A knowledge, attitudes and practices study on COVID-19 vaccines in Malawi

By

Chrissie Thakwalakwa, Tawonga Mwase-Vuma, Austrida Gondwe, Chipo Mchenga and Alister C. Munthali

Submitted to: UNICEF Malawi

Date: 23rd November, 2021

1.0 INTRODUCTION 4
1.2 COVID-19 vaccine hesitancy 6
1.3 Objectives of the Study 6
1.3.1 Overall objective 6
1.3.2 Specific objectives 7
2.0 STUDY DESIGN AND METHODS 8
2.1 Study setting and period 8
2.2 Study design 8
2.2.1 Desk review and social listening 8
2.2.2 Household survey 10
2.2.3 Focus group discussions (FGDs) 11
2.2.4 Interviews with key informants 11
2.2.5 Eligibility Criteria 12
2.2.6 Data collection instruments 12
2.3 Data management and analysis 12
2.4 Ethical considerations 12
2.4.1 Informed consent 12
2.4.2 Confidentiality 13
2.4.3 COVID-19 pandemic 13
2.4.4 Ethical approval 13
3.0 RESULTS 14
3.1 Respondent's background characteristics 14
3.1.1 Demographic characteristics 14
3.1.2 Respondents knowledge on COVID-19 and COVID 19 Vaccine 15
3.2 Sources of information about COVID 19 and COVID 19 Vaccine 21
3.2.1 Sources of information about COVID 19 and COVID 19 Vaccine 21
3.2.2 Most preferred and trusted sources of information about COVID 19 and COVID 19 Vaccine 23
3.3 signs and symptoms of COVID 19 25
3.4 Decision process of getting the COVID-19 vaccine 25
3.4.1 COVID-19 vaccine safety 27

3.4.2 Media reports on COVID-19 vaccine 28
3.5 Communication channels 29
3.5.1 Type of information required 29
3.5.2 Format of COVID-19 information 29
3.5.3 Ways of communicating COVID-19 vaccine 29
3.5.3.1 Chiefs 30
3.5.3.3 Involving people from the community 32
3.5.3.4 Other communication strategies 32
3.5.3.5 Engage those who have been vaccinated 33
3.6 Attitudes regarding COVID-19 vaccine 34
3.7 Barriers to accessing COVID-19 vaccine 36
3.7.1 Side effects of being vaccinated against COVID-19 40
3.7.2 Misperceptions about COVID-19 vaccines 40
3.7.3 Non-availability of vaccines 41
3.7.4 Long distances to vaccination sites 42
3.7.5 The perception that vaccines are for children 42
3.7.6 Religious beliefs 43
3.7.7 The perception that COVID-19 is not a problem 43
3.7.8 No vaccines for other diseases yet 44
3.7.9 Experiencing deaths in the community relating to COVID-19 vaccine 44
3.7.10 Cash transfer programme for COVID-19 patients 44
3.7.11 One can still get COVID-19 after being vaccinated 45
3.7.12 Health workers getting allowances 45
3.8 Factors that can encourage people to be vaccinated against COVID-19 46
3.8.1 Conducting a comprehensive awareness programme on COVID-19 vaccines 46
3.8.2 Make COVID-19 vaccine compulsory 47
3.8.3 Establish health facilities/Provide health workers 47
3.8.4 Provide evidence that COVID-19 vaccine works 48
3.8.5 If someone is vaccinated and does not experience side effects 48
3.8.6 COVID-19 vaccine as a requirement for people to get passports 49
3.8.7 Conduct door to door vaccinations against COVID-19 49
3.9 Practices regarding COVID-19 vaccine 49
3.9.1 Willingness to get the COVID-19 vaccine 49

3.9.1 Reasons for unwillingness to get the COVID-19 vaccine 50
3.9.2 Willingness to recommend the COVID-19 vaccine 52
3.9.3 Levels of COVID-19 vaccination 53
3.9.3 Descriptive social norms following vaccination 54
3.9.4 Factors associated with getting a COVID-19 vaccine 55
4.0 DISCUSSION 58
5.0 CONCLUSIONS AND RECOMMENDATIONS 59
REFERENCES 62
10.0 Annexes 63

1.0 INTRODUCTION

1.1 Background

Coronavirus disease (COVID-19) was first reported in Wuhan City, Hubei Province of China in December 2019. The Chinese Authorities confirmed that they had identified a novel coronavirus as the cause of pneumonia in the first week of January 2020. On 11th March 2020, the World Health Organisation (WHO) declared COVID-19 a global pandemic. To date, COVID-19 has spread to more than 150 countries, including over 10 countries in East and Southern Africa. The pandemic has affected more than 210 million people and claimed over 4.5 million deaths[1] while causing unparalleled social and economic hardships across the globe. The initial response to the pandemic focused on promoting protective behaviours namely social distancing, the use of face masks and frequent handwashing with soap.

The first case of COVID-19 was recorded in Malawi on April 2, 2020. In the following weeks, sporadic transmission clusters emerged in large cities, and additional importations of COVID-19 cases occurred among migrants returning primarily from South Africa, which was the African country with the largest documented outbreak at the time. In response, the Government of Malawi (GoM) declared COVID-19 a national disaster and adopted several measures, including closing schools and universities, implementing COVID-19 screening at border posts, and restricting attendance of public events. The Ministry of Health (MoH) encouraged the adoption of protective behaviors such as increased hand washing, physical distancing, using face masks, and working from home. A national lockdown was announced on April 18, 2020. However, its implementation was prevented by an order of the Malawi High Court. The incidence of COVID-19 then increased in June and July before starting to decline in August, 2020. Malawi has recorded 61,843 confirmed COVID-19 cases and 2,302 deaths as of November 15, 2021[2].

In May 2020, the 73rd World Health Assembly issued a resolution recognizing the role of extensive immunization as a global public-health goal for preventing, containing and stopping transmission of COVID-19[3]. Promoting the uptake of vaccines (particularly those against COVID-19) will require understanding whether people are willing to be vaccinated, why they are willing or unwilling to do so, and the most trusted sources of information in their decision-making process on whether to be vaccinated against COVID-19 or not . Published research carried out largely in high-income countries cites concerns about the safety of vaccines against COVID-19, including the rapid pace of vaccine development, as one of the primary reasons for vaccine hesitancy4, but data from low- and middle-income countries (LMICs) have been limited.

Malawi is one of the 92 low-and-middle income countries eligible to receive COVID-19 vaccines through COVID-19 Vaccine Global Access (COVAX). COVAX is co-led by Gavi, the World Health Organization (WHO) and the Coalition for Epidemic Preparedness Innovations (CEPI), working in partnership with UNICEF, the World Bank, civil society organizations (CSOs), manufacturers, and others. COVAX is part of the Access to COVID-19 Tools (ACT) Accelerator, a ground-breaking global collaboration to accelerate development, production, and equitable access to COVID-19 tests, treatments, and vaccines and to guarantee fair and equitable access globally.

The GoM has acquired over 1,000,000 doses of COVID-19 vaccine for administration to the public and this vaccine is administered intravenously. The Astrazeneca vaccine is given in two doses with an interval of 8 to 12 weeks while the Johnson and Johnson vaccine is given in one dose. The first batch of 360,000 Astrazeneca doses came in early March 2021 under the COVAX program. A few weeks later, Malawi received other allotments of 50,000 doses from India and 102,000 doses from the African Union. Between July and August alone, the country received four additional consignments of COVID-19 vaccine including 304,350 doses of Johnson & Johnson (Janssen)[5] and started initiating its second doses in early August 2021.

Malawi launched COVID-19 vaccination in mid-March 2021 targeting 20% (2.3 million) of the eligible population. As of 15th November 2021, Malawi has fully vaccinated 574,069 people out of a total eligible population of 11.4 million representing 3% of the eligible population. During the same period, a total of 1,304,110 people have received at least one dose representing 5.4% of the total eligible population. While there was a spike in vaccine uptake in the first weeks of vaccination especially in urban areas as compared to rural areas, there was a downward trend of approximately 38.4% as compared to the previous weeks and then a high spike again in vaccine uptake in June 2021. According to social media, one of the contributing factors to low uptake was vaccine hesitancy. In May 2021 Malawi destroyed approximately 19,610 doses because they had expired. Malawi was the first African country to destroy the expired vaccine following an advice from the Africa Centres for Disease Control and Prevention (Africa CDC) which confirmed that the expired jabs were not effective.

1.2 COVID-19 vaccine hesitancy

Recent studies have shown that in many countries COVID-19 vaccine uptake is low due to various reasons. For example, a study conducted in Bangladesh reported that 90% of the respondents believed that the COVID-19 vaccine used in Bangladesh had side effects[6]. Amongst the Greeks, willingness to be vaccinated for COVID-19 was dependent on beliefs and knowledge about the COVID-19 vaccine such that those who believed that COVID-19 was man-made were unlikely to be vaccinated[7]. A rapid review of available evidence reported that misinformation, rumours and conspiracy theories about COVID-19 and COVID-19 vaccines are widespread across Africa and have impacted negatively on COVID-19 vaccine uptake[8] .

In Malawi, studies on COVID-19 vaccine are limited and those conducted have been on a small scale: for example , a study by the Malawi Epidemiology and Intervention Research Unit (MEIRU) was also on a very small scale as it included only a few questions on COVID-19 vaccine, embedded in the routine COVID-19 mental health telephone survey[9]. Additionally, the previous two knowledge, attitudes and practices (KAP) studies on the COVID-19 pandemic in Malawi did not focus on the vaccine part[10]. The available data on uptake of vaccines in Malawi shows a downward trend with hesitancy being the contributing factor. Despite Malawi launching the COVID-19 vaccination in mid-March 2021, only just over 2% of the population to date is fully immunized against COVID-19. The uptake of the COVID-19 vaccine is vital for achieving the target of vaccinating 60% of the population in Malawi by December 2022[11] as well as for controlling the pandemic in the country. The success of this strategy relies on public acceptance of the vaccine. Besides, the WHO recommends that a substantial proportion of the population must be fully immunized against the COVID-19 to induce herd immunity apart from following other recommendations[12]. While the proportion of the population which must be vaccinated to induce herd immunity against COVID-19 is not yet known, the proportions are higher for other vaccine preventable diseases at 95% for measles and 80% for polio[12].

Until now, there has been no in-depth understanding of how the general population in Malawi perceive the COVID-19 vaccine and what would either encourage or discourage them to be vaccinated. Understanding how people think, perceive, and act in relation to COVID-19 vaccine(s) is vital when developing strategies that will generate increased vaccine acceptance and uptake in Malawi. It is against this backdrop that UNICEF Malawi Office, in partnership with WHO and MoH commissioned a comprehensive KAP study on COVID-19 vaccine in Malawi. The results of this study will inform the development and implementation of interventions that will support the roll-out of the COVID-19 vaccine. This study has, among other issues, identified the drivers and bottlenecks associated with the behaviors, perceptions, attitudes, and practices towards COVID-19 vaccine.

1.3 Objectives of the Study

1.3.1 Overall objective

The overall objective of this study was to understand the current knowledge, attitudes, practices, drivers, bottlenecks and communication channels on COVID-19 vaccine uptake to improve the design and implementation of interventions that would improve vaccine uptake in Malawi.

1.3.2 Specific objectives

The specific objectives of this study were as follows:

1. To quantify current knowledge levels and attitudes of people on the COVID-19 vaccine.
2. To quantify the current practices on COVID-19 vaccine.
3. To quantify and describe the current social norms associated with COVID-19 vaccine.
4. To map and quantify the strengths, drivers, and bottlenecks to adoption of improved behaviors and access COVID-19 vaccine.
5. To map and quantify the strength of information channels available to understand COVID-19 vaccine.
6. To recommend social behaviour change communication channels and interventions for improved covid-19 vaccine uptake.

2.0 STUDY DESIGN AND METHODS

2.1 Study setting and period

Data collection for this study took place between 29th September and 11th October 2021 after a very comprehensive training of research Assistants (RAs). The study was conducted in 6 districts in total, that is, 2 districts per region. In each region 1 district chosen was high performing while the other was (1 high performing and 1 low performing district) in terms of uptake of the COVID-19 vaccine. These districts are Blantyre (high performing) and Mangochi (low performing) in the Southern Region; Ntchisi (high performing) and Mchinji (low performing) in the Central Region and Chitipa (high performing) and Mzimba South (low performing) in the Northern Region (Figure 1). These districts were selected in collaboration with UNICEF and the MoH Ministry of Health.

2.2 Study design

The KAP study was cross-sectional in nature and used both qualitative and quantitative methods of data collection. Both primary and secondary data collection methods were used. The following data collection methods were used in this study:

2.2.1 Desk review and social listening

The MoH provided documents that guide the GoM on the roll out of the COVID-19 vaccine including how issues of vaccine hesitancy are being addressed. Over the years, the GoM has introduced a number of vaccines especially for under-five children where issues around vaccine hesitancy have been raised and addressed. The MoH's Expanded Programme on Immunisation (EPI) shared documentation on how new vaccines have been introduced in Malawi, the challenges the Ministry has experienced and how issues around vaccine hesitancy have been addressed. In addition, popular databases such as PubMed, Google Scholar and Web of Science were searched for peer reviewed articles and KAP study reports covering vaccine hesitancy and related issues. Further, social listening was conducted to extract COVID-19 vaccine and related information from social media channels such as Facebook, Twitter and news sites (e.g. Malawi Broadcasting Corporation (MBC), Zodiak Online, Times 360 Malawi, Mibawa, Capital FM, MIJ Online, Nation Online Malawi, and other community media sites) to help refine some questions. Results from the desk review and social listening informed the design and finalisation of the data collection tools. The major output from the desk review was the comprehensive protocol for the KAP study.

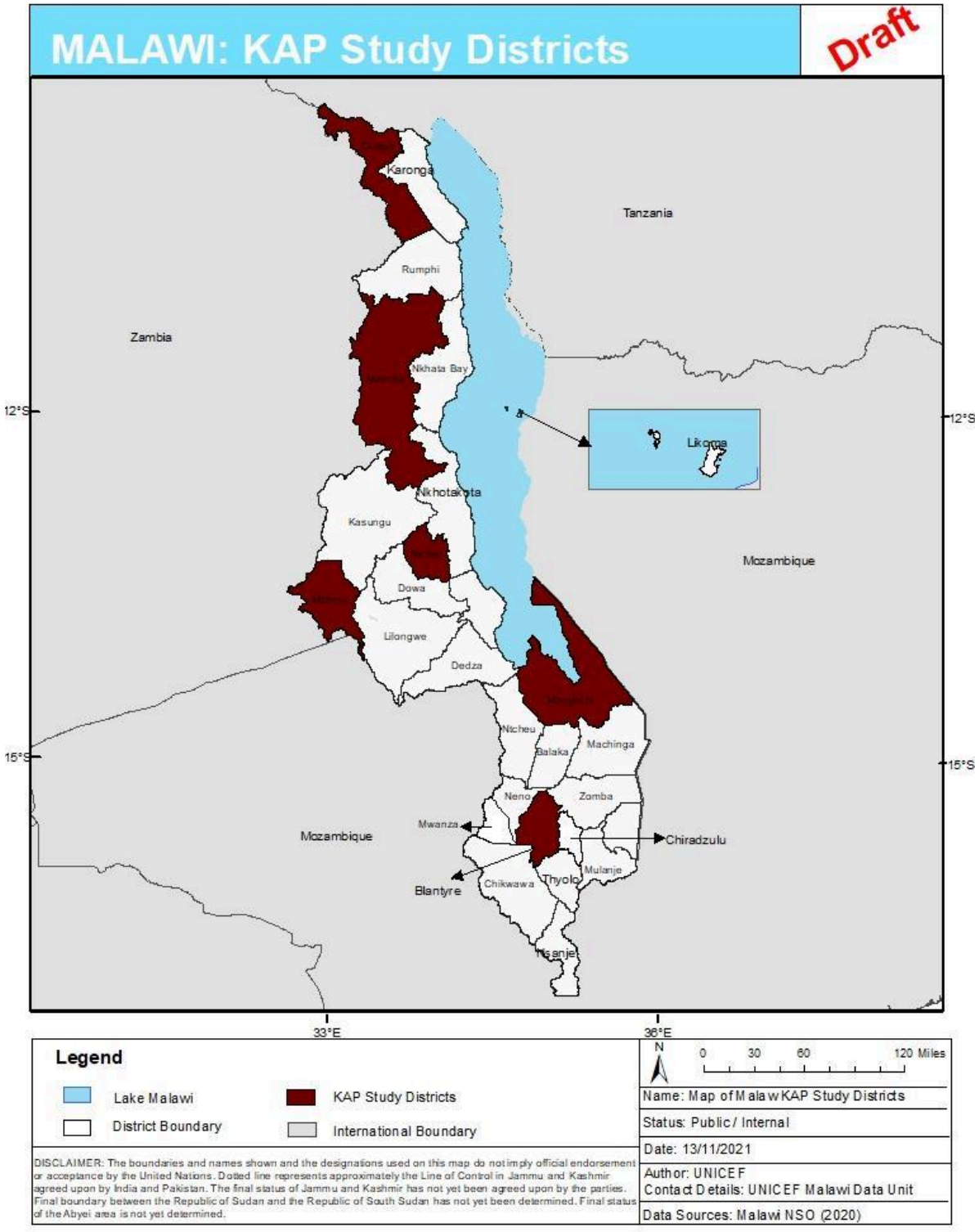


Figure 1.1: Map of Malawi showing the districts that the study covered

2.2.2 Household survey

Quantitative data on the current knowledge, attitudes, practices, social norms, drivers and bottlenecks and information channels relating to COVID-19 vaccine uptake was collected from 1265 households from the 6 sampled districts in Malawi. The quantitative household survey targeted households in selected study sites (i.e. 6 districts across the three regions of Malawi).

The sample size for the quantitative household survey was determined using the following formula13 for calculating sample size for proportions when the population is infinite:

where n = sample size,

Z = Z statistic for a level of confidence,

P = expected prevalence or proportion, and

d = precision.

In our calculation, we assumed a Z-value of 1.96 and ±5% precision (i.e. d = 0.05). Since one of the objectives for the KAP study was to quantify the current knowledge levels and attitudes of people on COVID-19 vaccine, and in the absence of existing data on knowledge levels, we assumed that 50% of the population has knowledge about COVID-19 vaccine in order to get a larger sample size (i.e. P = 0.50, and therefore 1 – P = 0.50). We also allowed for a 10% refusal rate and failure to provide complete data among households who consent. This gives a sample size of about 420 households per region and a sample size 1,260 for the three regions.

Sampling strategy

The household survey adopted a multi-stage sampling design to obtain a random sample of households which was representative at the national level. The sampling frame used for the household survey was the sampling frame developed for the 2018 Malawi Population and Housing Census (PHC) obtained from National Statistical Office (NSO). The sampling frame is a complete list of all enumeration areas (EAs) created for the 2018 MPHC. The sampling frame contains detailed information about EA location, type of residence i.e. urban or rural, and the estimated number of residential households.

In the first stage of sampling, two districts were purposively selected in each of the three regions of Malawi in collaboration with UNICEF and MoH. These were stratified as urban and rural areas to allow sampling from both areas. The second stage involved selection of EAs in each district using probability proportional to size (PPS) sampling procedure. The PPS sampling method ensured a self-weighting sample for each district. In total, 63 EAs were selected and these were the primary sampling units (PSU). At the EA level, the field teams determined the centre of the EA together with the local leaders. The direction of movement for the enumerators was determined through picking of a piece of paper (from four pieces) on which the directions were written. The supervisor wrote ‘north, south, east and west’ on

the four pieces and asked one of the local leaders/people to pick one piece at random. This determined the direction of movement for the enumerators.

In the final stage, a fixed number of (20) households was selected in each EA using systematic sampling methods. There are on average 300 households in an EA and since we needed 20 households, it meant having a sampling interval of 10 which was quite high. We therefore decided to have a sampling interval of 3, which implied that the enumerators visited every 3rd household. The enumerators then moved in the selected direction, interviewing the sampled households and eligible respondents up to the end of the EA. If the required sample size in the EA (i.e. 20 households) was not achieved, the enumerator tossed a coin to select the next direction of movement either right or left side of the EA. This process was repeated until the 20 interviews were achieved. In order to assist with EA boundary identification, T/A maps showing EAs within them were obtained from the NSO in Zomba.

At the household level, the enumerator identified any eligible adult who had lived in the selected EA for at least 6 months prior to the study to participate in the study. If there were no eligible participants, the next household was selected. Due to the limited data collection period, the household was replaced by the next household if there were no eligible adults aged 18 years and older at the selected household. Only one eligible respondent was selected from each household while taking into consideration the gender balance of the participants.

2.2.3 Focus group discussions (FGDs)

To complement the quantitative component, 24 FGDs of 6-8 people per group were s conducted in the sampled districts. A total of people participated in this exercise. The FGDs were conducted to collect information on the current knowledge, attitudes, practices, drivers, bottlenecks, social norms and information channels for COVID-19 vaccine. In addition to this, FGD participants were also asked about how the uptake of COVID-19 vaccine could be improved. We conducted 4 FGDs per district (two each in rural and urban areas per district) in the purposively selected EAs where the household survey was conducted. The FGDs were conducted separately for men and women aged 18 years and older who are eligible for the COVID-19 vaccine. Age group categories for FGD participants were determined together with UNICEF as follows: 18–29, 30–49, 50–59, and 60 years and above.

2.2.4 Interviews with key informants

To understand the current interactions and messages with the community level, we conducted 4 key informants in each of the 6 selected districts. A total of 24 key informant interviews (KIIs) were conducted with local leaders (religious leaders and traditional leaders), health centre staff, health surveillance assistants (HSAs) and other government extension workers, non-governmental organisations (NGO) staff working in the health sector and community radio staff. These key informants shared prevailing knowledge, attitudes, practices, social norms and information sources for COVID-19 vaccine and how the uptake of this vaccine can be improved.

2.2.5 Eligibility Criteria

Adult populations over the age of 18 years who are eligible for the COVID-19 vaccine and had lived in the selected EAs for at least 6 months were included in the study. Respondents who were mentally or seriously ill at the time of the study were not eligible.

2.2.6 Data collection instruments

Data for the desk review and social listening was collected and collated using a data extraction sheet. Data for the household survey was collected using a questionnaire while data for FGDs and KIIs was collected using guides. The household survey questionnaire and FGD/KII guides were adapted from the WHO BeSD () 15. Appendices 1 and 2 are the questionnaire for the household survey and guides for FGDs/KIIs in English, Chichewa and Tumbuka, respectively. Appendix 3 is the participants' information sheet and consent in English, Chichewa and Tumbuka languages.

2.3 Data management and analysis

Data from the quantitative household survey was captured electronically using tablets on which the survey questionnaire was programmed using Open Data Kit (ODK) software. Every evening, the supervisors uploaded the data to a secure server managed by the Centre for Social Research (CSR). All the tablets were password encrypted. The Field Supervisors reviewed each tablet for completeness of the interviews before uploading the data to the server. Data was downloaded from the server for cleaning and analysis using Stata/IC v.16.1 for Mac (StataCorp, College Station, Texas, USA).

Data for the quantitative household survey was post-stratified on age and sex using the 2018 Malawi PHC data. We report weighted results disaggregated by sex, age group, location (rural and urban), district performance (low and high), and region. Age groups have the following categories as suggested in Section 2 above: 18–29, 30–49, 50–59, and 60 years and above.

All FGDs and KIIs were audio-recorded and were transcribed and translated into English language and analyzed using thematic analysis and was supported by NVivo (version 12.0) software. Findings from the qualitative data were triangulated with findings from quantitative data, literature and other studies.

2.4 Ethical considerations

2.4.1 Informed consent

All participants were asked to provide consent for their participation. No participant was forced to participate in this study. Information sheets and consent forms were translated into Chichewa, Chitumbuka and Chiyao languages which were used for data collection. We read to each participant the contents of the consent form verbatim (about the objectives of the study, the importance of their participation, the nature of voluntariness of their participation and how the data would be kept

confidential during the field team's stay in the EA and during data analysis). All participants were asked to sign or thumb print their consent forms to show their acceptance to participate in the study and a copy of the consent form was left with them.

Since participation in this study was voluntary, selected participants who did not provide informed consent were not included in the study and no reprisals fell on them. Upon entry into the EA, we ensured that all the relevant authorities (e.g. chiefs) were contacted and informed about the study. No other person was allowed to interfere with the interview process even including field supervisors.

2.4.2 Confidentiality

Confidentiality was discussed in detail with all members of the research and data collection teams and was addressed during a training session on research ethics. Training emphasized the importance of protecting the confidentiality of study participants and the data collected about the participants. Quantitative data was collected using password-protected tablets and data was uploaded and stored onto a secure server at the CSR. Upon completion of data collection, tablets were returned to the CSR, checked for completeness of data delivery, and cleared of all survey data. Qualitative data, including audio recordings, written notes, and forms, do not contain personal identifiers other than participant identification codes. During analysis, reporting for both quantitative and qualitative data was done at the aggregate level to minimize potential for identification of participants, including identification of households.

2.4.3 COVID-19 pandemic

Data collection for the study was conducted during the COVID-19 pandemic; however, daily reported cases of COVID-19 were relatively low during this period. As such, specific measures were instituted to ensure the safety of the CSR researchers, field teams and participants from COVID-19, and these include social distancing, sanitizing, hand washing and respiratory hygiene including wearing of masks. Besides, we followed all other COVID-19 guidelines provided by the Ministry of Health to ensure safety of both research team and participants.

2.4.4 Ethical approval

Ethical approval for this study was obtained from the University of Malawi Research Ethics Committee (UNIMAREC) prior to data collection (Ref.: P.09/21/83). Permission was also sought from the relevant district (and city) authorities (e.g., District Commissioners, Directors of Health and Social Services "DHSS", Chief Executive Officers for city councils, etc.) at all study locations prior to the start of data collection. In addition, the MoH provided a letter of support which was sent to the DHSS for the selected sites ahead of data collection.

3.0 RESULTS

3.1 Respondent's background characteristics

3.1.1 Demographic characteristics

A total of 1265 respondents participated in the study, and out of these, 54% were females, almost three-quarters (74.1%) were below 60 years, and the majority (68%) were married. Rural residents accounted for 85% of the respondents. Most respondents had completed primary education (59%) and about a quarter had completed secondary and higher education. Fifty seven percent (57%) of the respondents were Christians while 22% were Muslims. In addition, thirty two percent (32%) of the respondents were Chewa, 25% Yao and 13% were Tumbuka. Nearly half (47%) of the respondents owned mobile phones with about 26% reporting using the mobile phones to access WhatsAppplatform for messaging and about 20% using it to access social media (facebook, twitter etc). On average, each household had about 5 people (Table 1).

Table 1: Demographic characteristics of study participants

	Number	Percent (%)
Sex		
Male	463	46.5
Female	802	53.5
Age group		
18–29	503	29.5
30–49	501	31.9
50–59	121	12.8
60+	140	25.9
Marital status		
Married	951	68.3
Divorced	84	6.3
Separated	30	1.5
Widowed	75	13.9
Single	125	10.0
Highest education level		
None	141	16.6
Primary	779	59.1
Secondary	308	21.8
Higher	37	2.5

Religion		
No Religion	6	0.6
Catholic	221	19.2
CCAP	202	15.7
Other Christian	285	21.8
Muslim	280	21.5
Other	271	21.1
Tribe		
Chewa	391	31.8
Tumbuka	171	13.3
Yao	317	25.3
Lomwe	116	9.1
Ngoni	107	8.2
Other	162	12.3
Don't know	1	0.1
Residence		
Urban	200	15.0
Rural	1065	85.0
District performance		
Low	761	59.4
High	504	40.6
Region		
Northern	300	23.5
Central	301	23.5
Southern	664	53.0
Mobile phone ownership		
Yes	604	46.9
No	661	53.1
Mobile phone use		
WhatsApp	188	25.9
Social media	146	19.5
Average household size, mean (SD)	1265	4.8 (3.5)
Currently pregnant or recent birth within 6 months prior to the survey		
Yes	102	14.1
No	563	85.9
Mean household size (SD)	1265	4.8 (3.4)

3.1.2 Respondents knowledge on COVID-19 and COVID 19 Vaccine

Overall, almost all respondents (≥95%) had heard about COVID 19 and COVID 19 vaccines with no major difference between males and females, urban and rural residence, high and low performing districts, regions and among the different age groups. However, a slightly lower proportion (90%) of respondents aged 60 years and above had heard about COVID 19 vaccine (Table 2).

About 84% of the respondents had knowledge of where to get COVID-19 vaccine with more males (88%) knowing than females (81%). Over 80% of the participants aged 18-64 knew where to get the vaccine while it was lower (71%) for those aged 65 and above. Almost all respondents 96%) in the urban areas knew where to get the vaccine as compared to the rural areas (82%). About 91% of the respondents from the high performing districts knew where to get the vaccine as compared to low performing districts (80%). The proportion of respondents who knew where to get the vaccine were from the central (92%) and northern region (90%) as compared to the southern region (79%).

Overall, about 54% of participants reported that it was easy for them to get the COVID 19 vaccine while about 18% reported that it was hard because the vaccination site was too far away with slightly a slightly higher proportion (20%) from the rural areas; those in the age ranges of 18-44 and those in the low performing districts reporting on this. A higher (25%) portion of the participants in the central region reported the same as the main reason that made it hard for them to access the vaccine.

Table 2: Knowledge about COVID-19 and COVID-19 vaccines

	Number	Ever heard about COVID-19	Ever heard about COVID-19 vaccine
All	1265	99.3	96.8
Sex			
Male	463	100.0	99.1
Female	802	98.7	94.9
Age group			
18–29	503	99.8	99.6
30–49	501	99.7	99.1
50–59	121	100.0	97.9
60+	140	98.0	90.4
Residence			
Urban	200	99.7	99.7
Rural	1065	99.3	96.3
District performance			
Low	761	99.4	95.1
High	504	99.3	99.3
Region			
Northern	300	99.8	99.2

Central	301	100.0	99.5
Southern	664	98.8	94.6

During the FGDs and interviews, most participants as well reported that they had ever heard about COVID-19. The things they heard ranged from COVID-19 being a very dangerous disease to the disease killing many people.

> "COVID19 is very dangerous and we are hearing that in most areas people are dying and we are afraid when we hear about this pandemic because we don't really know when this pandemic will come to an end ….", (P5, FGD with women, Mwawa, TA Jalasi, Mangochi).

In general, most repondents were aware of what vaccines are and they also have heard about the COVID-19 vaccines. They said that vaccines protect people against COVID-19. A community leader at Mchinji Boma added that the vaccines are very important because "[they] prepare you for the infection as it was happening with polio and smallpox vaccines that were given in the past". It was difficult for participants to describe how vaccines work with an exception of a clinician in Mzimba.

> "I can say that it is a medication that is given to a person. One of the ingredients is the disease-causing virus only that is weakened or killed, though I am not sure but the component is there. When you are injected the body responds and develops memory for the virus and when you are exposed and infected the body has the immunity to fight the infection and protect you from getting sick or developing severe infection. It strengthens your immunity to the disease", (Clinician, Mchinji Boma).

Some participants for example during an FGD with men in Mzimba and an HSA in urban Mzimba had a misperception that vaccines can also cure a disease. There were also others who did not know what vaccines are: during an FGD with women at Mangochi Boma a participant described a vaccine as an injection that people receive for instance when they suffer for example from malaria.

> "…. As such people are reacting differently, others are saying if you get a vaccine you will die within 5 years, others are saying the vaccine is related to 666, recently we had network problems for airtel and TNM lines, WhatsApp was not working, again others attributed this to the vaccine. So, there are mixed reactions. Others are getting vaccinated because they want to have freedom to move to other countries and also to secure their jobs, while others are getting vaccinated because they saw a victim of Covid-19", (Clinician, Mzimba)

During the FGDs and KIIs, most participants as well reported that they had ever heard about COVID-19. The things they heard ranged from COVID-19 being a very dangerous disease to the disease killing many people.

> “COVID19 is very dangerous and we are hearing that in most areas people are dying and we are afraid when we hear about this pandemic because we don’t really know when this pandemic will come to an end ….”, (P5, FGD with women, Mwawa, TA Jalasi, Mangochi).

Some communities including those in rural areas acknowledged the existence of COVID-19 in their communities and that deaths of people due to this pandemic have also been reported.

> "Covid-19 is there. It’s found right here in our community because when we cross check with health workers it looks like figures are there about those that were infected and have now recovered, and death too and in our church almost two lives have been lost but autopsy say they have died due to the pandemic even though there is mix bag some agree to it while others are rejecting it", (Religious leader, Chitipa).

For some informants, the disease has created a sense of panic and that people are worried that they are dying and many lives have been lost.

> “We are very worried about this COVID19 because we are just dying but we don’t see any medication for this illness”, (P5, FGD with women, Mwawa, TA Jalasi, Mangochi).

> "It is a saddening experience because we have lost our many friends and relatives. If there is a way to fight this, please help us”, (P4, FGD with men, urban Mchinji).

The worrying thing about this disease, according to some participants, is that there is no medication and that in some cases health facilities are situated very far for people with COVID-19 to be helped in a timely manner.

> “We hear about this COVID-19 and we are very concerned as we have said because the hospitals are very far away. If one of us gets the virus, how is he going to be transported? This community most of the people are women who are single and don’t have the means of transport like motorcycles”, (P4, FGD with males, Michiru Ward, Blantyre).

COVID-19 is real, and this is why some informants reported that people were following preventive measures as advised by the Government. COVID-19 was described as a big problem because it has disturbed people's lives including public gatherings and church attendance restrictions, disruption of business opportunities such as selling onions and customers not showing up and that everything is at standstill including children not going to school.

> “Even to my side l will say covid 19 has threatened our daily lives. In the case of our children now they rarely attend schools and performance of our business has gone very low”, (P2, FGD with females, TA Machinjiri, Blantyre).

While acknowledging that COVID-19 is a big problem in Malawi, there were other participants who reported that there was noone in their community who contracted the disease, and they have not seen anyone suffering from the disease. This is why some participants said that COVD-19 was not a major problem.

> “I think people in this community are not scared because they haven’t seen anyone being sick from this community. So, it is just like spoken information which people are just taking for granted in this community”, (P6, FGD with women, Mphwanya, TA Chimwala, Mangochi).

> “Ïn our community COVID-19 was just like a story being told on the radios. We never experienced it. We never saw any patients. It is just a rumour here. School children are being sent home for not wearing face masks but the reality is that we have never experienced Covid-19 cases here. Nobody has ever died of COVID-19 here", (P5, FGD with men, TA Chindi, Mzimba).

In some communities, participants reported that they have also not experienced any COVID-19 deaths; hence, they do not take this disease seriously: they take COVID-19 just the same way as other regular infections such as fever, coughs and flu. There were participants who added that this disease is also not perceived as a big problem because, among other things, people are reluctant in wearing masks and if they do they just do it because they are scared of those in authority such as the Police who sometimes beat up people not wearing masks. To demonstrate that some people do not believe that there is COVID, in some cases people demand bodies of their relatives who have died of COVID-19 to bury without following COVID-19 procedures as established by the Government.

> "I have seen people getting bodies of their relatives claimed to have died from COVID-19 from doctors, insisting that they bury the corpse alone with proper traditional procedures without COVID-19 preventive measures. All this because they don’t believe that there is COVID-19”, (P4, FGD with males, Michiru ward, Blantyre).

In this FGD, a participant added that COVID-19 was actually created to scare people including Malawians and he had a strong belief that there was no COVID-19. There were others who were of the view that the signs and symptoms of COVID-19 such as coughs are not new as also expressed during an FGD with females, Mangochi.

> “As for me, it doesn’t because coughing has been there, and I am surprised that they are saying that this is COVID19. So, for me, I am not concerned, and I am not worried”, (P2, FGD with females, Mphwanya, Mangochi).

People's perceptions that COVID-19 is not a problem in this country is also based on their observations of what senior government officials are doing. During an FGD with men in Michiru Ward in Blantyre a participant observed that while the COVID-19 hit Malawi the former president was on the campaign trail which was not supposed to be the case if COVID-19 was real.

"…. The time COVID-19 hit Malawi was during the campaign period we had the former president that time who tried to stop the elections but eventually he didn't stand on his word. He was one of the people who did a rally at Njamba Park. If this disease really existed this could have never happened. If this disease was dangerous people could not have been walking around like how they are doing now. Maybe you can help me understand this but I don't believe I will understand it"" (P3, FGD with men, Michiru Ward, Blantyre).

In this FGD with men in Michiru Ward in Blantyre participants mentioned that the Government is also getting a lot of grants from foreign governments and funding organizations. Some participants alleged that health workers get allowances when they declare that a person has died of COVID-19 and the burial conducted by them. This somehow has affected the way people seek health care.

"The health workers are on the forefront finishing the lives of people in the hospitals and in the end they say that it's COVID-19. I made a decision not to go to the hospital after getting sick, I would rather use herbs and it scares me because we have seen people going to the hospital when he is okay after a few hours you hear he is dead", (P3, FGD with males, Michiru Ward, Blantyre).

In one FGD in Mangochi participants reported that more males are affected by the COVID-19 pandemic compared to women explaining that this was because men go to many places in the communities where they gather unlike women who stay at home. These participants said that women on the other hand are not found for example in drinking places. Whether people accept the existence of COVID-19 or not, they were nevertheless aware of preventive measures and some were actually worried about situations that expose them to being infected by the disease.

"My worry comes in since within our community we do attend different functions such as weddings, initiation ceremonies and many more public gatherings, after attending these functions fear comes whether you have contracted the virus"" (P1, FGD with females, TA Chimwala, Mangochi).

"It's true we are concerned about COVID-19, we go to town, Monkey bay, Mtakataka and we carry different air when we travel. We really don't know how God is going to help us with this, but most importantly when we travel we wear masks to get more protection", (P2, FGD with males, TA Nankumba, Mangochi).

Lastly, some informants reported that although guidelines exist for prevention of COVID-19, the challenge is that people do not follow guidelines for prevention of infection.

"We are living in fear because we are not adhering to what the doctors are advising us since we are just moving anyhow and we believe that this illness will anytime catch us since we are not just reluctant but also we don't want to listen to what the doctors are saying", (P3, FGD with females, TA Chimwala, Mangochi).

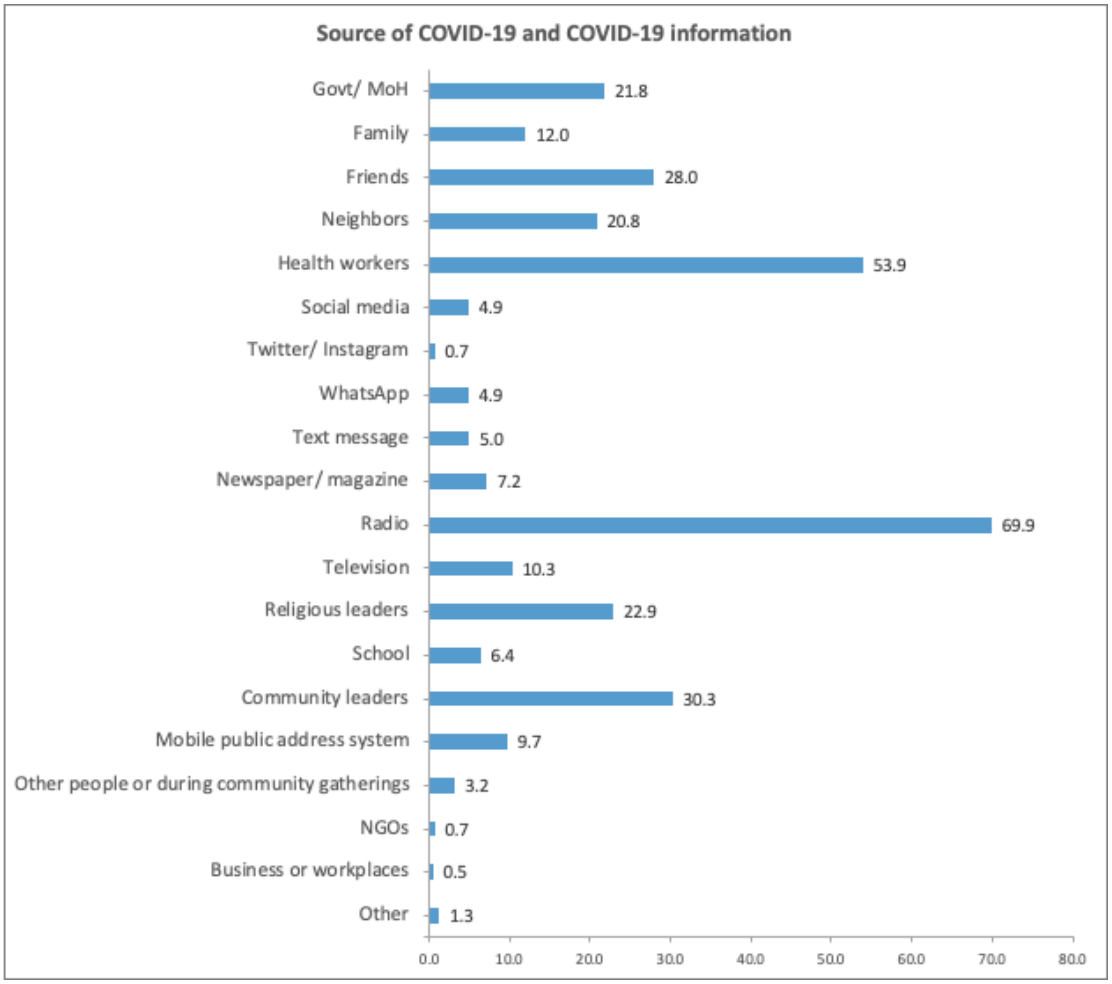
In general, most people have heard about COVD-19. However, while some accepted that it is a big public health problem, others, for various reasons, do not perceive this as a big problem.

3.2 Sources of information about COVID 19 and COVID 19 Vaccine

3.2.1 Sources of information about COVID 19 and COVID 19 Vaccine

Survey respondents reported several sources of information on COVID 19 and COVID 19 vaccine and hese included the radio (70%), Government /Ministry of Health (MoH) (22%), health workers (54%), community leaders (30%), friends (28%), religious leaders (23%) and neighbours (21%). The trend was almost the same for males and females, for the different age groups, for urban and rural residents and for the low performing and high performing districts. Although the health workers were the most commonly mentioned sources of information in all regions, there was a slightly different trend for the second and third sources of information whereby in the north, they were neighbours and Government/ MoH respectively while in the central region, the second and third common sources were friends and neighbours and in the southern region, they were friends and Government / MoH (Figure 1).

Figure 1: Sources of COVID-19 and COVID-19 vaccines information



In the qualitative component of the study, the major sources of information on COVID-19 that were also mentioned by participants were the radio, health workers, chiefs, and social media such as WhatsApp and Facebook. A key informant in Mzimba gave an example of COVID-19 vaccine information that the radio provides.

> "This time we sensitize much on getting the vaccine, we give people the option to go for Johnson and Johnson (J&J) or AstraZeneca covid-19 vaccine. We also explain in detail that Johnson and Johnson is only one dose and AstraZeneca is two doses so that people will understand that the vaccine is available, and that if more people get vaccinated the cases will decrease or disappear completely", (Key informant, Mzimba [radio personality]).

In addition, while health workers have tried to reach communities with this information, the challenge is that not everyone has been reached with this information. The chiefs, on the other hand, use the meetings they conduct at community level and also during funerals to disseminate information on this disease and the vaccine.

> "I think the covid-19 messages. We have received information differently. Health workers have not reached everyone to explain clearly that there is this disease and there is also a vaccine. Yes, local leaders tell us when we meet at funerals but it's not all of us who attend funerals. So, if there is any proper way to visit people and explain to them that the disease is real because people do not believe covid-19 and the vaccine", (P5, FGD with females, Kameza, Blantyre).

A key informant in Mzimba reported that TNM and Airtel also send SMS messages on the COVID-19 vaccine. Most people had reservations about this as in most cases the information that is shared on COVID-19 and the vaccines is wrong and scary.

> "People who are on WhatsApp are giving wrong information. No wonder people from Mobile networks want to do research on people who are misusing WhatsApp", (FGD with women, TA Nthondo, Ntchisi).

> "…. WhatsApp is so simple to use and has influenced people so much. It has helped to scare people away from getting the Covid-19 through sharing of fake videos or stories about the vaccine. People believe in those stories and conclude that the vaccine is bad. In the end they refuse to get vaccinated", (Key informant, Mzimba).

An HSA in TA Kameme in Chitipa acknowledged that while social media can be an important source of information, the challenge is that not many people have smartphones and hence WhatsApp and Facebook. In addition to this, there are network problems in some parts of the country for example in Chitipa where the TNM network has some challenges and since the district borders Zambia people also use Zamtel, a Zambian mobile network. This makes phone-based communication very difficult.

3.2.2 Most preferred and trusted sources of information about COVID 19 and COVID 19 Vaccine

The household survey respondents reported the most preferred sources of information as radio (45%) and health workers (27%). Respondents generally mentioned the health workers (27%), radio (27%), Government /MoH (10%) and community leaders (11%) as the trusted sources of information for COVID 19 and COVID 19 vaccine as can be seen in Figure 2 and Figure 3. The respondents suggested that three best ways of communicating correct information about COVID 19 and COVID 19 vaccine were health workers (23%), radio (22%) and community leaders (18%).

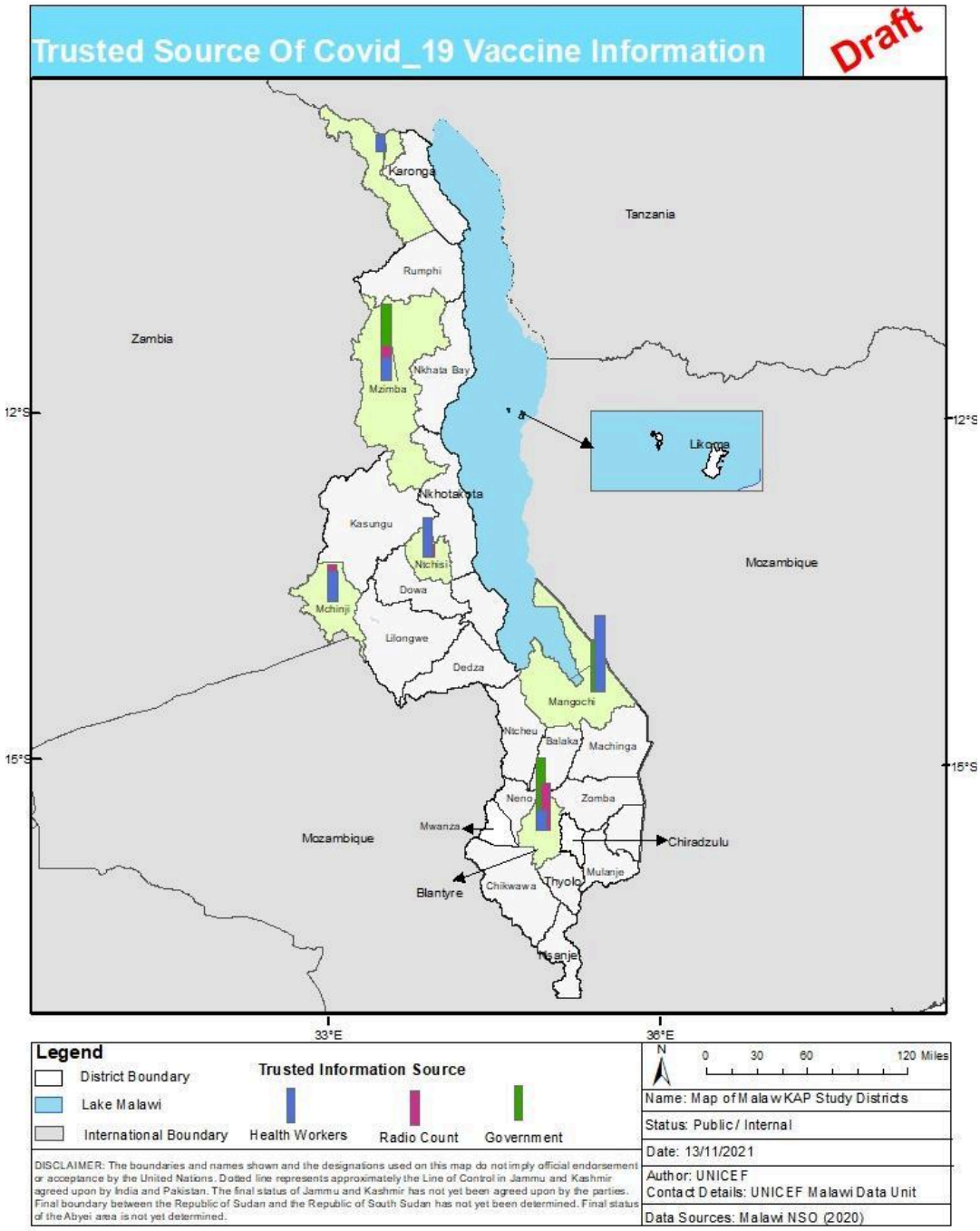


Figure 2: District distribution of trusted sources of information for COVID-19nvaccine

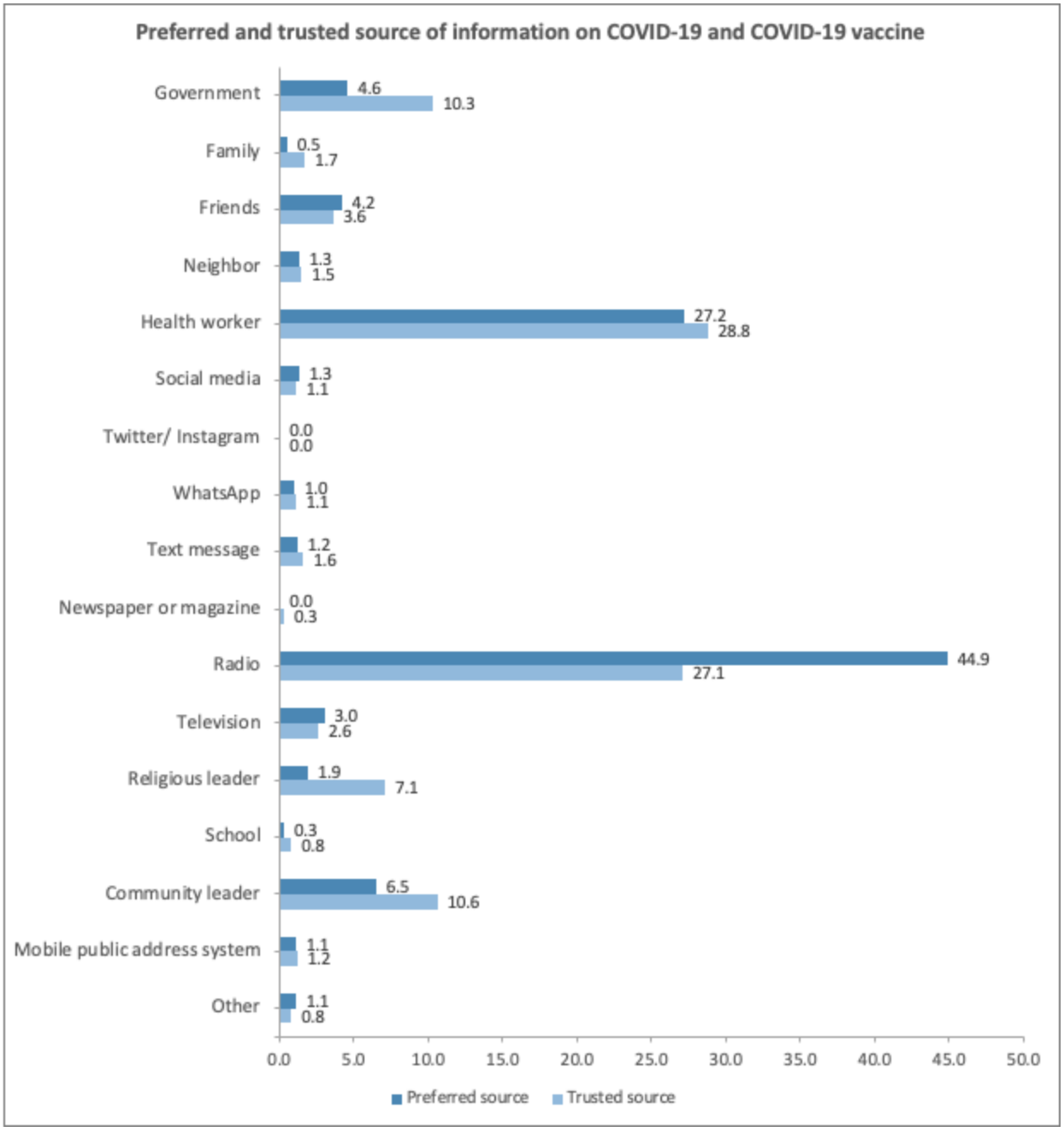


Figure 3: Preferred and trusted sources of information

3.3 signs and symptoms of COVID 19

Survey respondents mentioned dry cough (77%), fever (71%), difficulty breathing or shortness of breath (56%) and headache (36%) as symptoms of COVID 19.

3.4 Decision process of getting the COVID-19 vaccine

This section explores how people make decisions to be vaccinated against COVID-19. There were some participants who ever suffered from COVID-19 or they have ever seen people with COVID-19. Their experience of the disease made them decide to get the vaccine.

> "After I saw how my relatives suffered after getting the disease, I made a decision to get the vaccine to protect myself. Family and relatives from this problem of covid-19", (P1, 20860).

> "I made a decision after seeing many deaths, a lot of our friends lost their lives so I thought I should get the vaccine so that if I fall ill it should not be severe. This vaccine has brought in to help some people who could have died if the vaccine was not there", (P4, FGD with women, TA Nthondo, Ntchisi)

For others this is not the first time they are getting the vaccines as they ever received these from childhood. Since they understood the seriousness of the disease, and the importance of vaccines they then decided that they should take the vaccine.

> "When this disease came and how I understood the vaccine that it was certified. And also considering that this is not the first vaccine I have gotten I made the decision right away to get the vaccine. This vaccine has an impact in protecting my body so I decided to be protected and get the jab", P2, 20858).

In addition to experiencing COVID-19 and seeing others suffering, others made the decision to be vaccinated after seeing many people dying.

> "I also saw people losing their lives with the disease so this made me go get the vaccine to prevent this disease", (P4, 20860).

As said earlier, there were rumours that people who were vaccinated would die. There were others therefore who reported that when they saw people being vaccinated, they observed and that they did not die, they went ahead and got vaccinated against COVID-19.

> "In the beginning I was afraid, with what people were saying that when one gets vaccinated she/he will die so I really took my time, I waited for others to get vaccinated first. After a month of observing people who get vaccinated it's when I got courage to be vaccinated I even asked myself why those that are vaccinated are not dying. So I went for the vaccine to be protected", (20865).

There were many people who were not yet vaccinated. Some reported that they knew people who have been vaccinated and they were waiting to see what is going to happen to them after which they will make a decision. Others were not vaccinated at the time of data collection but they knew people nearby who had been vaccinated. They were therefore waiting to see what would happen to them after being vaccinated.

> "Some people from Chilimba village just across the river, got vaccinated so I am waiting to see what will happen to them. If they are alright then I will get vaccinated but not now. (F: why) Hahahah (laughs) Mjomba (uncle) you live this life once. But surely I have to see what those that got vaccinated are doing then I will make a decision to get vaccinated", (2088).

There were also some negative rumours about the vaccine. For exampke many people heard that when one is vaccinated they cannot have sex with their wives and make them pregnant. However, when those who were vaccinated said that they were having sex afer being vaccinated, it encouraged other to make decisions and get vaccinated.

> "The other concern is coming from those who have been vaccinated, they say that if you get vaccinated, you will not be able to have sex with your wife to impregnate her, so we have heard from our friends that nothing has changed sexually, they are doing their job in the bedroom as they were before getting vaccinated. So, it has encouraged us to get vaccinated…. that was the concern that should I just sleep till morning without sex", (P3, FGD with men, TA Kapunula, Mchinji).

3.4.1 COVID-19 vaccine safety

Many people in general reported that the COVID-19 vaccines are safe. A community leader was of the view that the COVID-19 vaccine is safe mainly because of the belief that leaders cannot give something to their people which is unsafe.

> " …. Being a community leader, I know that a country has leaders and in that county they are ruling. There are people they have to rule, I don't think they can take something that is not safe and give it to their people, then they are not going to be leaders. Because of this reason, leaders have the capacity to know that this thing is safe so because I trust them I believe it is safe", (Community leaders, TA Kuntaja, Blantyre).

There were others, however, who were not sure about the safety of the COVID-19 vaccines although they received the jab.

> "We just receive the vaccine that it contains. We just got vaccinated and we don't know if it's safe or not. It's you [Research Assistant] who knows these things who can tell us if it's safe or not", (P7, Female FGD, Kameza, Blantyre).

There were still others, for example in Mangochi who said that they cannot know the safety of vaccines until they are vaccinated arguing that it is only those who have been vaccinated who can be able to talk about this. While many participants felt the vaccines were safe, it should be highlighted that many participants cited the rumours that were circulating in their communities for example that COVID-19 vaccines are poisonous, they kill people, and they make people who are vaccinated infertile. These rumours were cited as reasons why some participants were not vaccinated against COVID-19.

3.4.2 Media reports on COVID-19 vaccine

There are many media reports about the COVID-19 vaccine especially those which are spread through social media. Study participants were asked about how these media reports have affected their decision with regard to the uptake of the vaccine. There were those participants who reported the media reports that affected them in that they decided not to be vaccinated against COVID-19.

> "We are not receiving the vaccine because of the information that we receive through radios and phones that the vaccine has lots of side effects. So, they are saying that we should not accept it in any way to receive the vaccine. So, lots of people are not receiving the vaccine because they are just being discouraged by what people are saying through these communication channels", (P2, 20854).

> "It is true that social media has influenced us, for instance I had decided to get vaccinated but before I did I got the news that Jacob the comedian has passed away because he got vaccinated for Covid-19. No one wants to die so I changed my mind. I did not get vaccinated"m (P5, FGD with men, Urban Mchinji).

> "I wanted to get vaccinated but at school I was told by a friend that when you get vaccinated your blood clots in reaction to the vaccine so I grew afraid and decided not to get vaccinated", (P3, FGD with men, urban Mchinji).

These negative rumours about the vaccine were not from the same communities where data was collected but they heard them from radios or social media and in an FGD with 20854 participants said they actually run away when they see strange vehicles visiting their communities.

> "…… And if any car comes in this community, you will see kids running away saying that the car is for COVID19 vaccine. Even adults run away when they see a car thinking that it is for COVID19 vaccine. We haven't heard people saying this face to face, no. But it is through the radios and the phones", (P2, 20854).

While some messages discouraged people from accessing COVID-19 vaccines, others were however not affected by these messages. They went ahead and got vaccinated.

> "Some information was instilling fear, some was encouraging but personally I was encouraged to receive the vaccine by my day to day experience not what I got from the social media", (Clinician, Mchinji).

> "I heard from my friend that after he got vaccinated that he was not able to have sex with his wife but then that did not discourage me from getting vaccinated because people react differently. So, I decided to proceed with my decision of getting vaccinated", P4, FGD with men, urban Mchinji).

3.5 Communication channels

3.5.1 Type of information required

There are many rumours circulating in communities in Malawi about COVID-19 and the COVID-19 vaccines which make it difficult for community members to accept to be vaccinated. Some study participants reported that they would like to get information which will assure them that there is no harm or side effects following vaccination. Participants argued that they would like to get the right information including proof that COVID-19 exists and then they would get the vaccine.

> "When we say proof, we don't mean on the television that has been edited. We need the actual person suffering from covid-19", (P5, 20858).

> "People want to know the actual truth of the vaccines, what are the side effects, and the procedures to get the vaccine, perhaps live cinemas showing people of Malawi receiving the vaccine", (P, 20859).

This is the information that people would like to have to accept to receive the COVID-19 vaccine.

3.5.2 Format of COVID-19 information

There are different formats that can be used to communicate COVID-19 vaccine information. This study found that most people would prefer spoken, face to face information. The advantage of this format is that people can also ask questions and be answered unlike other channels of communication for example videos. They also prefer spoken information since some did not go to school.

> "The information should be spoken because there are some people who cannot read so spoken information can be ideal", (P?, 20863).

> "People prefer the information to be spoken with words, there has to be an interaction of some kind then people will hear more. If questions are asked and answered people's minds are instantly cleared. You now start to sail in one boat", (20867).

3.5.3 Ways of communicating COVID-19 vaccine

This study explored the best strategies or ways that can be used to communicate information on the COVID-19 vaccines. The three best ways of communicating correct information about COVID 19 and COVID 19 vaccine as suggested by the household survey respondents were health workers (23%), radio (22%) and community leaders (18%) as can be seen in Figure 4 below.

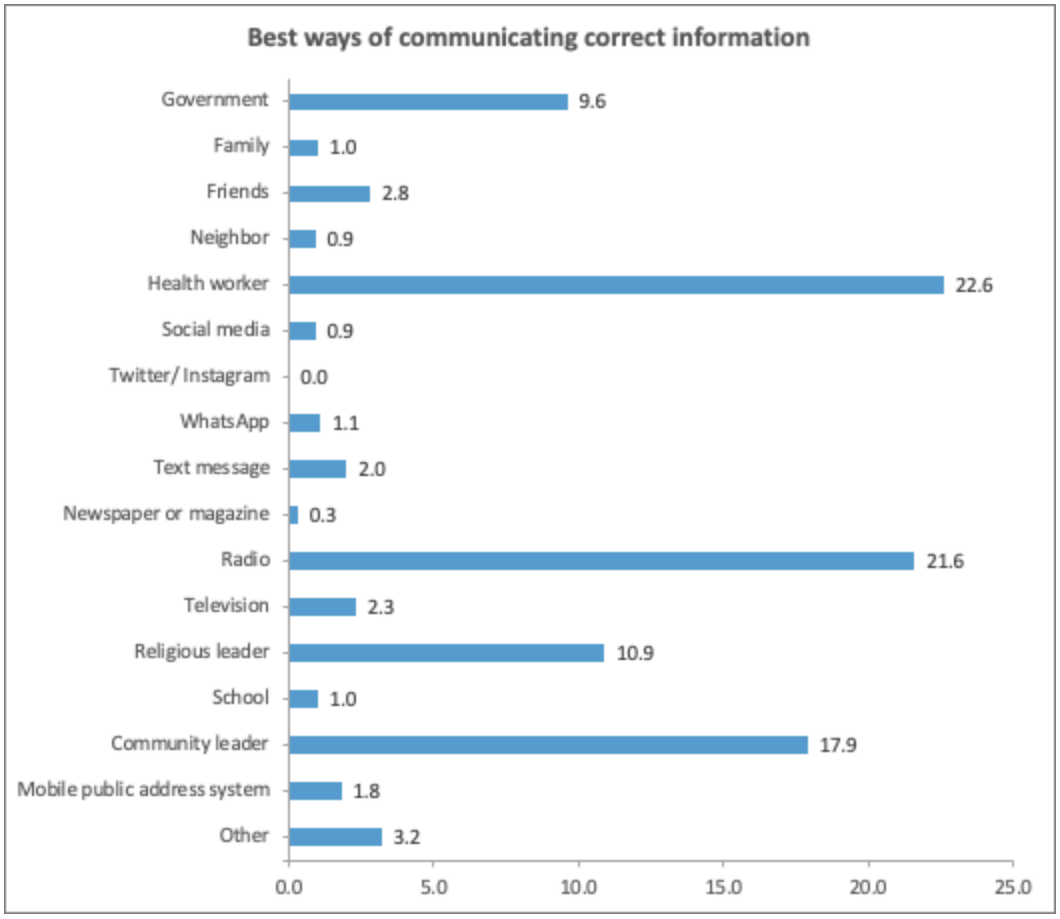


Figure 4: Best ways of communicating COVID-19 information

Most FGD and KII participants suggested the use of existing structures at community level to communicate COVID-19 and COVID-19 vaccine information.

> "The best way is through religious and community leaders like chiefs. We also have structures that we trust and if these structures are given the right information on this, we can all be vaccinated in a short period of time. And these are like the Village Development Committee Area Development Committee", (20868).

There were two main ways of communicating COVID-19 vaccine information to people that FGD /KII participants mentioned. These included chiefs and health workers.

3.5.3.1 Chiefs

About a tenth (11%) of the study participants were of the view that information on COVID-19 vaccines can best be disseminated through local chiefs. Meetings can be conducted by the chiefs at community level as a way of sharing information with their people. Some participants especially during FGDs and interviews conducted at community level argued the village head would be the best person to share such information since his responsibility is to care for his people and that community members listen to him easily.

> "The chief is the custodian of the culture and in his village he meets with his village members weekly or often so a chief is the right person because people have confidence in their chief more than they can have on someone who has just come from afar", (Religious leader, Chitipa).

> "The other way is to use our community leaders, the chief, you can easily build trust as people believe in them. Perhaps convincing them to get the jab and he asks his people to do the same", (P3, FGD 20859).

According to 20868 chiefs are already being used by the government to spread messages in their areas of jurisdiction. The chiefs are therefore preferred because they are trusted, listened to by their subjects and they have authority.

> "Yes. The chief can also get boys to tell people in their homes because sometimes some people don't report to the chief even if the chief calls us. So, door to door will be ideal", P1, 20855).

While chiefs are preferred, during an FGD 20857 participants reported that chiefs can, however, easily be manipulated.

3.5.3.2 Health workers

A quarter of the survey respondents also mentioned that the best person to communicate information about the COVID-19 vaccine is the health worker mainly because he has the knowledge about health issues including vaccines.

> "There are also HSAs who come here in the village for under-five clinics, so, those health personnel can also communicate the information to us", (P3, 20854).

> "The health workers should come and visit us and do dramas to explain about the vaccine since now some people don't even want to hear anything concerning the vaccine. They should visit us in our homes to erase that false information we heard before", (P7, 20860).

Some participants were of the view that these health workers can actually visit places where people meet in large numbers for example churches, market places and also attend meetings organized by the chiefs and explain to people facts about COVID-19. While health workers were preferred to communicate information on the COVID-19 vaccine, there have been situations when they were hated by communities.

> "I feel like church elders and chiefs are the ones with a lot of influence if we are to talk of covid-19 but for the health workers, almost everybody hated them that they are working because of allowances they were getting not that they have our interest at heart", (Religious leaders, Chitipa).

In an FGD with men in Mzimba participants added that once health workers diagnose a COVID-19 patient they are given money. This has made many people to be afraid of going to the hospital for fear of either contracting the disease or being found COVID-19 positive.

3.5.3.3 Involving people from the community

During several FGDs and interviews participants reported that it is advantageous if people from within the community are taught about COVID-19 vaccine and then when communicating such information community members should be effectively engaged. Since COVID-19 vaccine has been controversial, participants argued that the communication of these issues should not just be left to strangers.

> "We want the government to get some people like the youth in our community and educate them on COVID-19 and they should come back and teach us here. Don't bring strangers to teach us, people will not believe. They want testimonies from their own people", (P4, 20859).

> "Yes I have thought so but I and the community members need to get the right information, otherwise I would rather not get the vaccine. One thing I would have loved is that our own people from within our community are part of those that have been trained on covid-19 vaccine to assist us here", (20868).

Some participants were also of the view that the members of the community who should be involved in these activities should also include young people. The argument of using people from the same community was that as mentioned by 20868 "[they] will be our people. They can't betray us all here. They will tell us the real truth about this vaccine. We are united here".

3.5.3.4 Other communication strategies

About 22% reported that radio is the best way of communicating about COVID-19 vaccine. However, participants in FGD / KII mentioned other communication strategies on the CVID-19 vaccines including social media and the radio. These were not preferred: for social media the problem is that it spreads false information on the COVID-19 vaccines which scare people. It was only during an FGD with 20858 during which participants reported that the best person to communicate these messages on the COVID-19 vaccine is the politician.

> "The way I see it, I think the ones that are close are political leaders, they are the ones influential with villagers as they help in different developments already unlike religious leaders who might have different views based on their religions", (P4, 20858)

There were, however, others for example 20868 whose view was that politicians are crooks hence they cannot be trusted to communicate information on COVID-19 vaccines. Other communication strategies suggested included the use of videos, teachers, NGOs, religious leaders and vehicles with loud speakers moving around communities. For videos, the challenge as mentioned by 20860, not everyone can manage to purchase a TV screen. In an FGD Files:/FGD FEMALE participants reported that there are some

people who have hearing impairment and the use of videos would be the most appropriate and effective strategy for communication. In addition to this in rural areas videos are not common and can attract a large audience if used.

> "It can indeed help because videos are not common here so the people will be attracted to the idea of seeing the cinema and then they will get to hear of the vaccine", (P7, Files\\FGD FEMALE).

While some participants reported that videos would be better, others reported that such an approach would not be appropriate for them as their religion forbids them from watching videos. On the other hand, religious leaders can be used to communicate information on the COVD-19 vaccines as they are trusted.

> "A pastor is like a father; a child believes whatever the father says. So even if the pastor may be wrong, the flock he is leading will believe him", (Religious leader Chitipa).

While using public address systems mounted on vehicles can be used, this may not be an effective strategy.

> "I recommend dialogue. Using a car and some loudspeakers -I don't think it is effective because a lot of people take that as noise making, not as a means to get a better and good message. So, I recommend dialogue", (Religious leader, Chitipa)

A key informant in Mzimba reported that using a public address system mounted on a vehicle cannot be effective because people think it is so casual and just meant for entertainment. It was only in one FGD when participants suggested that young people like entertainment and in order to best reach them the use of shows and entertainment can be the best strategy to effectively communicate information on the COVID-19 vaccines. Lastly, some participants suggested that whether it is chiefs, health workers and others who are being used to communicate this information, the best is to use a door-to-door strategy to communicate information on the COVID-19 vaccines. As mentioned at the beginning, the emphasis was again at using existing local structures at community level.

> "It has to be a combination between local and religious leaders. Chiefs as they are gatekeepers, village development committee and the area development committee. Without these local structures nothing can be done. We have much faith in these structures and when doing your things without involving these you are to achieve nothing. They are trusted very much. Social media is always full of lies and cannot be trusted", (20870).

3.5.3.5 Engage those who have been vaccinated

There are people at community level who have been vaccinated against COVID-19 and the feeling among some participants was that these can be engaged to communicate to communities about the COVID-19 vaccine.

"Even those of us who got vaccinated should tell others about the benefits of vaccination like what we do after being screened for cervical cancer. We tell people about the benefits of being screened", (P1, 208560).

"Those people who have been vaccinated in the area should be used as role models for those not vaccinated who might see that they are not dead and this can encourage them to get vaccinated", P?, 20863).

3.6 Attitudes regarding COVID-19 vaccine

Attitudes refer to an individual's feelings, thoughts, and beliefs about something, COVID-19 vaccine in this case, which in turn would positively or negatively influence one's actions. For example, an attitude against the COVID-19 vaccine may influence an individual not to get the vaccine.

Table 3 shows the distribution of the respondents' attitude statements towards the COVID-19 vaccine. The majority of the survey respondents (55%) indicated that it was "very easy" to get a COVID-19 vaccine for themselves, while just over a quarter (26%) said it was "not easy at all". Over half (54%) of them believed that COVID 19 vaccine is important for their health. Although 54% of the respondents reported that COVID 19 vaccine is good for their health, only about 47% expressed much trust in the COVID 19 vaccine while about 27% expressed mistrust. Less than half (42%) of the respondents believed that getting the COVID 19 vaccine would protect other people in the community while about 28% believed that the vaccine cannot protect other people in the community. A good number (72%) of the respondents reported that they trust health workers who administer the vaccine very much while a small proportion (9%) of them reported that they dont trust the health workers at all.

Table 3: Attitudes towards the COVID-19 vaccine

	Number	Percent
How easy is it to get a COVID-19 vaccine for yourself?		
Not at all easy	294	25.5
A little easy	121	10.0
Moderately easy	135	10.0
Very easy	715	54.6
How much do you trust the COVID-19 vaccine?		
Not at all	332	27.0
A little	156	11.6
Moderately	194	14.8
Very much	583	46.6
How important do you think getting a COVID-19 vaccine is for your health?		
Not at all important	283	23.0

A little important	146	11.5
Moderately important	163	11.9
Very much important	673	53.7
How safe do you think a COVID-19 vaccine will be for you?		
Not at all safe	331	26.0
A little safe	213	16.7
Moderately safe	233	17.8
Very much safe	488	39.5
How much do you think getting a COVID-19 vaccine for yourself will protect other people in your community from COVID-19?		
Not at all	359	28.1
A little	197	16.7
Moderately	174	13.2
Very much	535	42.0
How much do you trust the health care worker who gives COVID-19 vaccine?		
Not at all	107	8.7
A little	108	8.3
Moderately	150	10.7
Very much	900	72.4

When asked how much they trust the COVID-19 vaccine, almost half (47%) reported that they trust it "very much" and over a quarter (27%) reported that they did not trust the vaccine at all. In addition, just over half (54%) of the survey respondents reported that the COVID-19 vaccine was "very much important" for their health while 23% reported that it is "not at all important". Whilst the majority of the survey respondents thought the vaccine was very important for their health, only less than half of the survey respondents thought that getting a COVID-19 vaccine will be very much safe for themselves and will protect other people in their community. For example, 40% reported that the COVID-19 vaccine will be "very much safe" for themselves, and a similar proportion of the survey respondents (42%) reported "very much" when asked how much they thought getting a COVID-19 vaccine for oneself will protect other people in their community from COVID-19.

Furthermore, survey respondents were asked how much they trust the health care workers giving the COVID-19 vaccine. Generally, nearly three-quarters (72%) reported they "very much" trust the health workers while nearly one in every 100 respondents (9%) reported that they do not trust health workers giving the vaccines at all.

Table Survey respondents were also asked whether they agreed or disagreed with the following statement: I would get a COVID-19 vaccine if available in my community/district?

Table 4: Proportion of respondents who agreed/disagreed to get a COVID-19 vaccine

	Number	Do you agree or disagree with the following statement: I would get a COVID-19 vaccine if available in my community/district?		
		Agree	Disagree	Don't know/ Not sure/ Depends
All	1265	61.1	27.6	11.2
Sex				
Male	463	70.5	20.7	8.9
Female	802	53.0	33.7	13.3
Age group				
18–29	503	66.9	25.3	7.9
30–49	501	62.9	25.7	11.4
50–59	121	60.6	28.7	10.8
60+	140	52.7	32.2	15.1
Residence				
Urban	200	57.2	34.3	8.5
Rural	1065	61.8	26.4	11.7
District performance				
Low	761	58.5	28.4	13.1
High	504	65.0	26.4	8.6
Region				
Northern	300	76.9	17.4	5.8
Central	301	70.8	19.7	9.4
Southern	664	49.9	35.7	14.5

3.7 Barriers to accessing COVID-19 vaccine

Several barriers to accessing the COVID-19 vaccine were assessed during the household survey and during the FGDs/KIIs. Over half (54%) of the respondents reported not experiencing any barriers to accessing the vaccine. However, some respondents reported the following as barriers: the vaccination site being too far away (20%), people being turned away without the vaccination (5%), bad stories about the vaccine (9%), fear of side effects or complications (5%), lack of trust in the vaccine (6%) (Figure 5, Table 5 and Table 6).

In the FGD and KII, participants reported that either there is none in their communities who have received the COVID-19 vaccine or that a few have been vaccinated. Some informants reported that some people do not trust the COVID-19 vaccines and they have never heard anything positive about these vaccines.

> "They don't trust since no one has fallen sick with this disease in our community", (P1, FGD with females, Mchinji).

A number of barriers to the uptake of COVID-19 vaccines were mentioned also by participants and these are described below.

Figure 5: What makes it hard for you to get a COVUD-19 vaccine?

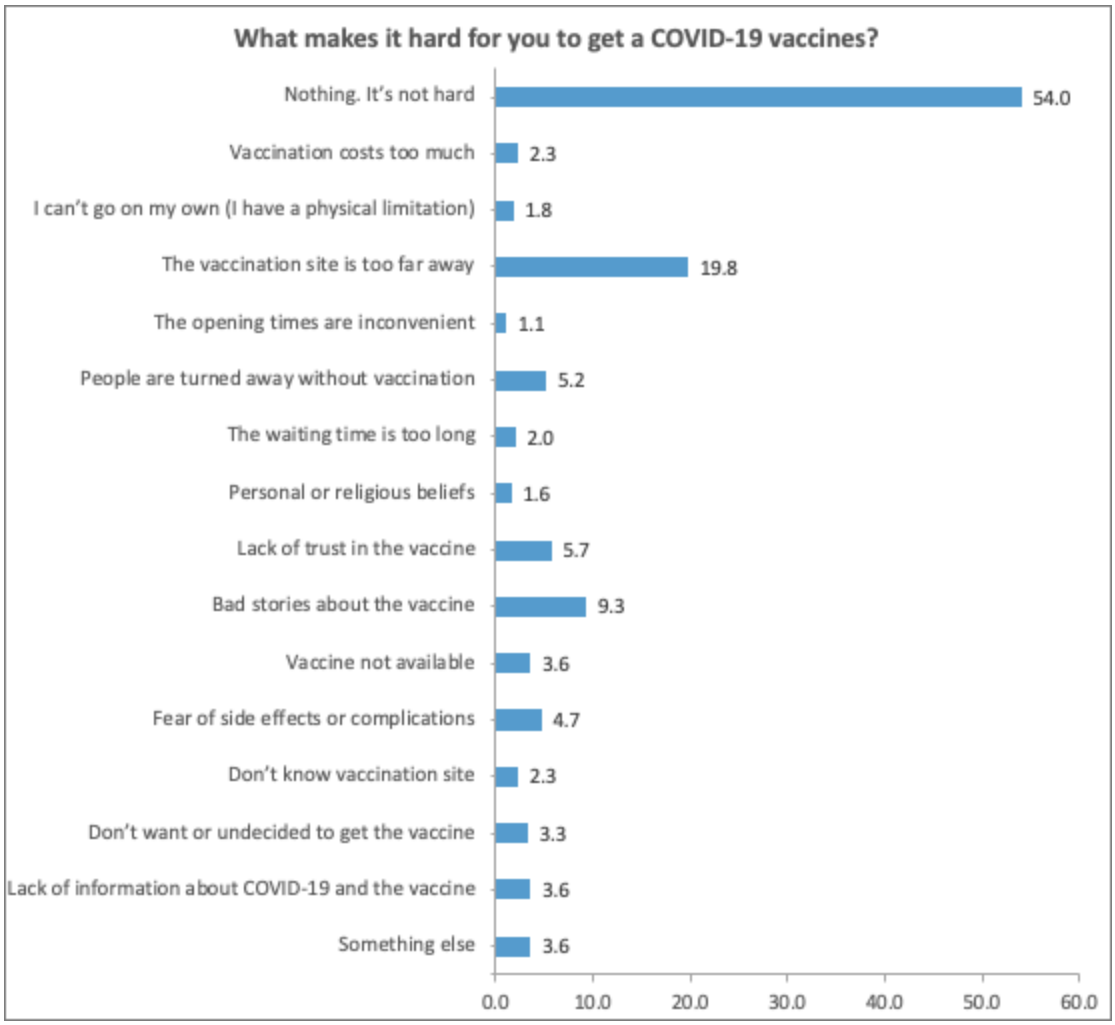


Table 5: Barriers to accessing COVID-19 vaccine by background characteristics

	Number	Nothing. It's not hard	Vaccination costs too much	I can't go on my own (I have a physical limitation)	The vaccination site is too far away	The opening times are inconvenient	People are turned away without vaccination	The waiting time is too long	Personal or religious beliefs
All	1265	54.0	2.3	1.8	19.8	1.1	5.2	2.0	1.6
Sex									
Male	463	54.7	2.4	1.0	20.3	1.3	7.4	3.3	1.5
Female	802	53.4	2.2	2.5	19.4	1.1	3.4	0.9	1.7
Age group									
18–29	503	49.8	3.5	0.7	20.3	1.8	5.4	3.1	1.6
30–49	501	54.2	1.4	0.7	21.6	1.2	7.5	3.0	1.8
50–59	121	55.5	1.8	1.6	17.0	1.1	5.7	1.1	2.4
60+	140	57.9	2.3	4.4	18.3	0.3	2.1	0.0	1.0
Residence									
Urban	200	59.2	2.3	1.5	7.8	2.0	3.2	2.7	3.2
Rural	1065	53.1	2.3	1.8	21.9	1.0	5.6	1.9	1.3
District performance									
Low	761	52.9	1.6	2.5	21.9	1.3	5.1	2.0	0.9
High	504	55.8	3.3	0.7	16.7	0.9	5.5	2.0	2.6
Region									
Northern	300	66.9	1.7	1.1	17.1	2.5	10.2	1.9	1.5
Central	301	56.6	0.0	4.9	28.5	0.7	8.2	2.9	1.1
Southern	664	47.2	3.5	0.7	19.8	0.8	1.7	1.7	1.8

Table 6: Barriers to accessing COVID-19 vaccine by background characteristics

	Number	Lack of trust in the vaccine	Bad stories about the vaccine	Vaccine not available	Fear of side effects or complications	Don't know vaccination site	Don't want or undecided to get the vaccine	Lack of information about COVID-19 and the vaccine	Something else
All	1265	5.7	9.3	3.6	4.7	2.3	3.3	3.6	3.6
Sex									
Male	463	3.4	10.8	4.0	4.3	1.4	4.2	3.6	3.6
Female	802	7.7	8.1	3.3	5.1	3.1	2.5	3.6	3.6
Age group									
18–29	503	5.5	13.4	1.3	5.9	3.1	3.5	2.8	3.8
30–49	501	3.5	11.1	2.8	4.9	1.0	3.0	3.0	4.4
50–59	121	6.3	9.7	6.1	3.6	1.4	3.9	3.6	2.1
60+	140	8.3	2.4	6.0	3.7	3.4	3.0	5.2	3.1
Residence									
Urban	200	6.0	13.5	0.5	5.9	0.7	6.4	0.8	3.8
Rural	1065	5.7	8.6	4.2	4.5	2.6	2.7	4.1	3.6
District performance									
Low	761	6.7	10.0	4.6	4.3	3.0	2.2	4.2	3.3
High	504	4.3	8.3	2.2	5.3	1.2	4.7	2.7	4.0
Region									
Northern	300	0.7	6.0	5.3	2.5	3.3	3.1	2.5	3.0
Central	301	2.2	4.3	5.3	3.9	0.5	0.2	2.2	3.9
Southern	664	9.5	13.0	2.1	6.1	2.6	4.7	4.7	3.8

3.7.1 Side effects of being vaccinated against COVID-19

As one of the barriers to accessing COVID-19 vaccine, about 5% reported fear of side effects / complications. Both participants who were vaccinated as well as those who were not reported that the COVID-19 vaccine is associated with many side effects. The emphasis was that these side effects do not last that long.

> “The day I got vaccinated I had a fever; I was worried and I said to myself am I not dying? But after the fever was gone the worries ended. The fever was for a short period of time”, (P1, FGD with men, TA Kunselema, Mangochi).

> “My body was alarmed since a foreign substance has entered my body. That's why I took panado to avoid other things”, (P7, FGd with men, TA Kunselema, Mangochi).

A few study participants for example an HSA in TA Kameme in Chitipa mentioned that the reports spread through WhatsApp for example that those who were vaccinated experienced side effects made some people decide not to be vaccinated.

> "We are not receiving the vaccine because of the information that we receive through radios and phones that the vaccine has lots of side effects. So, they are saying that we should not accept it in any way to receive the vaccine. So, lots of people are not receiving the vaccine because they are just being discouraged by what people are saying through these communication channels”, P2, FGD with women, TA Chimwala, Mangochi).

3.7.2 Misperceptions about COVID-19 vaccines

Almost one- tenth (9%) of the household survey respondents reported bad stories about the vaccine as one of the barriers to accessing the vaccines. In many FGDs and interviews participants reported that there were negative rumours circulating mainly through social media that contribute to people making decisions not to be vaccinated. These rumours include that once one is vaccinated, he or she will be very weak, that COVID-19 vaccines are poisonous, that people will die once they get vaccinated and that the body develops sores.

> “The rumors we get from radios deter us from getting the vaccine (clarifying)…such as once you get the vaccine you become very weak”, (P2, FGD with females, TA Machinjili).

> "Other chiefs are telling people not to go and receive the vaccine saying that the vaccine is poisonous", (P1, FGD with females, TA Chimwala, Mangochi).

> "…. You find that some of our community leaders are telling us that we are going to die. With that we become afraid. That's one of the problems we have", (FGD with men, urban Mzimba).

There were also rumours that those who have been vaccinated have less years to live, that vaccines make both men and women infertile and some pregnant women fear that they may miscarry once they are vaccinated.

> "I have not been vaccinated. I was afraid that I could miscarry (she is pregnant). I heard that those that are pregnant should not be vaccinated for fear of miscarrying" (P3, FGD with women, urban Mzimba).

20855 also mentioned that there was also a claim that good COVID-19 vaccines are given to health professionals while poisonous ones are given to others.

> "But again, people say that the good vaccines are given to the health professionals and the poisonous ones are given to normal people hence people are not going to receive the vaccine,'' (P6, 20855).

Such rumours, while untrue, scare people from being vaccinated against COVID-19. In a number of FGDs and interviews participants reported that people have even stopped going to the health facilities to receive health services including family planning due to these rumours.

> "We have even stopped taking family planning methods with fear that the health workers will inject us with the COVID-19 vaccine instead. FGD with women"P5, FGD with women, TA Chimwala, Mangochi).

3.7.3 Non-availability of vaccines

Five percent of the household survey respondents mentioned lack of vaccines while about 4% mentioned vaccines not available as some of the barriers to accessing COVID-19 vaccines. There were a few participants vaccinated against COVID-19 because the vaccine was not yet available in their community, or they were not aware if the vaccine was not available at the health centre or that the health workers had not yet informed them about the vaccines.

> "I would say that I went to receive the vaccine but discovered that it had run out. I was very worried because I would often go into town and meet all sorts of people so on my own I knew that I ought to get vaccinated in order to be protected. They were saying that this week, the vaccine may arrive at any time so we will go to get vaccinated", (P7, FGD with women, TA Kalumo, Ntchisi)

While participants wanted to be vaccinated, in some cases the vaccines were not available. This explains why a key informant in Chitipa suggested that the government should make available the COVID-19 vaccines in all health facilities.

> "Government should make sure to supply all health centers with the COVID-19 vaccines, so that people should access the vaccines there. Even at the under-five clinics COVID-19 vaccine should be available so that mothers should get information about COVID-19 vaccine or COVID-19 jabs while attending the under-five clinic. It should not only be accessed in district hospitals", (Key informant, Mzimba).

3.7.4 Long distances to vaccination sites

The Ministry of Health provides the COVID-19 vaccines in established health facilities as well as through outreach clinics. For some places in Blantyre, Mangochi and Mchinji, participants reported health facilities were situated very far and this was a barrier for them to access the COVID-19 vaccine. about 20% reported this as a barrier to accessing COVID-19 vaccine.

> "As I have said it is far to get to the hospital. You can imagine 18kms just for a vaccine aah no. They should rather bring a shelter here for the purpose of providing COVID-19 vaccines…", Village head, TA Machinjiri, Blantyre).

> "…. And also the process of getting the vaccine was hard, many reside in the rural communities and the only trusted hospital is Mzimba hospital, so from the village to the hospital it can cost K7,000 in transport fares. So a round trip can cost K14,000", (Key informant, Mzimba).

In some places, for example in some parts of TA Chimwala in Mangochi, participants claimed that they have not yet received the vaccine in their communities which implied that all the places which were offering this service were situated very far and hence they could not get vaccinated. In TA Kapunula, in Mchinji participants explained that there is no health centre very close to them as such they usually travel to a health centre in neighbouring Zambia to access health services. They reported that if they registered cases there will be no one to take care of them as health workers are not there.

> "We are hearing about the Covid-19 vaccine but the challenge Is that the hospitals are far from us to access the vaccine and there are no permanent health workers here, they just visit us occasionally. The people are willing to get vaccinated but because there is no HSA there is no one to encourage us, we keep deceiving ourselves with false information which is affecting one's willingness to get vaccinated. But all in all, the willingness is there (P3, FGD with men, TA Kapunula, Mchinji).

3.7.5 The perception that vaccines are for children

This was mentioned by very few participants: for example, during an FGD with men in Michiru Ward in Blantyre participants were of the view that vaccines are traditionally for children. However, COVID-19 vaccines are given to adults and this according to participants is strange, hence some do not get it.

> "I didn't receive because as my friends have explained we don't believe in COVID-19 because of how it came. We have received and seen vaccines that have been and are given to children. But this one that is given to adults is very doubtful. Because

> vaccines are given to kids not grown-ups, I didn't get the jab because the disease has stories like 666. New world order they have made a national ID for the people who have vaccinated", (P5, FGD with men, Michiru Ward, Blantyre).

3.7.6 Religious beliefs

About 2% of the household survey respondents reported about religious beliefs as one of the barriers. However, many FGD / KII participants reported that there are some religious beliefs that do not promote the uptake of vaccines including COVID-19 vaccines. In some cases, religious leaders are the ones making people not to get the vaccine as they link this to 666 as written in the Bible.

> "I am a leader from seventh day Adventist. They say that the coming of 666 you will not be able to access anything even go to work. This is what is happening, I have evidence I have friends who have been sent back from work because they don't have the vaccine, even Game stores did a promotion that those who are vaccinated can buy their products at a 10% discount. This has made me conclude that this is the start of 666. I have learnt, I have taught and now I understand the script", (P3, FGD with men, Michiru Ward, Blantyre).

There were also some informants who reported that while many community members trusted the COVD-19 vaccine, churches such as members of the Apostolic Faith did not trust the vaccine.

> "A lot of people in my community trust the COVID-19 vaccine because the vaccine protects the body from the virus. I feel like adequate information should be given to some believers especially members of the Apostolic Faith because they don't believe in the vaccine …. ", (Block leader, South Lunzu Ward, Blantyre).

With the advent of the COVID-19 pandemic people were advised that they should not shake hands and that they should also practice social distancing. However, in one FGD participants said that within Islam it was difficult to follow these guidelines as explained below.

> "As I have already said that we were not supposed to shake hands when we are in the mosque but we are still shaking hands. But Islam does not allow that, we are meant to shake hands other prayers. So we have maintained our rules just like the way we were doing before COVID19", (P2, 20854).

Some religious beliefs are so strong and they do not allow their members to take any form of medication including vaccines. In order to address these challenges the suggestion was that the government, as it did with the HIV/AIDS era, should engage religious leaders effectively.

3.7.7 The perception that COVID-19 is not a problem

There were some places for example in Blantyre and Mangochi where participants reported that they have not yet had cases of COVID-19. They have heard about such cases on the radio. COVID-19 is therefore not an issue for them. Some therefore think that since it is not an issue for them or it is just a

simple thing, there is no need for them to go for vaccination against the disease. Some of these still doubt about the existence

> "We haven't yet received the vaccine here since we are still doubting about the existence of COVID-19"" P6, FGD with females, TA Chimwala, Mangochi).

> "Firstly, till now we still don't understand what this covid-19 is all about. Am saying we still don't understand. We hear different stories pertaining to it some good and some bad, so I am still researching to find the truth so that if I make the decision it should be a right decision"" (Church leader, Chitipa).

There were others who felt that COVID-19 does not exist, that health workers 'lied that there is COVID-19' as explained during an FGD with women in TA Mwaulambya in Chitipa and for such people it is difficult to convince them that they should take the COVID-19 vaccine.

3.7.8 No vaccines for other diseases yet

The signs and symptoms of COVID-19 are just similar to other diseases to which people get cured and there are no vaccines yet for them. The COVID-19 vaccine is therefore not trusted as the disease(s) the COVID-19 shares the signs and symptoms do not have a vaccine. This issue was raised particularly in Michiru Ward in Blantyre. One other issue that was raised by 20857 is that there are many devastating diseases for which a vaccine has not been found and people wonder why a vaccine for COVID-19 has been found so quickly.

> "I also agree, but what I always ask myself is that the vaccine for COVID-19 has been instantly found but we have been having a lot of diseases way back such as cancer, HIV and cholera that don't even have medicine to cure it nor a vaccine. Why is this new disease covid-19? And Upon hearing the bad rumours too that it is destroying the body I decided not to receive, and more over am fit and strong why should I be going to receive the vaccine", P5, 20857).

3.7.9 Experiencing deaths in the community relating to COVID-19 vaccine

There was only one informant, a village head in TA Machinjiri in Blantyre who reported that people in his community need to be convinced about the vaccine and it would not be easy especially after experiencing deaths of people who were vaccinated against COVID-19. These deaths occurred in neighboring villages and in his village no one has been vaccinated so far.

3.7.10 Cash transfer programme for COVID-19 patients

Very few informants in this study reported that patients with COVID-19 in urban areas were receiving money. They were of the view that in areas where people are not receiving money from Government COVID-19 is not there. This issue was also raised in TA Machinjiri in Blantyre and in TA Chimwala in Mangochi.

> "I hear there is money being given to people in other areas, so the problem is people think that maybe if they don't receive the money in their area it means COVID-19 hasn't reached their area …", (HSA, TA Chimwala, Mangochi).

With such views it is very difficult to convince them that they should go and receive the vaccination against COVID-19.

3.7.11 One can still get COVID-19 after being vaccinated

There are some participants who know that once they are vaccinated they can still suffer from COVID-19 but not severely. There are misperceptions that once you get vaccinated you are not supposed to suffer from the disease you have been vaccinated against. However, 20857 says that with covid 19 vaccine, once one is vaccinated it is not a guarantee that you will not suffer from the disease.

> "We did not receive the vaccine with the way it's being described out here, because even though a person should get the vaccine he will still be infected with the covid-19, so I don't see any point because I can't see the real protection there.", (P1, 20857).

If they will still suffer from COVID-19 after being vaccinated against this disease, they do not see the benefits of being vaccinated and they do not understand why they should go ahead and be vaccinated. The other issue with the COVID-19 vaccine is that even after being vaccinated people have to continue using preventive measures such as wearing face masks, washing hands frequently with water and social distancing.

> "You get the jab and they tell you to still follow the preventive measures. So people are looking at vaccines like polio, scabies and the like, it was only one injection and you were fully protected, so its raising questions with this COVID-19", (P1, 20858)

3.7.12 Health workers getting allowances

In several FGDs and interviews participants alleged that health workers get allowances when they diagnose a person with COVID-19 and also for each COVID-19 related death they report.

> "And also previously were the rumors that health workers at Mzimba hospital deliberately kill the patients because they receive allowances for each death reported. For any COVID-19 death at the hospital the health workers are alleged to be pocketing some money. This increased the number of deaths as each death was attributed to COVID-19. The allowances triggered the increase in the death rate. So people stopped going to the hospital when sick as a resultP: yes, in fear of false diagnosis of covid-19", (Radio reporter, Mzimba0.

Due to these claims and the fact that COVID-19 vaccines are being conducted in health facilities, many people feared to get a false diagnosis of COVID-19 hence they could not go to the health facilities.

3.8 Factors that can encourage people to be vaccinated against COVID-19

There were many participants who reported that they had no problems getting the COVID-19 vaccine. This is because they have received vaccines in the past for example for polio and measles and that the government cannot introduce vaccines or any other programme with the aim of killing its citizens.

> "I made the decision by reflecting on the things that happened in the past. There was polio, measles and smallpox. We received the vaccine for these diseases and we can not have them at present, I did not see any difference with the Covid-19 vaccine. I thought that if the government has permitted the vaccine to be given to people then we are supposed get it, so I got vaccinated"" (P1, FGD with men, urban Mchinji)

For such persons there was no need to convince them as they knew the benefits of vaccines. There were some informants in this study who reported that there is nothing that can motivate them to get the covid-19 vaccine.

> "…. I don't see anything that can motivate me into getting the vaccine because I made the decision that this thing is coming from Satan. Going back to history there is no vaccine that is given to the whole world, whilst this one, it's being forced to everyone when we go to court they call it theft by deceit. Same as you people doing this research, I am sure after the report you will use that to encourage people to get the vaccine"" (P3, FGD with men, Michiru ward, Blantyre).

Some people believe that the COVID-19 vaccine is aimed at killing people as mentioned earlier on. During an FGD with men in TA Chindi in Mzimba, participants reported that there were rumours that the government wants to kill 3 million people as a way of depopulating the country. They therefore said that it is better for them not to be vaccinated because they will still die. Study participants made a number of suggestions on the strategies that can be used to encourage people to be vaccinated against COVID-19 as discussed below.

3.8.1 Conducting a comprehensive awareness programme on COVID-19 vaccines

As said earlier, there are many stories circulating in communities about the COVID-19 vaccines. For example, these vaccines make people infertile, therefore people with such views can only be convinced to be vaccinated if they can see women who have been vaccinated having children.

> "I heard that the COVID-19 makes women impotent. If I can see that any vaccinated woman has given birth, I would change my mind and get vaccinated. I am waiting to see what will happen to those who got vaccinated if they will successfully deliver their babies. If nothing bad happens, that will motivate me", P2, FGD with women, TA Chindi, Mzimba).

.

Study participants emphasized that there should be a comprehensive awareness campaign during which correct information about the COVID-19 vaccine should be provided to the population. This will

encourage people to go for COVID-19 vaccine as it would clear the many negative rumours circulating in the communities.

> "We need civic education to make everyone believe in it just like how it was with HIV/AIDs people were used to doubt its existence but with thorough and various campaigns people believed in it eventually"" (P4, FGD with men, Michiru Ward, Blantyre).

> "When I see how people were struggling with the disease and how people who have gotten the vaccine were saying good things about it though it's wise to get vaccine too because there are a lot of problems that our friends who haven't get the vaccine are facing - HSA, Urban Mzimba, Mzimba)

The creation of awareness including mobilization of communities to go for COVID-19 vaccination should not only be done by 'strangers' but community members should also be involved as the feeling among participants was that "our people cannot betray us all here [as] they will tell us the real truth about the vaccine' as narrated by a senior group village headman.

3.8.2 Make COVID-19 vaccine compulsory

The study has identified a number of barriers to the uptake of the COVID-19 vaccines. Most study participants acknowledged that COVID-19 is a big public health problem. This explains why most participants said that a comprehensive awareness campaign should be launched on the COVID-19 vaccine so that people should understand the benefits of the vaccine. Some participants therefore suggested that government should make it compulsory that everyone should be vaccinated

> "I want to say that the government needs to put laws that everyone should go for a vaccine like how it was with the smallpox vaccine. Everyone got the vaccine because if someone doesn't get the vaccine the disease will still be spreading so everyone needs to be vaccinated to protect one another", (P2, FGD with women, TA Nthondo, Ntchisi).

Many study participants suggested that people in Malawi should be made aware of the importance of COVID-19 vaccine and that even village heads should play a part in this activity. In Ntchisi participants further suggested that chiefs should introduce bylaws for all their subjects to be vaccinated. In addition to this, some people suggested that it should be made mandatory that those who access services should be only those that have been vaccinated and thus will make more people get the vaccine

3.8.3 Establish health facilities/Provide health workers

In this study there were some participants who reported that they lived very far from health facilities where COVID-19 vaccines are provided with some participants in Mchinji accessing services in neighbouring Zambia. In such situations two suggestions were made: either to construct health facilities in such places as mentioned during an FGD with men in TA Kapunula in Mchinji or that the Ministry of

Health should introduce outreach clinics in such places as for example mentioned by an HAS in TA Kalumo in Ntchisi.

3.8.4 Provide evidence that COVID-19 vaccine works

Some study participants doubted the effectiveness of the COVID-19 vaccines. A religious leader from urban Ntchisi suggested that there is a need to tell people in Malawi for example that in foreign countries the death rates due to COVID-19 were quite high but after receiving the vaccines the death rates have significantly reduced and countries for example have allowed people to watch football games in stadiums.

> "I think telling people that from foreign countries death rates were so high but after receiving the vaccine [mmmmh] there is a low death rate. I love football a lot and they completely banned [watching] football. They could only allow players to play without people watching and now we have seen that they are allowing people in their stadiums. Just recently there were finals for France and Spain. We saw that there were a lot of people, but these two countries were hit more by the pandemic but because of the vaccine the numbers have decreased which means even in our country the numbers can reduce, we can tell people by giving them such examples", (Religious leader, Ntchisi).

COVID-19 has impacted negatively on the country: many people have contracted the disease and many have died. Such a situation has made people make a decision to be vaccinated against COVID-19. Participants also argued that providing such evidence even from the Malawian context would encourage people to be vaccinated against COVID-19. Some participants argued that it is better that community leaders and other important leaders be vaccinated on the ground where everyone else can see them get the jab and when they see leaders receiving, it's going to be easy for them to follow up. This should not only be for the leaders but also the health workers who are responsible for vaccinating people against COVID-19.

> "Because even the ones giving the vaccine we have never seen them being vaccinated, even to see them on the television being vaccinated at least our hearts would have been at ease", (P5, 20857).

3.8.5 If someone is vaccinated and does not experience side effects

Many people in this study were worried about side effects of the COVID 19 vaccine. This is why some participants reported that if they see someone has gone for vaccination and does not experience any side effects then they would go and get the vaccine themselves.

> "I think if there will be a person from this community who will get the COVID19 vaccine and then face no side effects. Then this person will be the one telling others to go and receive the vaccine since it hasn't shown any serious side effects. This person will be ensuring others about the safety of the vaccine", (P3, FGD with women, TA Chimwala, Mangochi).

Participants therefore suggested that people who got vaccinated against COVID-19 and did not experience any side effects should be used to motivate other people to go for vaccination against COVID-19.

3.8.6 COVID-19 vaccine as a requirement for people to get passports

People in Mangochi like travelling to South Africa for greener pastures. IN order to travel to South Africa, they need passports. It was only in this district during an FGD with men where participants reported that for them a passport is a valuable thing; they, therefore, said that they can accept to be vaccinated if they are told that the only way they can get the passport I =s if they are vaccinated againstCOVID-19.

3.8.7 Conduct door to door vaccinations against COVID-19

It has been said earlier on that the government should introduce outreach clinics where people experience challenges of accessing CIVID19 vaccines because of distance. In addition to this, some participants suggested that the government should introduce door to door vaccination programme for COVID-19.

> "…. Just like how dogs are vaccinated, health workers [should] move door by door and give jabs and sometimes they invite all people in their communities to bring their dogs for the place within the community [where they are offering vaccines] . This will also help in sensitization to the effectiveness of the vaccine as people will be asking questions and getting answers from these people", (20866).

3.9 Practices regarding COVID-19 vaccine

3.9.1 Willingness to get the COVID-19 vaccine

Table 7 presents the distribution of respondents who showed willingness to get a COVID-19 vaccine when recommended to them or available in their community. Over two-thirds of the respondents (67%) showed their willingness to get a COVID 19 vaccine if it was recommended to them, a quarter (25%) were unwilling to get the vaccine and very few (8%) were undecided. Males (77%) were more willing to get the vaccine when it was recommended to them than their female counterparts (59%). In addition, the trend was not very different by area of residence and age group although the 60+ group was lower than the younger age groups. Most respondents from the rural area (68%) would get the vaccine if recommended as compared to 62% in the urban area. Further, respondents from high performing districts and in the Northern region were more likely to report willingness to get the vaccine when it was recommended to them.

When asked whether they agree or disagree with getting the COVID-19 vaccine if available in their community, most respondents (61%) expressed willingness to get the vaccine, over a quarter (28%) were unwilling and the remaining few (11%) were undecided. The proportion of those who were willing to get the vaccine when available in their community was slightly lower than those who were willing to get the

vaccine if it was recommended to them. However, the proportion slightly increased by about 3% for those who were unwilling or undecided to get the vaccine when available in their community. As presented in Table xxx, the trend in the distribution of respondent's willingness to get the vaccine if available in their community is similar to those who showed willingness to get the vaccine when recommended to them..

Table 7: Distribution of respondents' willingness]to get a COVID-19 vaccine by background

	Number	If a COVID-19 vaccine were recommended for you, would you get it?			Would you recommend a COVID-19 vaccine to eligible adults aged 18 years or older in your community?		
		Yes	No	Don't know/ Not sure	Yes	No	Don't know/ Not sure
All	1265	67.4	24.9	7.7	61.7	27.7	10.6
Sex							
Male	463	76.6	19.2	4.1	70.0	22.4	7.6
Female	802	59.4	29.8	10.8	54.5	32.4	13.1
Age group							
18–29	503	73.5	21.9	4.6	65.8	24.6	9.6
30–49	501	71.8	22.9	5.3	67.9	24.8	7.3
50–59	121	67.5	25.0	7.4	62.8	26.7	10.5
60+	140	55.2	30.6	14.3	48.8	35.4	15.8
Residence							
Urban	200	62.5	32.3	5.2	62.3	32.3	5.4
Rural	1065	68.3	23.6	8.1	61.6	26.9	11.5
District performance							
Low	761	64.9	26.6	8.4	58.7	26.9	14.4
High	504	71.1	22.3	6.5	66.1	28.9	5.0
Region							
Northern	300	80.0	14.4	5.6	73.2	18.5	8.4
Central	301	78.2	16.1	5.8	67.7	24.8	7.5
Southern	664	57.2	33.4	9.4	53.9	33.1	12.9

3.9.1 Reasons for unwillingness to get the COVID-19 vaccine

Respondents who reported unwillingness to get the COVID-19 vaccine when recommended to them were further asked to indicate the reasons for their unwillingness. Overall, the main reasons for not willing included lack of trust in vaccines, fear of side effects, lack of information, the vaccine not effective and being undecided, presented in Figure xxx. As it can be seen from Table xxx, respondents from rural areas (29%) and low performing districts (20%) were more likely to express lack of information for their

unwillingness to get the vaccine when recommend to them compared to their counterparts (11% urban and 20% high performance district).

Figure 6: Distribution of reasons for unwillingness to get a COVID-19 vaccine

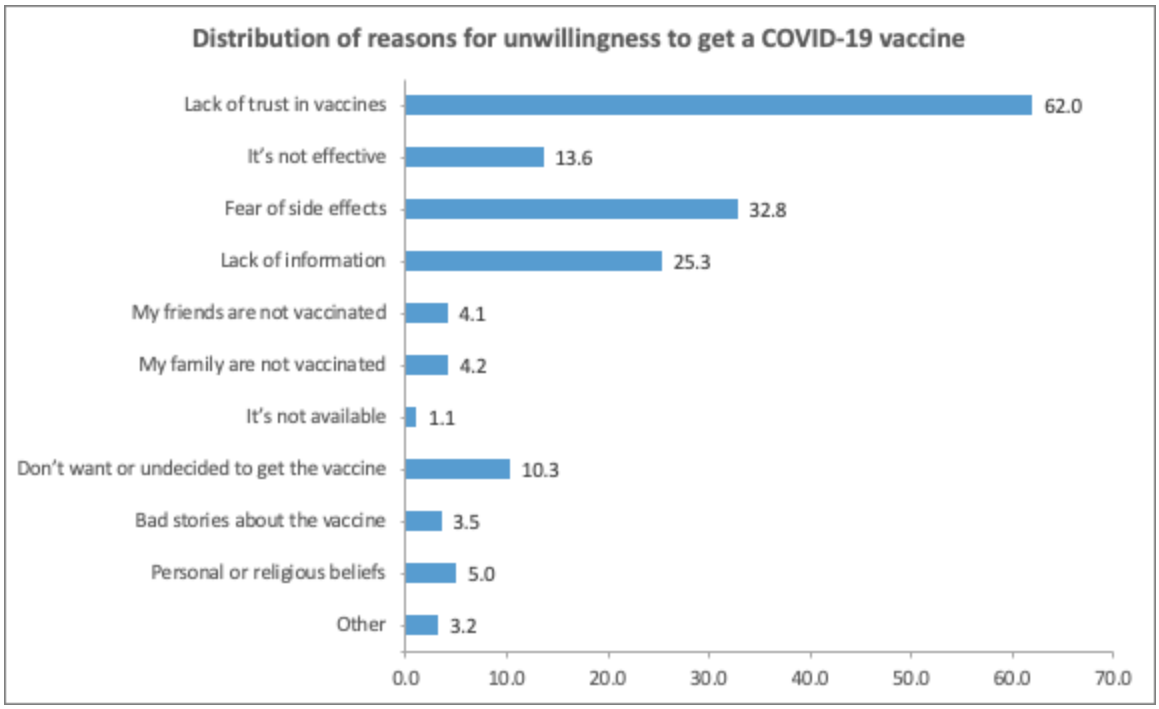


Table 8: Distribution of reasons for unwillingness to get the COVID-19 vaccine [1]

	Number	Lack of trust in vaccines	It's not effective	Fear of side effects	Lack of information	My friends are not vaccinated	My family are not vaccinated
All	381	62.0	13.6	32.8	25.3	4.1	4.2
Sex							
Male	106	62.8	17.8	31.4	25.6	5.1	6.0
Female	275	61.4	10.0	34.0	24.9	3.3	2.7
Age group							
18–29	142	67.3	19.5	31.1	21.8	2.7	2.2
30–49	151	62.3	18.4	49.0	25.0	6.2	5.5
50–59	41	61.9	4.2	29.1	20.6	1.7	1.7
60+	47	55.3	5.8	16.1	32.3	4.6	6.5
Residence							
Urban	75	69.9	17.4	43.8	11.4	3.6	4.1
Rural	306	60.2	12.7	30.2	28.4	4.3	4.3
District performance							
Low	239	59.1	11.0	30.2	28.9	2.3	2.9

High	142	66.3	17.4	36.5	19.9	6.8	6.1
Region							
Northern	64	62.3	12.0	34.3	30.9	0.0	0.0
Central	66	72.4	14.4	55.0	39.1	2.6	6.4
Southern	251	59.2	13.6	26.5	20.0	5.8	4.9

Table 9: Distribution of reasons for unwillingness to get the COVID-19 vaccine [2]

	Number	It's not available	Don't want or undecided to get the vaccine	Bad stories about the vaccine	Personal or religious beliefs	Other
All	381	1.1	10.3	3.5	5.0	3.2
Sex						
Male	106	0.5	12.9	2.8	4.6	2.3
Female	275	1.7	8.0	4.2	5.3	3.9
Age group						
18–29	142	0.0	7.7	6.7	3.9	2.4
30–49	151	0.7	8.0	4.9	3.6	2.4
50–59	41	0.0	19.0	0.0	6.4	2.7
60+	47	3.7	11.1	0.0	7.3	5.2
Residence						
Urban	75	0.0	10.3	7.9	3.9	1.7
Rural	306	1.4	10.3	2.5	5.2	3.4
District performance						
Low	239	0.8	9.5	2.8	7.0	4.7
High	142	1.6	11.3	4.6	2.0	0.9
Region						
Northern	64	0.6	17.0	0.0	1.3	1.3
Central	66	0.0	5.4	0.7	6.0	1.2
Southern	251	1.6	9.6	5.3	5.8	4.9

3.9.2 Willingness to recommend the COVID-19 vaccine

Respondents were asked whether or not they would recommend a COVID-19 vaccine to eligible adults aged 18 years or older in their community. Overall, 62% of the respondents reported that they would recommend, over a quarter (28%) reported that they would not recommend it, and the remaining few (11%) were undecided (Figure 7 and Table 10). Females and respondents from the Southern region were less likely to recommend the COVID-19 vaccine to others than their counterparts. In addition, younger respondents were more likely to recommend the vaccine than older respondents. For example, over 60% of respondents aged 59 and below were more willing to recommend the vaccine to others compared to 49% of those aged 60 years and older.

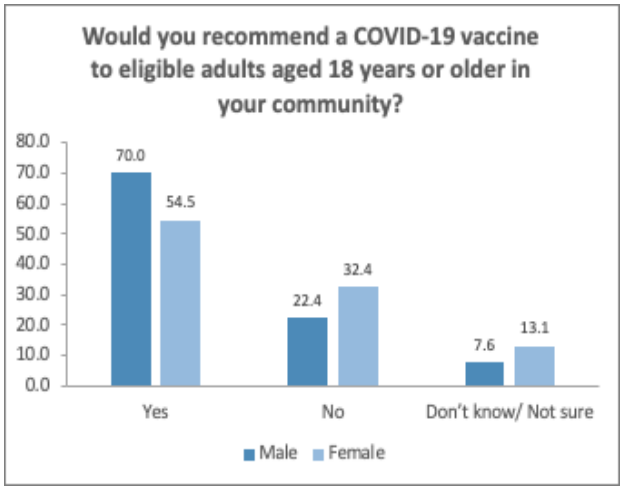


Figure 7: Willingness to recommend COVID-19 vaccine by sex

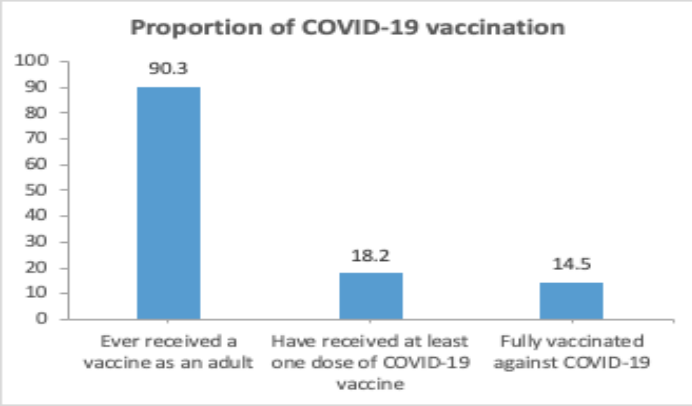
Table 10: Respondents''; willingness to recommend a COVID-19 vaccine to eligible adults in their community

	Number	Would you recommend a COVID-19 vaccine to eligible adults aged 18 years or older in your community?		
		Yes	No	Don't know/ Not sure
All	1265	61.7	27.7	10.6
Sex				
Male	463	70.0	22.4	7.6
Female	802	54.5	32.4	13.1
Age group				
18–29	503	65.8	24.6	9.6
30–49	501	67.9	24.8	7.3
50–59	121	62.8	26.7	10.5
60+	140	48.8	35.4	15.8
Residence				
Urban	200	62.3	32.3	5.4
Rural	1065	61.6	26.9	11.5
District performance				
Low	761	58.7	26.9	14.4
High	504	66.1	28.9	5.0
Region				
Northern	300	73.2	18.5	8.4
Central	301	67.7	24.8	7.5
Southern	664	53.9	33.1	12.9

3.9.3 Levels of COVID-19 vaccination

Of the 1265 respondents, the vast majority (90%) reported to have ever received a vaccine as an adult, and the proportion is almost similar across the socio-demographic characteristics of participants (Figure xxx). However, only 18% percent of the respondents reported that they have received at least one dose of a COVID-19 vaccine and about 15% of them were fully vaccinated against COVID-19.

Figure 8: Proportion of those who have ever received COVID-19 vaccine



As shown in Table xxx, the proportion of those who have received at least a dose of the COVID-19 vaccine is similar among males and females, but slightly higher among males with regards to those fully vaccinated. In addition, the proportions of those who reported to have ever received at least one dose of COVID-19 vaccine and those who were fully vaccinated against COVID-19 at the time of the household survey were lower among rural residents, respondents from low performing districts and those from the Southern region compared to their counterparts.

Table 11: Proportion of those who have ever received COVID-19 vaccine by background characteristics

	Number	Ever received a vaccine as an adult	Have received at least one dose of COVID-19 vaccine	Fully vaccinated against COVID-19
All	1265	90.3	18.2	14.5
Sex				
Male	463	88.0	17.8	15.0
Female	802	92.3	18.5	14.0
Age group				
18–29	503	88.4	12.1	7.8
30–49	501	90.2	18.9	16.0
50–59	121	89.4	20.7	19.0
60+	140	93.0	23.0	17.9
Residence				
Urban	200	82.0	22.2	19.4
Rural	1065	91.7	17.5	13.6
District performance				
Low	761	92.5	12.4	10.6
High	504	87.1	26.6	20.2
Region				

Northern	300	86.4	19.7	16.2
Central	301	92.4	29.2	20.3
Southern	664	91.1	12.6	11.1

3.9.4 Descriptive social norms following vaccination

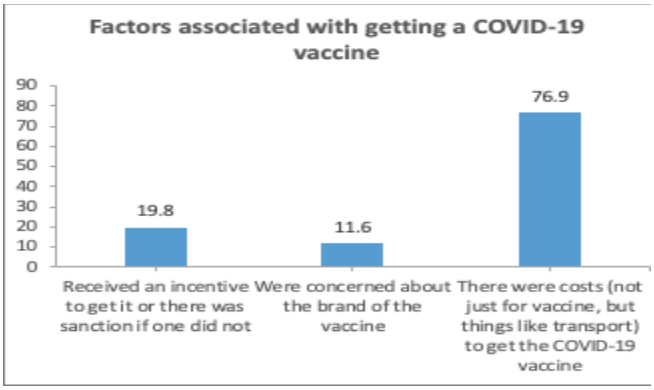
The respondents who reported to have ever received at least a dose of the COVID-19 vaccine were asked who they discussed with regarding their vaccination decision. Overall, Table 12 shows that, of the 206 who reported to have ever received a COVID-19 vaccine, nearly half (49%) did not discuss with anyone while about 38% discussed with their spouse/partner. Over eighty percent had a final say about getting the vaccine without being coerced nor given an incentive despite incurring different costs while getting the vaccine.

Table 12: Who did you discuss it with to get a COVID-19 vaccine?

	Number	Percent
Who did you discuss it with to get a COVID-19 vaccine?		
None	91	49.2
Spouse/ partner	88	37.5
Parents (mother/ father)	8	3.5
Children (daughter/ son)	2	2.3
Other relatives (sister/ brother/ uncle/ aunt/ grandparents/ parents in-law)	4	1.8
Health worker	2	1.1
Friend	9	3.7
Entire family	2	0.9
Who had a final say in this decision in your family to get a COVID-19 vaccine?		
Me	164	83.0
Spouse/ partner	35	12.4
Parents (mother/ father)	5	2.2
Children (daughter/ son)	1	2.1
Entire family	1	0.3

3.9.5 Factors associated with getting a COVID-19 vaccine

Respondents who reported that they have ever received a COVID-19 vaccine (n=206) were further asked to indicate whether or not they received an incentive to get the vaccine or a sanction if they did not, were concerned about the brand of the vaccine, and whether there were costs (not just for vaccine, but things like transport) to get the COVID-19 vaccine. Overall, more than three-quarters (77%) reported that there were costs associated with getting the vaccine, about one-fifth (20%) reported that they received an incentive to get the vaccine or a sanction if they did not, and a minority (12%) reported that they were concerned about the brand of the vaccine.



Respondents aged 18–29 and urban residents were more concerned about the brand of the vaccine than their counterparts. Again, urban residents, respondents from high performance districts as well as those from Central and Southern Malawi were more likely to report that there were associated costs of getting the COVID-19 vaccine.

Table 13: Factors associated with getting a COVID-19vaccine

	Number	Received an incentive to get it or there was sanction if one did not	Were concerned about the brand of the vaccine	There were costs (not just for vaccine, but things like transport) to get the COVID-19 vaccine
All	206	19.8	11.6	76.9
Sex				
Male	76	21.9	10.7	71.1
Female	130	18.0	12.3	81.9
Age group				
18–29	60	20.8	21.3	67.3
30–49	88	22.5	8.9	82.0
50–59	23	7.3	12.0	78.7
60+	35	20.2	3.3	81.2
Residence				
Urban	41	9.3	22.7	91.4
Rural	165	22.0	9.2	73.9
District performance				
Low	84	13.8	8.2	55.8
High	122	24.3	14.1	92.5
Region				
Northern	53	7.8	9.3	36.5

Central	83	34.7	10.9	100.0
Southern	70	13.1	14.1	83.2

Since the advent of the COVID-19 pandemic people have been advised to continue observing COVID-19 preventive measures. The concern however is that these COVID-19 preventive measures are not being religiously followed.

> "I can explain it like this, it can be a big problem or a small one. Depending on what I see in the streets. People are reluctant in wearing masks if they do they just do it because they are scared of those in authority", (P4, 20858).

This study also explored people's knowledge about whether they should still observe COVID-19 preventive measures. Many people were of the view that even after being vaccinated people have to use COVID19 preventive measures.

> "We can continue wearing a mask because we are still going out and lots of people haven't received the vaccine yet and they might have been infected and might have coughed and infected you. So, we continue wearing masks even after you have been vaccinated", P3, 20654).

> "Yes, it is true. One must continue to wear a mask and keep a distance after receiving the vaccine", (P2, 20855).

> "It is necessary to observe all the precautions that we are told to observe by the health workers, we are continuing to wear masks, washing hands and other measures", (P3, FGD with men, TA Kapunula, Mchinji).

While most participants said that they are supposed to adhere to COVID-19 preventive measures after being vaccinated, some did not know or were not all that sure. Others felt that if after being vaccinated against COVID-19 people still are required to continue observing preventive measures including wearing face masks then "…. People think that it is not important to get the vaccine if they are still forced to continue with all COVID-19 preventive measures' as narrated by a key informant in Mzimba.

4.0 CONCLUSION AND RECOMMENDATIONS

This study was conducted to understand the current knowledge, attitudes, practices, drivers, bottlenecks and communication channels on COVID-19 vaccine uptake to improve the design and implementation of interventions that would improve vaccine uptake in Malawi. This study has found that 97% of the respondents have ever heard about COVID-19 vaccine. This is higher than the proportion of respondents who reported to have ever heard about the vaccine in Bangladesh (90%) and Oman (88%) (Al-Marshoudi 2021; Islam, 2021).

Furthermore, we found that the most common sources of COVID-19 vaccine information among the surveyed were radio, community leaders and health workers. Social media and other online platforms (Twitter or Instagram) were not popular and were described as spreading false information of COVID-19 vaccine that contributed to people refusing to be vaccinated. Again, radio and health workers were cited as most preferred and trusted sources of information. Our finding is similar to an earlier study which reported radio as the most popular trusted source of information about COVID-19 in Malawi unlike social media (Africa CDC). This suggests that radios and health workers would be key in spreading the correct information about the COVID-19 vaccine to improve vaccine acceptance and uptake in the country.

In 2019 WHO reported that unwillingness to get the vaccine was one of the top ten global health threats (WHO, 2019) and this continues to be a problem with COVID-19 vaccination as well. In this current study, over two thirds of the respondents (67%) were willing to get a COVID-19 vaccine if it was recommended to them, a quarter (25%) were unwilling to get the vaccine while about 8% were undecided. More male respondents (77%) were willing to get the vaccine when it was recommended to them than their female counterparts. A report on acceptance of COVID-19 vaccines in Sub-Saharan Africa, which Malawi is part, also showed more men willing to take the vaccine than women and it further showed that respondents in urban area were more skeptical than those from rural areas (Kanyanda, 2021).

This study also identified barriers to the uptake of the CoVID-19 vaccine and these included concerns about possible side effects, lack of information about the vaccine, safety of the vaccine, doubts about the effectiveness of the vaccine against COVID-19, religious and related reasons, long distances to facilities that offer vaccination, the belief that the vaccine causes infertility that it makes men fail to perform in bed. A rapid systematic review around COVID-19 vaccine hesitancy globally also documented perceived risk, concerns about the vaccine safety and doubts about the safety and effectiveness of the vaccine as some of the common influencing factors for vaccine hesitancy (Lin, 2020, Larson 2014 & Karafillakis, 2016).
While all these barriers were mentioned, 54% of the respondents reported that they were not experiencing any barriers to accessing the vaccine. This study found that 15% of the respondents were fully vaccinated while 18% had received at least one dose of COVID-19 vaccine. This proportion is higher than the current proportion of people who are partially and fully vaccinated in Malawi estimated at 6% and 3% respectively.

Based on the results of the findings of this study the following recommendations:

- **Continued creation of awareness about COVID-19 and COVID-19 vaccine:** A majority of people in Malawi have been reached effectively with COVID-19 and COVID-19 vaccine messages through different channels including radio, community leaders and health workers. These channels should continue being used. These messages should target at addressing the negative rumours about COVID-19 and COVID-19 vaccine.

  In addition to this, people who have been vaccinated, should be used in the creation of awareness about the COVD19 vaccine. There were also suggestions that the creation of awareness should be door to door.

- **The use of social media:** As mentioned earlier, social media negative rumours are spread quite quickly, and this negatively impacts the uptake of COVID-19 vaccines. In this study, participants emphasised the need for provision of correct information in order to ensure that people are knowledgeable about this. While social media can be used to provide information, it is limited in that not every Malawian has a smartphone. It should be complimented by other forms of communicating COVID-19 vaccine information.

- **Explore making COVID-19 vaccine mandatory:** Government of Malawi, with guidance from WHO, provides guidance on how people can protect themselves against COVID-19 vaccine. Unfortunately, the use of COVID-19 measures such as masks, regular handwashing with soap and social distancing are not being used consistently. Government of Malawi should explore the mandatory vaccination against COVID-19.

- **Provide vaccines through outreach clinics:** Distance is a major barrier to accessing COVID-vaccine. It would be better if arrangements can be made to provide vaccines through outreach clinics.

REFERENCES

1 Ministry of Health. COVID-19 National Information Dashboard. 2021. Accessed on September 3, 2021 from https://covid19.health.gov.mw/

2 World Health Organization. WHO Coronavirus (COVID-19) Dashboard. 2021. Accessed on September 3, 2021 from https://covid19.who.int/?adgroupsurvey={adgroupsurvey}&gclid=Cj0KCQjw7MGJBhD-ARIsAMZ0eeshhLbcxeQC0_Nbw2JFlaFNlBwuegpkNmdU1ir0HKawY6Llh7OPtVsaApWkEALw_wcB

3 GAVI. COVAX vaccine roll-out Malawi. 2021. Accessed on September 3, 2021 from https://www.gavi.org/covax-vaccine-roll-out/malawi

4 World Health Organization. WHO Coronavirus (COVID-19) Dashboard. 2021. Accessed on September 3, 2021 from https://covid19.who.int/region/afro/country/mw

11 Chitsulo L. Mixed views on 60% COVID jabs target. The Nation. September 6, 2021:1–3.

12 WHO. Coronavirus disease (COVID-19): Herd immunity, lockdowns and COVID-19. 2020. Accessed on September 3, 2021 from https://www.who.int/news-room/q-a-detail/herd-immunity-lockdowns-and-covid-19

14 Naing L, Winn T, Rusli BN. Practical Issues in Calculating the Sample Size for Prevalence Studies. Arch Orofac Sci. 2006;1:9-14. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.504.2129&rep=rep1&type=pdf

15. World Health Organization. Data for Action: Achieving High Uptake of COVID-19 Vaccines. Interim Guidance. 2021. Accessed on July 29, 2021 from https://www.who.int/publications/i/item/WHO-2019-nCoV-vaccination-demand-planning-2021.1

10.0 Annexes