear of injections and adverse events, low perceived need for immunisation and limited understanding of how vaccines work were important factors affecting acceptance of the cholera vaccine.

Although these studies provided important insights on vaccine hesitance and its contributing factors, most were conducted outside the country. The one conducted in Zambia explored mothers' intentions to receive the COVID-19 vaccine and not the actual behaviour. Moreover, the study was conducted before the COVID-19 was implemented. The other Zambian study focused on the Cholera vaccine. It thus, not clear how the Zambian population perceive the COVID-19 vaccination programme. Available evidence suggests that vaccine hesitance is complex and context specific, varying across time, place and vaccines. A study is therefore needed to explore people's perspectives and attitude towards COVID-19 vaccine uptake in the country. The aim of this study, therefore, was to explore community members' and health workers' perspectives on the COVID-19 vaccine uptake and the reasons that affect its uptake in Zambia. This information can provide insight to the COVID-19 vaccine hesitancy and the contributing factors, which in turn, can inform design of interventions to increase vaccine intentions and uptake in the general population. To date, no such study has been conducted in Zambia.

METHODS

Study design

This study employed a qualitative design comprising FGDs and in-depth interviews (IDIs) as the data collection techniques. FGDs have been used in public health research for over three decades now.³¹ They aim to explore participants' experiences, beliefs and attitudes towards a target behaviour, by using group processes to stimulate responses and gain insights through participants' exchanging views, questioning and challenging one another.³² IDIs enable the researcher to understand participants' lived experiences through their own words and perspectives.^{32 33} Use of both FGDs and IDIs allows for in-depth exploration and understanding of various aspects regarding the subject under investigation. The approach also allows for triangulation and corroboration of the FGD and IDI findings, which, in turn, increases the internal validity of the study.^{34 35}

Study setting

The study was conducted in 16 primary health facilities and their catchment communities—3 from Lusaka city, 2 each from Chongwe, Ndola, Masaiti, Kabwe, Chibombo and Kafue, 1 one from Mazabuka districts. Selection of health facilities was done in consultation with various

stakeholders including health staff working in the COVID-19 vaccination programme and health promotion departments at the provincial and district health offices, Zambia National Public Health Institute and Ministry of Health (MoH) headquarters. To be selected, health facilities needed to have been providing COVID-19 vaccination services as well as other COVID-19 prevention, control and care services including screening, contact tracing, isolation and treatment facilities. In addition, health facilities needed to be accessible by road during the study period. Health facilities from Lusaka and Copperbelt provinces were selected because they were COVID-19 epicentres due to huge populations and commercial activities; Central province is a transit area for traffic from Tanzania and the Democratic Republic of Congo in the north and north-east, respectively; Southern province is a transit region for travellers from the Southern region (South Africa, Zimbabwe, Namibia and Botswana)—all of which reported high numbers of COVID-19 cases.^{36 37}

From each health facility one community was selected, in consultation with the health facility managers and local community leaders. Efforts were made to ensure an equitable distribution of urban and rural communities in the study. To be included in the study, communities needed to be accessible with passable roads, and within 2 hours drive from the health facility. In addition, the local community leaders needed to authorise the team to conduct the study in the community.

Participants and sampling technique

FGD participants

A total of 32 FGD (n=242) were conducted with community members. Each FGD comprised between 6 and 10 participants (n=242). To gain insight into the differences and similarities in the participants' views, FGDs were separated based on age, sex and place of residence. Half of the FGDs (50%) were held in urban communities and the other half in rural settings. To compare and contrast the views based on sex, separate FGDs were held with male

and female participants. In addition, a total of eight FGDs were separately held with the youth to gain insight into their perspectives on the subject. Efforts were made to balance the eight FGDs on sex (four male and four female) and place of residence. Initially, a total of 40 FGDs (10 per province) were planned by the research team. However, after conducting 10 FGDs in Lusaka province (men=4, women=4, youth=2), the point of saturation was achieved (ie, no further substantial information was obtained from the participants). At this point, the research team decided to reduce the number of FGDs and conduct only a few more FGDs in the other districts. At the end, 24 FGDs were conducted with the adults (males=12, females=12) and 8 with the youth (18–24 years) (see table 1).

Using a purposive sampling technique, community health workers assisted by local community leaders (traditional and civic) conducted the recruitment of FGD participants from the local communities. Purposive sampling allows for selection of participants with similar experiences regarding the health behaviour under investigation (ie, perspective and attitude towards COVID-19 vaccine), while, at the same time, allowing for recruitment of participants with different demographic and socioeconomic characteristics—such as age, sex and place of residence and occupation. This, in turn, helps provide insight into the similarities and differences in the participants' experiences with regard to the health problem under investigation.

Recruitment of the participants was done in multiple steps. First, the research field supervisor together with the district health promotion officer held meetings with the local health facility staff, community health workers and community leaders to inform them about the study and its objectives, and to identify the communities where the FGD participants would be recruited from. Following this meeting, community health workers and local leaders called for a meeting to inform the community members about the study. Community members willing

Table 1 Distribution of FGDs

Province	Selected district	Health facilities	No of FGDs						Total
			Urban community			Rural community			
			Male	Female	Youth	Male	Female	Youth	
Lusaka	Chongwe	2	0	0	0	1	1	0	2
	Lusaka	3	3	3	2	0	0	0	8
	Kafue	2	1	1	0	0	0	0	2
Copperbelt	Ndola	2	1	1	0	0	0	0	2
	Masaiti	2	0	0	0	2	2	2	6
Central	Kabwe	2	1	1	2	0	0	0	4
	Chibombo	2	0	0	0	2	2	2	6
Southern	Mazabuka	1	0	0	0	1	1	0	2
Total		16	6	6	4	6	6	4	32

FGDs, focus group discussions.

to participate in the study were asked to register with the community health workers and leave their details (place of residence and phone number). A few days after the meeting, the community health workers contacted the potential participants to provide more details about the study and assess their suitability to participate in the study. The assessment was based on the participant eligibility criteria described below. Next, the community health workers compiled a comprehensive list of community members who were eligible to participate in the FGDs and made arrangements for the selected participants to come for the actual discussion to an agreed on place (usually the headman's place, school or church) on the set time.

In-depth Interviews

To gain insight into the views of the local health staff and community leaders, a total of 30 IDIs (n=30) were conducted. IDI participants were recruited from their places of work and homes. Health promotion officers helped recruit the health staff; community health workers recruited the community leaders. Following identification of the potential participants, the recruiting staff compiled a comprehensive list of IDI participants and contacted them before the day of the interview. Health staff were selected from the district health offices and local health facilities and comprised public health officers, clinicians, nurses and community health workers (n=16). Community leaders were selected from the local communities and included traditional, religious and civic leaders (n=10). In addition, staff (n=4) from non-governmental organisations (NGOs) working with the MoH in the provision of COVID-19 services at the local district level were included in the study.

Eligibility criteria

To participate in both the FGDs and IDIs, participants needed to be:

- ▶ Aged 18 years and above.
- ▶ Residing or working in the study area for not less than 3 months.
- ▶ Health workers involved in the COVID-19 vaccination programme from the selected primary health facilities.

Prisoners and mentally ill people were not included in the study.

Before each FGD/ IDI, written informed consent was obtained from each participant; those who could not read or write were asked to mark with an 'X'. To make it easy for the study participants to understand, the consent form (online supplemental material 1) was translated into the local language (Bemba, Nyanja and Tonga). After signing the consent form (online supplemental material 2), each FGD/IDI participant was asked to complete a short demographic questionnaire (online supplemental material 3). To make it easy for those who could not read or write, research assistants read the consent form and the short questionnaire and filled it in for them.

Training of data collectors

Research assistants were a group of six (three male and three female) final year Master of Public Health (MPH) students recruited from the Schools of Public Health at the University of Zambia (n=3) and Levy Mwanawasa Medical University (n=3) in Lusaka. MPH students were selected because they were skilled and experienced in qualitative research methods: facilitating FGDs and conducting IDIs. To avoid information concealment during FGDs and IDIs, efforts were made to select students who spoke both English and one or two of the local languages, Nyanja, Bemba or Tonga. Before commencement of the data collection process, research assistants underwent a 5-day training in FDG facilitation and interviewing techniques: 3 days of theory and 2 days of practical fieldwork. Topics covered during the 3 days theoretical training included: (1) basic principles of qualitative research, (2) objectives of the study, (3) FGD facilitation techniques, (4) interviewing techniques, (5) research ethics and informed consent in human subjects' research and (6) FGD and IDI interview guide. Phase 2 of the study was a practical exercise in FGD facilitation techniques, conducting interviews and obtaining informed consent. On the first day of the practical phase, the research assistants worked in pairs and took turns to facilitate an FGD with their fellow trainees. They also took turns interviewing each other. At the end of each FGD/IDI, research assistants were asked to provide feedback on each other's performance. At the end, the trainer also provided feedback and guidance on group dynamics, participant interaction, body language, avoiding conflict and managing it when it arises. On the second day, the team was taken into the nearby neighbourhood to facilitate FGDs with community members and conduct IDIs with health staff and community leaders. The FGDs and IDIs were transcribed and analysed, after which the FGD and interview guides were revised based on the analysed data and feedback from the data collectors.

Data collection

Each FGD was facilitated by a pair of research assistants: one facilitated the discussion and took notes, the other one was in charge of the digital voice recorder. As they facilitated the FGDs, research assistants ensured that each participant was given an opportunity to speak; they also tactfully controlled the dominant individuals and prompted the passive ones to speak. They also ensured that the discussion flowed smoothly among the participants without turning it into an interview, personal attack or conflict. Where necessary, the facilitator asked for elaboration, clarification or probed for detail. Interviews were also conducted by a pair of research assistants: one conducted the interview and took notes; the other recorded the interview with a digital audio recorder. IDIs were conducted at the participant's preferred place including the office or home. On average, each FGD lasted between 1 hour and 1.5 hours. IDIs lasted between

30 and 45 min. To ensure quality in data collection, a digital voice recorder was used for both IDIs and FGDs.

Data collection tools

FGDs/IDIs were conducted using a paper-based, FGD/interview guide (online supplemental material 2). The FGD/interview guide had predetermined themes, including: (1) perspectives on acceptance of the COVID-19 vaccine and (2) factors affecting vaccine uptake. The second theme had several probes including knowledge and information sources, and attitude towards COVID-19 vaccine. The same interview guide was used for both the FGDs and IDIs, with minor elaboration for the IDIs to elicit some detail. During the FGDs, the focus was on the community perspectives; for IDIs the focus was more on the participant's perspectives regarding the issues under investigation. In addition, a short questionnaire (online supplemental material 3) was prepared to collect FGD and KII participants' demographic, socioeconomic and vaccination data. To ensure internal validity, the FGD/interview guide went through a rigorous development process. First, the principal investigator with vast experience in qualitative research and familiar with the subject, drafted the initial version. The themes in the FGD/interview guide were adapted from various sources, including review of the available literature on COVID-19 vaccine and the researchers' experience in qualitative research methods. Next, the document was shared with the research team members for their comments and feedback. The document was revised based on the research team's comments. Two independent bilingual experts translated the document into the local languages, Bemba, Tonga and Nyanga. The translated document was pretested in an urban slum of Lusaka during the research assistant training, after which both the KII and FGD recordings were transcribed and analysed. The tool was then revised based on the pre-test findings and feedback from the data collectors.

The data management and analysis

Audiorecordings from the FGDs and IDIs were transcribed and translated into English by four independent people who never participated in the data collection, and were proficient in English and the local language. To check for accuracy, 10% of the transcripts were back-translated into the local language. NVivo V.11 MAC was used for coding and analysis. To make it easy to compare differences and similarities in the participants' perspectives by different attributes, a separate codebook was created for FGD and IDI data using a framework based on the FGD/interview guide. An inductive approach to data analysis was used, ensuring that subthemes were derived from the predetermined themes and grouping all similar statements concerning particular themes. In order to determine similarities and differences in the responses, findings for the FGDs and IDIs were analysed separately, according to the FGD participants: age (adults vs youth), sex (male vs female) and place of residence (urban vs

rural). Summary and descriptive statistics were computed for FGD and IDI participants' demographic characteristics using SPSS V.25 (IBM SPSS Statistics 25)

Quality assurance and control

The team ensured the quality of data collection by: (A) recruiting skilled and experienced data collectors who were trained for 5 days on the theoretical and practical aspects of the study, (B) ensuring that data collectors worked in pairs, (C) using an interview guide (translated into the local language), (D) using a digital voice recorder and taking extensive notes during the FGDs and interviews, (E) by comparing notes and voice recordings each day after the interviews, (F) using experienced and independent staff to transcribe the recordings from the FGDs and KIIs.

Patient and public involvement

Study participants and the public were not directly involved in the design of the study. Rather, the study was designed in response to the call for consultancy for a research proposal on COVID-19 vaccine issued by the COVID-19 Centre, funded by GIZ in Lusaka. However, selection of the primary health facilities, communities and study participants was done in collaboration with stakeholders from the provincial, district and primary health facility and community levels. First, prefield meetings were held with the provincial and district managers to select primary healthcare facilities and local communities to be included in the study. Next, local district managers selected the primary health facilities to be included in the study. In turn, primary healthcare facilities together with the local community leaders recruited the FGD participants and made arrangements for them to come for the actual discussion; they also contacted and prepared a comprehensive list of IDI participants. Finally, a report was written and shared with the funding organisation, GIZ and the COVID-19 centre for dissemination of study findings.

RESULTS

Demographics

Our sample comprised a total of 272 respondents (FGD=242 and IDIs=30). The majority (51.5%) of the participants were female, with a mean age just above 34.04 years and between 2 and 3 children. Almost half (47.1%) of the participants were married. Most participants (55.2%) had secondary school education, 18% had tertiary level education and 1.5% had never attended school. Majority (62.1%) of the participants had an average income of less than K500 per month. Most of the participants (69.5%) mentioned that they were aware about COVID-19, and 52.9% reported that the COVID-19 vaccine was beneficial. Less than 1/10th (9.9%) of the respondents were vaccinated (see table 2).

Theme 1: perspectives on acceptance of the COVID-19 vaccine

Analysis of the findings from the short demographic questionnaire administered to the respondents before each

**Table 2** Demographic characteristics of the respondents (n=272)

Variable	Mean (SD)/n (%)
Age	34.03 (13.64)
Sex	
Female	140 (51.5)
Male	132 (48.5)
No of children	2.5 (2.6)
Marital status	
Single	109 (40.1)
Separated	15 (5.5)
Married	128 (47.1)
Widow	16 (5.9)
Cohabiting	3 (1.1)
Religious denomination	
Catholic	63 (23.2)
Seventh day adventist	40 (14.7)
Pentecostal	91 (33.5)
Jehovah's witness	16 (5.9)
New Apostolic Church	27 (9.9)
United Church of Zambia	24 (8.8)
Baptist	11 (4.0)
Level of education	
Never attended	4 (1.5)
Grades 1–4	8 (2.9)
Grades 5–7	60 (22.1)
Grades 8–9	60 (22.1)
Grades 10–12	90 (33.1)
College	28 (10.3)
University	21 (7.7)
Level of income (in Zambian Kwacha)	
<500	169 (62.1)
500–999	37 (13.6)
1000–1499	26 (9.6)
1500–1999	6 (2.2)
>2000	34 (12.5)
COVID-19 vaccine knowledge	
Yes	189 (69.5)
No	83 (30.5)
COVID-19 vaccine beneficial	
Yes	144 (52.9)
No	115 (42.3)
Don't know	13 (4.7)
Vaccination status	
Yes	27 (9.9)
No	265 (90.1)

FGD and IDI showed that less than 1/10th (9.9%) of the total sample (FGD and IDI participants) had received the vaccine (table 2). Out of the 27 (9.9%) that reported being

vaccinated, 18 (66.7%) were health workers. Our analysis of IDIs also confirmed that most health workers and participants from the NGOs had a positive attitude towards the COVID-19 vaccine and were willing to be vaccinated. Both the community leaders and participants from the NGOs confirmed that they had accepted the vaccine and that many people were willing to be vaccinated. They clarified that the low vaccine coverage reported, especially in rural areas, was a result of the limited access, low supply and stock-out of the vaccine. They mentioned that the vaccine was mainly available and administered in the urban health facilities. Those that lived in remote areas, far from the health facilities, had difficulties accessing the vaccine.

The vaccine has been accepted.... because people have been vaccinated; if they had not accepted the vaccine, they wouldn't have been vaccinated (**IDI informant, health worker, Ndola district**).

They aren't so many people that have been vaccinated. It is because the people vaccinating are rarely seen here (**Community leader, IDI participant, Pemba district**).

For those who live in far-flung places, we don't know if they get vaccinated. I think it would be best to ask them (**Community leader, IDI participant, Mazabuka district**).

Most adult participants (both male and female) confirmed that they had not been vaccinated. However, most expressed willingness to be vaccinated. Especially, participants from the rural sites mentioned that many people would accept the vaccine if they had adequate information about its benefits and if it were made available in the health facilities. Our analysis showed no much difference between male and female FGD participants with regard to their attitude towards the COVID-19 vaccine and their intention to be vaccinated.

We can accept the vaccine, but we need sensitisation because even when we were going to school, our parents would tell us whether to accept the vaccine or not (**FGD participant, Lusaka**).

In contrast, analysis of FGD findings showed a striking difference in perspectives between the youth and adult participants. Most youth participants (from both the urban and rural areas) believed that the vaccine was not beneficial and confirmed that most young people had not accepted it.

We have not accepted the vaccine because we don't know how it's going to affect the life of someone in future. In short, we don't know what the life span of people will be. This is the reason why we have not accepted it in our communities (**Youth FGD participant, Kabwe district**).

Theme 2: factors affecting acceptance of the COVID-19 vaccine

Our analysis of both FGD and IDI data showed various factors contributing to the low acceptance of the vaccine

among study participant including lack of knowledge and information, myths and misconceptions, and negative attitude towards the vaccine. These factors are presented below.

Knowledge about COVID-19 vaccines

Overall, IDI participants (ie, health workers and participants from the NGOs) expressed better knowledge about COVID-19 vaccine than the FGD participants. Health workers and participants from NGOs knew the types of the COVID-19 vaccines, their mode of administration, benefits and side effects. They also knew about the COVID-19 national vaccination programme. Although most community members (both IDI and FGD participants) perceived the vaccines to be beneficial, majority lacked information about the vaccine—the various types, mode and frequency of administration. They explained that many would accept the vaccine if they had adequate information. Limited access to information, especially in rural areas, was cited as the main reason for the low acceptance of the vaccine. Community leaders and health workers were unanimous on the information gaps in their communities.

People don't have the truth about the vaccine. The health team should come to educate us on how the vaccine works. They should come to communities, gather people and teach them about the COVID-19 vaccine (**Female FGD participant, Masaiti district**)

A contrast was noted among the FGD participants with regard to their knowledge about the vaccine. In general, participants from urban areas expressed better knowledge than those from rural communities. Differences were also noted between the adults and youth FGD participants. Although most youth confessed that they did not know much about the vaccines, they explained that young people had heard about the vaccine, especially those from urban areas.

We know about the COVID-vaccine...most of us youth have heard about COVID-19 and know about the new vaccine (**Youth FGD Participant, Chainda, Lusaka city**)

Limited access to information about the COVID-19 vaccine

Overall, our findings show that there was limited access to correct and quality information about the COVID-19 vaccine among most community members who participated in both the FGDs and IDIs. Limited access to information was mentioned as a major reason for the low vaccine acceptance among the participants. Participants from urban settings had better access to information than those from rural areas. Both the IDI and FGD participants confirmed that mass media (radio, television (TV)), internet and social media were the main sources of information on the COVID-19 vaccine.

A contrast was observed in perspectives on the access to information between the FGD participants from urban

and rural settings. Most adult FGD participants from urban sites confirmed that they had access to the major sources of information—media (radio and TV). However, they complained that they could not understand most messages on TV and radio because they were in English. They observed that broadcasting the same messages in local languages would greatly help increase community awareness about the vaccine.

Many people get the information from the radio and TV. They listen to the radio and TV to hear what the Minister is saying. (**Community leader, IDI participant, Chongwe district**)

Participants from rural sites did not perceive the media (TV and radio) and internet to be the main sources of COVID-19 information. Poor TV and radio signal reception limited their access to information. Rather, they received information from the health staff, schools, churches, community health workers and community leaders (during community meetings). Health staff disseminated the information about the COVID-19 vaccine when people visited health facilities for various health needs. Community health workers shared the information during community meetings; community members, in turn, would share the information with their families and social networks.

Many people don't watch TV here....they try to listen to the radio... They have TVs but they can't see anything....the signal is poor. Government needs to improve TV and radio signal here (**Health worker, IDI participant, Pemba district**)

Although community health workers played an important role in disseminating information about the COVID-19 vaccine in the community, most IDI and FGD participants (mainly community leaders and health staff) expressed concerns about the accuracy of the information. They complained that most community health workers did not have adequate knowledge about the vaccine and that, in some instances, the information was incorrect and distorted. As a result, most people did not trust the information they received from the community health workers. They suggested that people in their communities needed more sensitisation and education about the COVID-19 vaccine. They bemoaned that the local health facility staff did not do much to disseminate the information about the COVID-19 vaccine in their communities. Asked on the kind of information their communities needed, most community health workers and leaders mentioned information on the vaccine benefits, safety and the associated risks or side effects. They believed that accurate and adequate information would help the community members make an informed decision about taking the vaccine.

People in this area know nothing about the vaccine because they have never been sensitised. We need to be told what we can do so that we have an idea, but

the way it is at the moment, we don't have any idea (**Community leaders, IDI participant, Pemba district**)

We just hear from others in the community, because here most of the things we just hear them from these health workers when they pass and tell us, so we also believe what they tell us (**Female FGD participant, Masaiti district**).

In contrast, most young people, especially from urban sites, cited the internet and social media accessed through their phones as their main sources of information for COVID-19-related matters including the vaccine. However, poor internet and mobile phone signals in rural and remote areas made it difficult for most young people to access information.

Most of us use our phones to get information.... we get everything from social media on our phones (**Youth FGD participant, Ndola city**)

Myths and misconceptions about the COVID-19 vaccine

Our findings elicited many myths and misconceptions about the COVID-19 vaccine among both the IDI and FGD participants. Especially FGD participants were unanimous on the existence of various myths and misconceptions concerning the vaccine. These myths and misconceptions had a negative influence on people's attitude towards the COVID-19 vaccine and seem to be some of the most important reasons for the high vaccine hesitance.

One of the myths held among most FGD participants (especially in urban settings) was that western countries brought the vaccine in order to eliminate the African population. According to them, westerners brought the vaccine because they wanted to collect people's blood and kill them. They were concerned why certain vaccines given to the Africans had been rejected in Western countries.

There is a rumour that people in our community are spreading that the medicine [vaccine] was made to kill us Africans because we are too many. So even as we accept that this must be true (**Community leader, IDI participant, Ndola**).

The other strongly held belief by both male and female FGD participants from urban and rural sites (but not the youth) was that the vaccine was brought into the country for political reasons. They explained that politicians had gone into some contractual agreement with western countries to administer vaccines to their people in exchange for money. The money would then be used for political campaigns since it was a presidential and parliamentary election year (2021) in the country.

Some people are saying that they have brought the vaccine in an election period because they want them [community members] to die after giving them the injection so that they are sacrificed (**Female FGD participant, Lusaka**)

The other firmly held belief (especially among rural participants) seemed to be influenced by participants' religious background or inclination. They explained that people believed that the COVID-19 vaccine was part of the mark of the beast (666) mentioned in the Bible (see Revelation 13) and that those who receive the vaccine are initiated into the ritual.

Some people say this is 666, that's what I heard others say. So that's why we are scared, because we think that they will initiate us into the 666 rituals (**Female FGD participant, Kabwe**).

Other beliefs seem to be influenced by health reasons. For example, both the FGD and IDI participants from rural and urban settings explained that people in their communities believed that the vaccine is a slow poison which health staff introduced into the body. They believed that the vaccine dries up and makes the blood clot and that one will die after several months or years. Some participants also believed that after receiving the vaccine, one would start fitting and die immediately after being vaccinated; those who survived would only live for a few years afterwards.

Some say when you get vaccinated, you will just live for a few years, and then you get sick and die; that is why we are scared of getting vaccinated (**Traditional leader, IDI participant, Mazabuka district**).

Attitude towards the COVID-19 vaccine

Overall, our analysis of the data from the short demographic questionnaire showed that half (52.9%) of participants (both the FGD and IDI participants) perceived the vaccine to be beneficial (table 2). However, analysis of FGD and IDI data shows that participants expressed different types of attitude towards the COVID-19 vaccine: positive, negative and ambivalent. The detailed findings on these attitudes are presented below.

Most health workers and some FGD participants from both urban and rural settings expressed a positive attitude towards the COVID-19 vaccine and perceived it to be beneficial. Perceived benefits were that the vaccine confers protection against the coronavirus infection among the vaccinated individuals. They also believed that the vaccine reduces the chances of a vaccinated individual to transmit the virus to other people. The other cited benefit was that the vaccine reduces the risk of developing severe disease. If one got infected, the disease would not be as severe as it is among those who are not vaccinated.

Most FGD participants expressed a negative attitude towards the COVID-19 vaccine. Interestingly, our findings did not show differences in attitude between male and female participants. Rather, rampant myths and misconceptions about the COVID-19 vaccine and personal or family's previous experience with the COVID-19 disease or vaccination seemed to have influenced the participants' attitude. In general, individuals or families who had

not experienced the disease or seen someone suffer or die from COVID-19 disease expressed a negative attitude. They believed that the vaccine was not beneficial. Further, lack of information (especially in rural areas) and wide spread misinformation about the COVID-19 vaccine—such as exaggeration of the vaccine side effects—seemed to influence participants' attitude towards the COVID-19 vaccine.

I know the benefits are building our immunity and we don't get a chance to catch COVID-19, though people are saying even those that got the jab have tested positive, they don't have severe disease (**IDI participant, Health worker, Ndola district**).

Moreover, cultural beliefs and stigma about COVID-19 seem to have affected many people's attitude and prevented them from accepting the vaccine. Especially health staff explained that some people did not believe in the existence of COVID-19. They cited examples of communities where a family member would suffer and die from COVID-19, but relatives would hide the information and mention another disease, such as asthma, as the cause of death. Because of denial and low-risk perception, such people refused to take the vaccine.

Lack of confidence in the health workers (who came from outside their communities) was perceived as an important factor influencing participants' attitude towards the vaccine, especially among the community leaders and FGD participants from rural communities. They argued that people in their communities would only be convinced to take the vaccine if the health workers from their local communities administered the vaccine.

The people to vaccinate us must be from our community; otherwise, when an outsider comes to vaccinate us, we will be sceptical because we don't know them (**Village headman/IDI participant, Chongwe district**).

In addition, most participants from rural towns and communities expressed an ambivalent attitude towards the vaccine; they were not sure about the benefits of receiving the vaccine. They argued that they did not know the vaccine benefits because they had not seen anyone take it. They explained that they would only believe in the vaccine benefits if someone or a group of people who had taken the vaccine went to explain how they felt after receiving it.

We do not know the truth, and we are scared, that is why we don't go for the vaccine injection. We have been told that the vaccine injection is harmful to consumers (**Male FGD participant, Masait district**).

What we are saying is that they should bring us someone who has been vaccinated so that they tell us about the goodness of being vaccinated (**Male FGD participant, Chongwe district**).

We don't know how these things came, we are scared that we may die, and we can also be infected with other diseases. We don't see people who have been

vaccinated, to tell us how they feel (**Civic leader, IDI participant, Masaiti district**).

In general, young FGD participants from both urban and rural communities had a negative attitude towards the COVID-19 vaccine. Low-risk perception seemed to influence their attitude towards the vaccine. They believed that they were not at risk of getting the infection and that those who got infected would have mild or no symptoms at all. They also believed that the vaccine was not beneficial. Access to the internet and use of social media among the young people (especially from the urban communities with good internet connectivity) seems to have exposed them to incorrect information regarding the benefits and side effects of the vaccine. This, in turn, influenced their attitude. In addition, poor mobile phone signals, TV and radio reception in rural areas made it difficult for most young people to access information about the COVID-19 vaccine.

DISCUSSION

The aim of this study was to explore community members' and health workers' perspectives on the COVID-19 vaccine and the reasons that affect its uptake in Zambia. Overall, our findings showed low vaccine uptake among the participants. Several factors including limited knowledge, access to information, myths and misconceptions, negative attitude towards the vaccine and low-risk perception about the COVID-19 disease contributed to vaccine hesitance among the participants.

Our finding corroborates previous studies from LMICs and elsewhere which reported vaccine hesitance among health staff and community members. For example, a study conducted in Zambia²⁹ reported substantial uncertainty and hesitancy about receiving the vaccine among parents, despite expressing high intentions to have their children receive the COVID-19 vaccine. Similar findings were reported by Botwe *et al*³⁸ in Ghana who reported a vaccine hesitance of 44% among the health staff. These findings are also consistent with those by Baniak *et al*³⁹ who reported vaccine hesitance among nursing staff in the USA. The authors concluded that, despite the increase in vaccine uptake during the active vaccine rollout, there was still widespread and sustained hesitancy and unwillingness to take the vaccine. Other authors, Wong *et al*⁴⁰ and Luk *et al*⁴¹ in Hong Kong also reported a low intention to vaccinate. They concluded that vaccine hesitance was a major challenge to effective programming and implementation. Thus, formulation and implementation of evidence-based vaccination strategies focusing on increasing the intention to take the vaccine has a potential to mitigate vaccine hesitance.

Limited knowledge about the COVID-19 vaccine, its benefits and potential harms, was found to be one of the important barriers to effective vaccine uptake. The media (TV, radio and internet) play an important role in informing people about the vaccine. However, poor TV



and radio signal reception in rural and remote areas limit access people's access to these important sources of information. This explains the stark contrast in the levels of knowledge about the COVID-19 vaccine between participants from rural and urban communities. Moreover, our findings suggest that social media accessed through the internet on mobile phones is a major source of information among young people. However, poor internet and mobile phone signals in rural areas make it difficult for young people to access information. This finding is consistent with previous studies^{42–46} which reported low knowledge levels concerning the COVID-19 vaccine. Interestingly, these studies showed that knowledge about the vaccine was positively correlated with one's vaccine uptake. This finding suggests that information is an important factor influencing vaccine acceptance, and that lack of information affects peoples' willingness to take the vaccine. This result is consistent with the theory of reasoned action which highlights the importance of background factors such as knowledge and access to information in influencing people's intention to adopt a health behaviour such as COVID-19 vaccination.^{47–49} Public health interventions aiming at mitigating vaccine hesitancy and increasing vaccine uptake could benefit from focusing on knowledge and access to information about the COVID-19 vaccine, its benefits and safety.

Widespread myths and misconceptions about the reality of the COVID-19 disease and the benefits of the vaccine appear to be an important factor contributing to vaccine hesitance among our sample. These myths and misconceptions seem to be more rampant in rural communities where there is limited or no access to accurate information about the benefits and safety of the vaccine. For example, due to limited access to accurate information, many people in rural communities depend on the information from health workers and traditional leaders. Our findings suggest that such information, though important, is either inadequate or inaccurate with a potential to be misinterpreted. When people discover that such information is inaccurate untrustworthy, they seek alternative sources such as social media—which may also be misleading, resulting in the emergency of conspiracy and rampant myths and misconceptions.⁴⁹ However, especially in urban areas the situation is different; most myths and misconceptions seem to be influenced by the incorrect information spread by social media users, especially young people, with ready access to the phone and internet. For example, many participants (both FGDs and IDIs) believed that the vaccine is a poison: it dries up one's blood, causes it to clot and eventually kills the victim. Our findings suggest that these strongly held beliefs have a negative influence on people's intention to take the vaccine. These findings corroborate those reported elsewhere^{50–53} regarding the importance of social media in propagating myths and misconceptions about the vaccine. These findings are also consistent with previous studies, for example, Bertin *et al.*,⁵⁴ which reported that myths and misconceptions do not only instil fear among the people, but also influence

them not to take the vaccine. Public health interventions can benefit from provision of correct and accessible information to prevent and address myths and misconceptions which negatively influence people's perspectives and adoption of health behaviour, such as vaccine uptake. Thus, increasing access to correct information in the community has the potential to prevent and address the widespread myths and misconceptions about the vaccine and help mitigate vaccine hesitance.⁵⁵

Our findings suggest that attitude towards the COVID-19 vaccine has an important influence on the intention to take the vaccine. Although half of the participants perceived the COVID-19 vaccine to be beneficial, most had mixed attitudes towards the vaccine: positive, negative and ambivalent. Participants' attitude seems to have been influenced by various factors including place of residence, age, access to information, myths and misconceptions about the vaccine, and one's experience with the COVID-19 disease and the vaccine. Participants who had either experienced the disease, seen a friend or family member suffer from the disease expressed a positive attitude towards the vaccine compared with those who had not. Similarly, those who had either been vaccinated, seen or heard about someone who had been vaccinated appreciated the benefits of the vaccine and expressed a more positive attitude than those who had no such experience. Protection against COVID-19 and reduction in the severity of the disease if one got infected were the main perceived benefits. Perceived benefits appear to play an important role in influencing people's attitude towards the vaccine. Participants who perceived no benefits from the vaccine expressed a negative attitude. This finding is in keeping with the reasoned action approach which postulates that, before engaging in a healthy behaviour, people evaluate the benefits against the risks.⁵⁶ An individual's attitude, therefore, will depend on their evaluation of the perceived benefits compared with the risks. Those who perceive more benefits are likely to have a positive attitude towards the target behaviour, and possibly adopt it. This finding is also consistent with those reported by Elhadi *et al* in Libya.⁵⁷ These authors found that people who had a family member or friend infected with COVID-19 were more likely to accept the vaccine. Strategies that use a collaborative approach with community role models who have either experienced the disease or received the vaccine have the potential to change community attitudes towards the vaccine and possibly increase vaccine uptake.

Finally, our findings on low-risk perception and personal susceptibility to the COVID-19 disease, especially among young people, are worthy noting. It appears that young people's 'false sense of safety'—that they are not susceptible to the COVID-19 disease and that, if they get infected, the disease would not be severe—seem to influence their attitude towards the vaccine. Access to social media and incorrect information from the internet, especially among the young participants from urban communities, appears to contribute to the low-risk perception and vaccine hesitance. Interestingly, we did

not find a striking difference in risk perception between the male and female participants or according to place of residence (urban or rural). This finding contradicts Elhadi *et al*⁵⁷ who reported low vaccine hesitance among young people—that, compared with older people, young people were more likely to accept the vaccine. However, this finding is in line with Lazarus *et al*⁵⁸ who (in their survey of over 13 420 people from 19 countries) reported that young people were less likely to accept the vaccine than older people. The finding is consistent with previous studies that reported that age, and not sex, had a significant association with one's attitude towards acceptance of the vaccine. These studies also reported a positive correlation between age and vaccine acceptance. They also showed that high risk perception about the severity and one's personal susceptibility to the disease, benefits from the vaccine, cues to action and trust in the healthcare system or vaccine manufacturers were positive correlates of vaccine acceptance. Interventions that use social media to provide correct information to young people—about their personal risk and susceptibility to the disease—has a potential to mitigate vaccine hesitance among this age group. To be successful, such interventions should focus on addressing behavioural beliefs, risk perception and outcome expectancy.⁵⁹

Study limitations

Potential limitations of our study should be noted. First, this study was conducted at the beginning of the COVID-19 national mass vaccination programme in the country when people's knowledge about the vaccine was still limited; it is not clear how knowledge in the community has evolved over time. Second, like other qualitative study designs, this study could not establish a causal link between knowledge and attitude, and vaccine uptake. Further research with a longitudinal quantitative design is required to measure knowledge and attitude, and test their relationship with vaccine uptake in order to establish the causal pathway.

Nevertheless, we believe that use of FGDs and IDIs comprising adult male and female as well as young participants from both urban and rural settings provided in-depth information on vaccine uptake and the influencing factors, based on the views of the health workers and community members. We believe this study design increased the validity of our findings. Furthermore, selecting participants (both community members and health staff) from both urban and rural settings, increased the internal validity of the study. It also provides a balanced view of the Zambian people's perspectives on the subject under investigation. Our study also highlights the importance of using an integrated community-based approach to maximise vaccine uptake. This approach is in accordance with the WHO guidelines,⁶⁰ which suggest that a comprehensive approach, targeting multiple facets of social interaction, is more likely to dispel COVID-19 myths and misconceptions, and address vaccine hesitancy. Thus, our findings can serve as a basis for policy and

intervention design to mitigate vaccine hesitance and increase vaccine uptake. To our knowledge, no such study has been conducted in Zambia; this is the first one.

CONCLUSION

Our findings demonstrate low vaccine uptake among our participants; it also highlights several factors—including limited knowledge and access to information, myths and misconceptions, negative attitude towards the vaccine and low-risk perception about COVID-19 disease—which affect vaccine uptake. These results can provide starting points for future Public health policies and interventions which, in our opinion, should focus on: (A) increasing access to information and knowledge about the benefits and safety of the vaccine; (B) addressing myths and misconceptions about the vaccine; (C) increasing risk perception and perceived personal susceptibility to the COVID-19 and its severity, especially among young people; (D) making the vaccine accessible, especially in the rural and remote areas; (E) identifying role models in the community who have either experienced the disease or received the vaccine; (F) establishing linkages and collaboration between health workers and role models; (G) establishing a community operational and vaccine delivery mechanism through strengthened linkages with key community leaders such as local traditional, civic and religious leaders, and (H) addressing systemic barriers such as human resource shortage and stock-outs of the vaccine to increase access to the vaccine in the rural and remote communities.

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