

Barriers and Enablers to COVID-19 Prevention Behaviours and Vaccine Uptake in Five Districts of Southern Province, Zambia: A Barrier Analysis Study in Sinazongwe, Pemba, Monze and Kalomo

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Abstract:

➤ Background:

Despite high awareness of COVID-19, adoption of prevention behaviours and vaccinations remained suboptimal in Zambia. Southern Province, with high multiple waves due to high mobility and cross-border trade.

➤ Objective:

To identify barriers and enablers to consistent mask wearing, handwashing, and Covid-19 vaccination uptake in Sinazongwe, Monze, Pemba, Kalomo and Namwala districts.

➤ Method:

A cross-sectional Barrier analysis using Doer and Non- Doer approach was conducted between 1st July to 31st July 2020. 150 households with 1350 respondents were interviewed. Data was collected using a semi-structured questionnaire based on 12 behavioral determinants. Data was analyzed using the data collection tools. Mobile phones and tablets were used to collect data from the participants. All questions in the tool were scripted on the web-based platform Open Data Kit (ODK). The survey tool was uploaded to the server and downloaded to the phones and tablets. Data was collected offline and uploaded online with the availability of internet service. The interviews were face-to-face taking into consideration health guidelines recommended by Ministry of Health.

➤ Results:

Overall uptake was; mask use 37.6%, regular handwashing 44.6%, at least one vaccine dose at 48.2%. Key barriers included low perceived susceptibility, discomfort with mask, lack of water/ soap, fear of vaccine side effects, infertility myths, long queues at the clinic, and poor access in rural areas. Health workers, fear of fines, need of vaccine cards for travel, and social influence recommended key enablers from leaders. Uptake was lowest in Sinazongwe and Monze.

➤ Conclusion:

Knowledge alone did not drive the behaviour. COVID-19 prevention was limited by behavioral structural and social factors. Social Behaviour change programs should address misinformation, improve access to WASH and vaccine, and engage trusted community, influential and faith leaders. Findings are critical for Pandemic preparedness in Zambia.

Keywords: COVID-19, Barrier Analysis, Vaccine Hesitancy, and Social Behavior Change.

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I. INTRODUCTION

The Coronavirus Disease 2019 (COVID-19) pandemic has been one of the greatest public health challenges of the 21st Century. To date, it has resulted in more than 5 million

deaths worldwide, paralyzed health systems and damaged livelihoods (Assefa et al., 2022). As of 4 June 2021, sub-Saharan Africa recorded 3,530,845 cases with 131,630 deaths (WHO, 2022). The continent's case fatality rate, which is the proportion of deaths among confirmed cases, stood at 2.6%

against the global average of 2.2%, as of July 2021 (WHO, 2021a).

Zambia reported its first COVID-19 case in March 2020 and has since recorded 333,454 cases with 2,869 deaths, as of 10 October 2022 (ZNPFI, 2022). The most common symptoms of this viral infection are fever, cold, cough, bone pain, and breathing problems; which can ultimately lead to pneumonia (Haleem et al., 2020). Prevention and management of COVID-19 is now a global agenda with the implementation of restrictive measures such as social distancing, hand washing, masking up, and isolation to prevent further spread of the virus (Bhat et al., 2020).

Concerted efforts by scientists led to the development of several vaccines, with the first available COVID-19 Vaccine having 95% efficacy and a good safety profile announced in the press by Pfizer-BioNTech on 18 November 2020, raising the hope of ending the pandemic (Liew & Lee, 2021). Vaccines have been seen as a cost-effective health measure for disease prevention because they are developed to reduce the mortality and morbidity rate of diseases (Andre et al., 2008). The COVID-19 Vaccine is important in developing antibodies to the disease and thus put the virus' spread into decline (Jeyanathan et al., 2020).

Motivation to accept the COVID-19 Vaccine has varied considerably across countries over the course of the pandemic. Factors such as knowledge levels about the vaccine, conflicting views from significant others, previous bad experience, the belief that God protects against illness, and environmental factors, as well as faith in doctors, shape the uptake of vaccines, as reported by Kucheba et al. (2021), including rumours and conspiracy theories (Islam, et al. 2021). Vaccine acceptance and hesitancy also depend on the belief in vaccination and its safety, the trust placed in the system that delivers the vaccines, health issues, fear of side effects, and a lack of recommendation by healthcare workers (Pugliese-Garcia et al., 2018). Meanwhile, citizens' trust in biomedical science has been acknowledged as another factor that might affect people's attitudes toward vaccination (Palamenghi et al., 2020).

Scaling up and implementation of COVID-19 vaccination programs have received much attention in most low- and middle-income countries like Zambia. The Republic of Zambia, through the Ministry of Health (MoH), officially launched its COVID-19 Vaccination campaign on 14 April 2021, after receiving the first consignment of 228,000 doses of the vaccine from the COVAX facility, a global initiative representing a partnership among the World Health Organization, the Global Alliance for Vaccines and Immunization, UNICEF, and the Coalition for Epidemic Preparedness Innovations, working on the equitable distribution of COVID-19 Vaccines (Xinhua, 2021). Despite the huge efforts made to achieve successful COVID-19 Vaccination rollout and implementation in Zambia, the country remains having one of the lowest rates of population vaccination among its citizens, with 25,644 individuals fully vaccinated as of 10 October 2022, which translates into 5.4% of the total eligible population (ZNPFI, 2022).

The World Health Organization's Strategic Advisory Group of Experts on Immunization reviewed vaccine hesitancy definitions and concluded in their report that vaccine hesitancy is complex and driven by multiple factors. One intuitive framework for vaccine hesitancy is the "3C" model: The 3C model of vaccine hesitancy by definition is a model which was developed to map three main factors that influence vaccine uptake and these uptake include: confidence barriers, complacency barriers and convenience barriers (WHO, 2014).

➤ *Complacency*

Low perceived risk of vaccine-preventable diseases, so vaccination is not deemed necessary and other health issues may be a higher priority.

➤ *Confidence*

Low levels of trust in vaccines, the delivery system, or health authorities. This may include doubts about vaccine efficacy, motivations of policymakers, or mistrust rooted in a history of unethical public health practices.

➤ *Convenience*

Barriers related to physical availability of vaccines, geographic accessibility, affordability, and acceptability of services.

Some evidence exists regarding the epidemiological geographic mapping of COVID-19. However, very little has been documented on factors and strategies affecting COVID-19 Vaccination acceptability in Zambia. This gap calls for the need to understand the underlying concerns and barriers among those who are and are not intending to receive the COVID-19 Vaccine (Carcelen et al., 2021).

Given the severity of the COVID-19 pandemic and the time pressure to accelerate COVID-19 Vaccination, there was urgent need to gain insight into the psychological proposition of how people think and feel specific to the newly developed COVID-19 Vaccines so that effective recommendations or strategies may be proposed to improve vaccine uptake (Liew & Lee, 2021).

➤ *Study Objectives*

This study attempted to explore the barriers and provide an in-depth analysis of factors leading to low uptake of the COVID-19 Vaccines and recommend possible ways of addressing the challenges in the selected five (5) implementing Districts which are Monze, Pemba, Sinazongwe, Namwala and Kalomo in Southern Province, Zambia. The named districts are locations where WVZ has been implementing the Pfizer project since June, 2022 and whose main project goal is to increase the COVID-19 vaccine confidence, acceptance and uptake demand levels in vulnerable communities through multiple interventions composed of Risk Communications and Community Engagement strategies. The study is for academic purpose.

➤ *Specific Objectives*

- To identify the socio - demographic factors contributing to the low COVID-19 vaccination rates among the population in selected Districts of Southern Province.
- To understand people's knowledge about the COVID-19 Vaccines.
- To investigate whether or not men and women would take the COVID-19 Vaccine when presented to them.
- To investigate whether Children aged 12 – 16 years old would take the COVID-19 Vaccine when presented to them.
- To identify the specific myths and misconception that are contributing to low COVID-19 vaccination.

II. METHODOLOGY

➤ *Study Design*

This study involved a mixed methodology of both quantitative and qualitative data. To assess people's perception regarding the use and uptake of the COVID-19 vaccine, the study team collected quantitative data from persons aged 12 and above situated in five districts implementing the Pfizer project. The main logic thought of selecting and classifying participants between 12 – 16 years old as children is because the Ministry of Health in Zambia only approves vaccination of children beyond the age of 12 years. Furthermore, the Penal Code Act, Chapter 87 of the Laws of Zambia under section 131A defines a child as a person below the age of (16) sixteen years. A rapid assessment tool was used to collect quantitative data intended to identify enablers and barriers associated with the uptake or refusal to take up the COVID-19 vaccine in Zambia. The qualitative data was collected through the focus group discussions (FGDs) that were conducted in all the five districts in Southern province implementing the Pfizer Pfizer project. The target participant group for these FGDs was children aged 12 -16 years old, people living with disabilities, community members, traditional and faith leaders.

➤ *Sampling*

The sampling design for the barrier analysis utilized the probability sampling method to select units of measure. By definition probability, sampling is a sampling method in which each element from the larger population has a known non-zero chance of selection, or they must be selected using a random sampling technique (Das et al., 2017). The research participants were drawn from five districts implementing the Pfizer project. These districts include Monze, Pemba, Sinazongwe, Kalomo and Namwala. The study participants were not restricted to World Vision Zambia catchment areas.

➤ *Sample Size*

For this quantitative survey the main interest was those areas having the least vaccine percentage coverage, a sample of 150 respondents were randomly drawn from 5 districts. The sample size was arrived at after considering the five (5) least performing areas under health facilities with low COVID-19 vaccine uptake in each respective district another determining factor was limited capacity. The study participants were drawn from ordinary community members,

faith and traditional leaders. In terms of sample proportions 95 were drawn from ordinary community members, 25 from faith leaders and 30 from traditional leaders. The faith and traditional leaders were purposively selected (See table 1 below).

Table 1 Sample Size for Each Respective District

District	Frequency	Percent
Monze	36	23.9
Pemba	23	15.1
Sinazongwe	20	13.5
Kalomo	37	24.6
Namwala	34	22.9
Total	150	100

➤ *Training of Data Collectors*

After developing the data collection tool, a three days enumerators training was conducted from 12th to 15th July, 2022, the aim of the training was to ensure the accuracy and reliability of the data-gathering and data entry procedures. During the training exercise, the enumerators were taught sampling techniques for this study to ensure that correct proportions and target populations were adhered to.

➤ *Piloting of the Study Tool*

The study team conducted a pilot of the survey tools on 14th July, 2022. This exercise was done to confirm the adequacy of the tool developed and ensuring that all required data was covered in the tool. The tool was also piloted to guarantee its clarity in terms of yielding reliable data from the respondents. This was also done to test field procedures and processes that were used during actual data collection. Based on the pilot results, changes required to be adjusted to the instruments were done to ensure that the questions in the research tool provided clarity and adequacy.

• *Data Collection*

Mobile phones and tablets were used to collect data from the participants. All questions in the tool were scripted on the web-based platform Open Data Kit (ODK). The survey tool was uploaded to the server and downloaded to the phones and tablets. Data was collected offline and uploaded online with the availability of internet service. The interviews were face-to-face taking into consideration health guidelines recommended by Ministry of Health. The data was collected from 18th to 22nd July, 2022.

• *Data Analysis*

Since the district have different populations, the data was weighted at analysis. A comprehensive indicator-based data analysis plan was developed. After processing and cleaning, the data was exported to SPSS for further cleaning and analysis. Frequencies and distributions of all study variables by District, sex of respondent, type of respondent and other relevant disaggregation were done and presented tables and figures.

• *Ethical Considerations*

Informed consent from all study participants was obtained before administering the tools to the study

participants. This was done to ensure that participants entered the research freely (voluntarily) with full information about what it meant for them to take part, and that they agreed before they entered the research. The study never collected personal identifiers of the study participants.

• Study Variables

The following explanatory variables that were explored included; district, number of people in the household, type of study participants, age, education level, occupation, presence of chronic sickness, drinking alcohol, smoking cigarettes and hearing about CoVID-19. The dependent variable was vaccination against COVID-19.

➤ Demographic PROFILE

This section presents demographic data and characteristics of research participants and includes sex of respondents, age of respondents and level of education.

• Key Findings

- ✓ The survey was administered to a sample population of 150.
- ✓ Of the total sample, 36% (N=54) were community members, people living with disability were 11.3% (N=17), 19.3% (N=29) were Faith Leaders and 16.7% (N=25) were Traditional Leaders and 16.7% (N=25) were children aged 12 – 16.
- ✓ Male participants were at 63.5%, whereas females were at 36.5%.
- ✓ The majority of research participants were aged between 45 to 54 years, accounting for 18.5%.
- ✓ The majority of the participants had attained primary education accounting for 50.6% of the respondents.

➤ Demographic Characteristics of the Sample Population

• Sex of Respondents

Interviews were administered to a total of 150 research participants. Of the total population interviewed, male research participants were 63%, whereas female participants were at 37% (Table 2).

Table 2 Sex of Respondents

Sex of Respondents	Frequency	Percent
Males	95	63.5
Females	55	36.5
Total	150	100.0

• Age of Respondents

The researchers administered the study to people in the age range of 12 to 75 years or older. Investigations into the age range of participants revealed that most research participants were aged between 45 to 54 years, accounting for 18.5% of the total sample. These were followed by people aged between 35 to 44 years, accounting for 15.9% of the sample. The least age range to form part of the sample were participants aged 75 years or older at 4.1%. This is shown in table 3 below.

Table 3 Age of Respondents

Age of Respondents	Frequency	Percent
12 to 16 Years	25	17.0
17 to 24 Years	9	6.0
25 to 34 Years	21	13.9
35 to 44 Years	24	15.9
45 to 54 Years	28	18.5
55 to 64 Years	19	12.9
65 to 74 Years	18	11.7
75 Years or Older	6	4.1
Total	150	100.0

• Type of Respondents

Of the people interviewed, 96 were community members representing 64.4% of the sample, 29 were Faith leaders accounting for 19.5%, whereas Traditional leaders were 24, representing 16.1% of the total sample (Table 4).

Table 4 Type of Respondents

Type of Respondents	Frequency	Percent
Community Members	96	64.4
Faith Leaders	29	19.5
Traditional Leaders	24	16.1
Total	150	100

➤ Table Level of Education

Education attainment is one of the most influential factors affecting people perceptions, knowledge, attitudes and behaviours in various facets of life. The study revealed that most participants had attained primary education at 50.6%. There were also high numbers of research participants that had reached the secondary level of education at 36.5%. Results further showed that 6.2% had reached tertiary level while 6.6% had not had any form of education. This is shown in table 5 below.

Table 5 Level of Education

Level of Education	Frequency	Percent
None	10	6.6
Primary	76	50.6
Secondary	55	36.5
Tertiary	9	6.2
Total	150	100

• Type of Religion

The survey investigated which church research participants attended to ascertain the type of religion practised within their households. Table 6 below shows that of the 150 respondents administered the study, most respondents were Protestants who accounted for 74.4%. The least attended churches were found to be Pentecostal and Roman Catholics at 6.9% and 7% respectively. (See table 6 below).

Table 6 Type of Religion

Type of Religion	Frequency	Percent
Roman Catholic	11	7.0
Protestant	112	74.4
Pentecostal	10	6.9
Apostolic Sect	18	11.7
Total	150	100.0

➤ Occupation

Table 7 below shows the occupation of the respondents. Of the 150 respondents, most of them were in informal occupation accounting for 91.9%. (See table 7 below).

Table 7 Occupation

Occupation	Frequency	Percent
Formal	12	8.1
Informal	138	91.9
Total	150	100.0

➤ Awareness and Knowledge About COVID-19 and the COVID-19 Vaccine

This section presents and discusses the study's findings assessing people's awareness levels of the COVID-19 and the vaccine, including the use and uptake of the COVID-19 vaccine in Zambia.

• Key Findings

- ✓ 99.2% of the population are aware of or knew about the COVID-19.
- ✓ Media (Television, radio and Newspapers) account for the primary sources of information for COVID-19 at 45.6 %
- ✓ 99.5 % of the respondents indicated that they had heard about the COVID-19 vaccine
- ✓ 33.8% of the respondents stated that they had heard about the COVID-19 vaccine from media sources (television, radio and newspapers).
- ✓ The least source of information for COVID-19 vaccines was social media at 8.4%.
- ✓ Health workers were the most trusted sources of information for COVID-19 and COVID-19 Vaccine, accounting for 89.1%.
- ✓ 7.8% indicated that they trusted media sources (television, radio and Newspapers) as credible sources of information for COVID-19 and COVID-19 vaccines.
- ✓ Social media and friends scored very low as credible sources of information for COVID-19 and COVID-19 vaccines accounting for 1.2% and 2.6% responses, respectively.

In Zambia, COVID-19 has been around since 18th March, 2020. In an effort to curb the spread of the virus the Government enforced a partial lockdown to contain COVID-19 spread. The Government also recently introduced the vaccine to the nation in order to reduce the spiral increase in the number of COVID-19 cases. While the earlier mentioned initiative by the government may have been necessary to face

the emergence the effectiveness of prevention efforts relies heavily on people understanding what the COVID-19 virus is, how it is transmitted, adhering to guidelines on reducing the spread, and accepting the vaccine as a preventive measure. This survey, therefore, obtained information on awareness and knowledge of the COVID-19 and the vaccine.

➤ COVID-19 and COVID-19 Vaccine Awareness

• Knowledge and Awareness Levels about the COVID-19

To assess people's knowledge and awareness levels of the COVID-19, respondents were asked if they had heard any information about the COVID-19. Finding across all the 5 district indicate that information about COVID-19 has become almost universal in Zambia. Results show that 149 (99.2%) out of 150 respondents interviewed mentioned that they had heard information about the COVID-19. Only 1 respondents accounting for 0.8%, indicated that they had not listened to any information regarding the COVID-19. (See figure 1 below)

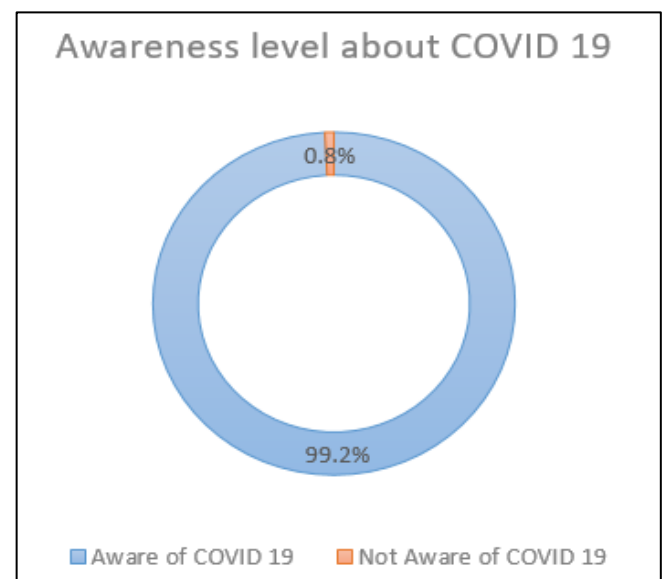


Fig 1 Awareness Level About COVID-19

The most common sources of information about COVID-19 were Health workers at 61.6%, Media (Television, Radio, Newspaper) 45.6% and Awareness Campaigns at 33.7% among the 5 districts. Social Media (Facebook, Twitters etc.) was the least common source of information at 7.7% followed friends 12.1%. (The summary can be seen in figure 2 below).

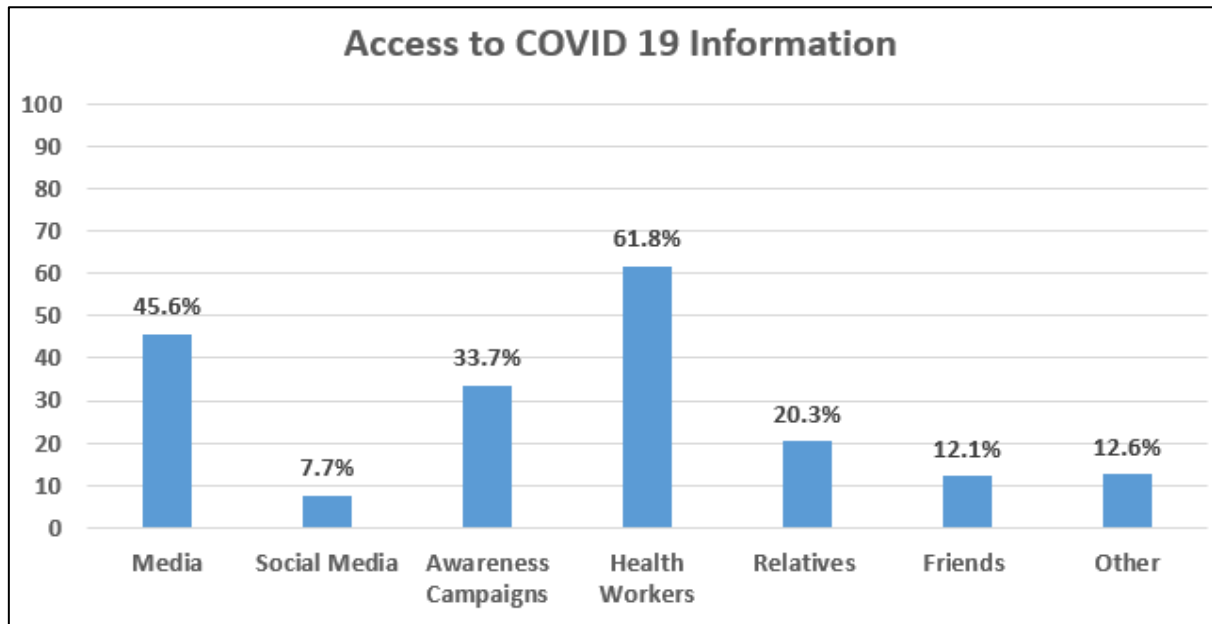


Fig 2 Access to COVID-19 Information

• *Knowledge about the COVID-19 Vaccine*

To assess the levels of awareness of the COVID-19 vaccine, respondents were asked if they had heard about the COVID-19 vaccine. The indicated that 99.5% had heard about the COVID-19 Vaccine. To further understand where the respondents obtained information about the COVID-19 vaccine, 81.3 % respondents reported having heard about COVID-19 Vaccine from Health Workers, knowing where

information is obtained about the COVID-19 vaccine provide guidance on where to focus on advancing understanding to the broader population about disseminating information for the COVID-19 vaccine. The minor source of information for the COVID-19 vaccine was found to be social media, with only 8.4% of the interviewed population reporting that they heard about the COVID-19 vaccine from social media. (See figure 3 below).

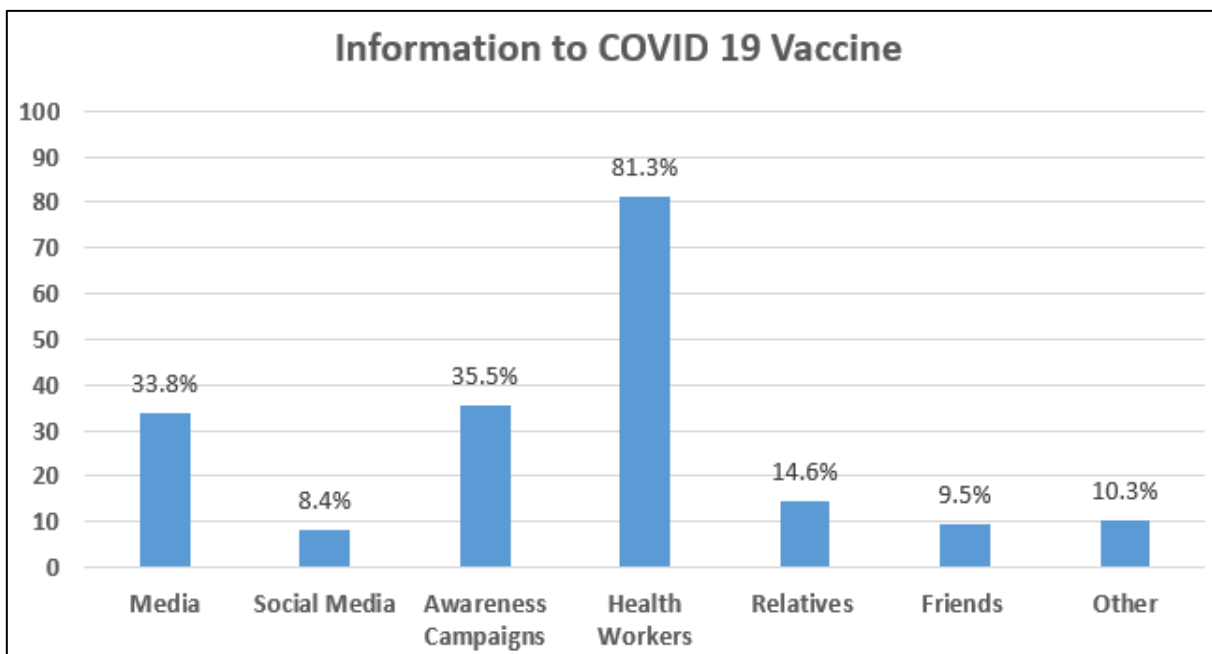


Fig 3 Information to COVID-19 Vaccine

Almost all the respondents had a holistic knowledge about the COVID-19 and the COVID-19 vaccine. However, it was also cardinal to understand which sources of information for COVID-19 and COVID-19 vaccine awareness were the most or least trusted sources of information.

Finding of the most trusted and least trusted sources of information for COVID-19 and COVID-19 vaccine are presented below in figure 4:

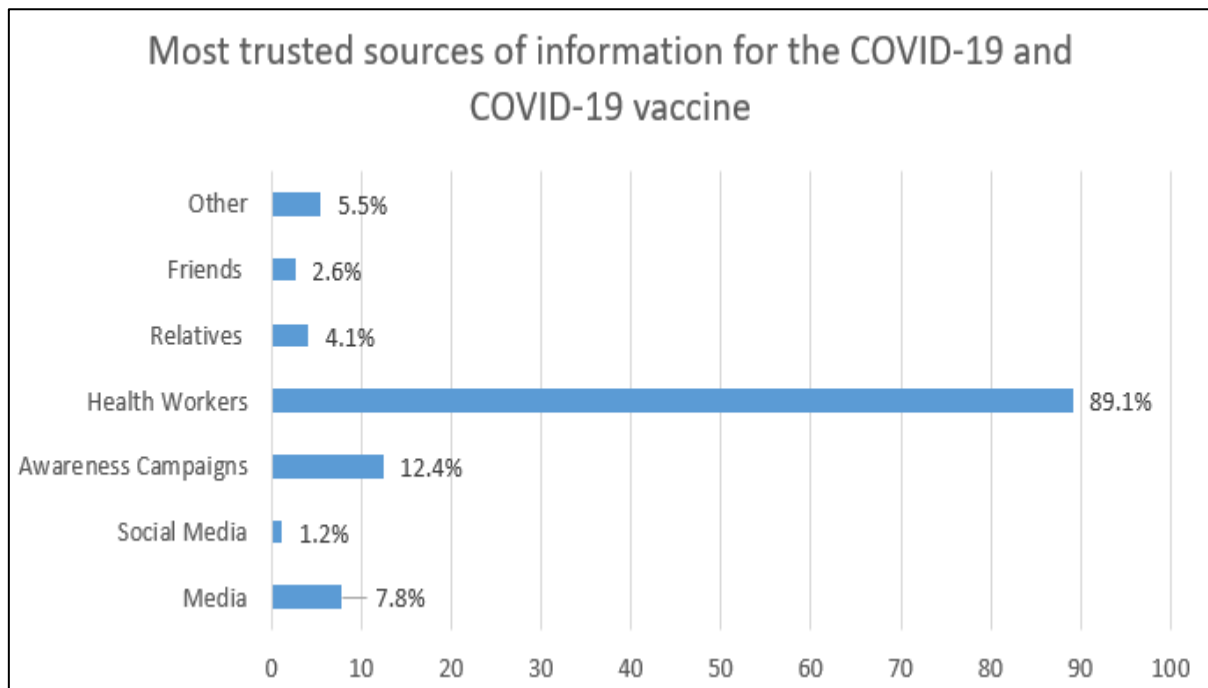


Fig 4 Most Trusted Sources of Information for the COVID-19 and COVID-19 Vaccine

Overall, health workers were indicated as the most trusted sources of information for COVID-19 and COVID-19 vaccines. 89.1 % respondents stated that they trusted health workers as good sources of information for COVID-19 and COVID-19 vaccines. Awareness Campaign were relatively trusted as good sources of information for COVID-19 and COVID-19 vaccines. Awareness Campaign accounted for 12.4 % of those that responded to trust the source. Further, the survey established that social media was the least trusted source of information for COVID-19 and COVID-19 vaccines.

➤ Perceptions and UPTAKE OF THE COVID-19 Vaccine

This section presents and discusses the study's findings on whether or not people would take the COVID-19 vaccine when presented to them.

• Key Findings

- ✓ 67.7% of respondents indicated that the COVID-19 vaccine was good for them

- ✓ More males at 40% indicated that the COVID-19 vaccine was good for them compared to 26.7% of females who affirmed that the COVID-19 vaccine was suitable for them.
- ✓ 36.7% of the population that had attained primary education affirmed that the COVID-19 vaccine was good for them.
- ✓ The majority (67.7%) of respondents indicated that they would be willing to take the COVID-19 vaccine.

➤ Perception of the COVID-19 Vaccine

To understand people's perception about the COVID-19 vaccine, respondents were asked whether they thought the COVID-19 vaccine was good for them or not. Results indicate that most of the respondents accounting for 67.7%, affirmed that the COVID-19 vaccine was good for them. However, 25.8% of the respondents did not know whether the COVID-9 vaccine was good for them whereas as 6.5% of the respondents indicated that the COVID-19 vaccine was not good for them (See table 8 below).

Table 8 Perception of COVID-19 Vaccine

Vaccine Good or Bad	Frequency	Percent
Yes	21	67.7
No	2	6.5
No Answer/ Don't Know	8	25.8
Total	31	100

People's perceptions regarding the COVID-19 vaccine were disaggregated into the districts of respondents to determine different perceptions among Districts. The findings when compared across the districts, Monze, Pemba and Sinazongwe had the highest vaccine acceptance rate while

Kalomo had the least. This could be explained by the fact that Kalomo District has predominantly more people that are coming from religious denominations that are hesitant when it comes to the uptake of vaccines (See table 9 below).

Table 9 Perception Whether COVID-19 Vaccine is Good or Bad Disaggregated into District

District	Yes	No	No Answer/ Don't Know	Total
Monze	5 (16.1%)	0	0	5 (16.1%)
Pemba	5 (16.1%)	0	0	5 (16.1%)
Sinazongwe	5 (16.1%)	0	0	5 (16.1%)
Kalomo	2 (6.5%)	1	5	8 (25.8%)
Namwala	3 (9.7%)	0	0	3 (9.7%)
Total	20 (64.5%)	2 (6.5%)	9 (29%)	31 (100%)

People's perceptions regarding the COVID-19 vaccine were disaggregated into the sex of respondents to determine different perceptions among males and females. More males

than females affirmed that the COVID-19 vaccine was good for them. This accounted for 40% of male respondents, whereas females were 26.7% (See table 10 below).

Table 10 Perception Whether COVID-19 Vaccine is Good or Bad Disaggregated into Sex of Respondents

Sex	Yes	No	No Answer/ Don't Know	Total
Males	12 (40%)	0	5 (16.7%)	17 (56.7%)
Females	8 (26.7%)	2 (6.7%)	3 (10%)	13 (43.3%)
Total	20 (66.7%)	2 (6.7%)	8 (26.7%)	30 (100%)

A further analysis was done to determine whether or not the level of education contributed to the way people perceived the COVID-19 vaccine. For this analysis, responses of whether the COVID-19 vaccine was viewed as good or bad was disaggregated among people that had attained various levels of education. The result shows that there were significant differences in responses among different levels of education. Among the population that had reached primary education, 36.7% affirmed that the COVID-19 vaccine was good for them. Further, 23.3% of the people that had attained secondary education confirmed that the COVID-19 vaccine was good for them. In addition, none of the respondents who

reached tertiary education indicated that the COVID-19 vaccine was good for them.

Of those who did not attain any form of education, 6.7% said that the COVID-19 vaccine was good for them. This is shown in table 11 below.

Despite this positive effect that education had on perception of COVID19 vaccine, the sample for this category of respondents was extremely small, and therefore, the survey could not conclusively deduce that views of this segment of people could be extrapolated to the broader population.

Table 11 Perception Whether COVID-19 Vaccine is Good or Bad Disaggregated by Level of Education

Level of education	Yes	No	No Answer/ Don't Know	Total
None	2 (6.7%)	0 (0%)	1 (3.3%)	3 (10%)
Primary	11 (36.7%)	2 (6.7%)	3 (10%)	16 (53.3%)
Secondary	7 (23.3%)	0 (0%)	3 (10%)	10 (33.3%)
Tertiary	0 (0%)	0 (0%)	1 (3.3%)	1 (3.3%)
Total	20 (66.7%)	2 (6.7%)	8 (26.7%)	30 (100%)

• Willingness to Take the COVID-19 Vaccine

Research participants were asked a question of "Are you planning to get vaccinated against COVID-19?" On average,

the majority (67.7%) of respondents indicated that they are willing to take the COVID-19 (See table 12 below).

Table 12 Willingness to Take the COVID-19 Vaccine

Willingness to take the COVID-19 Vaccine	Frequency	Percent
Yes	21	67.7
No	5	16.1
No Answer/ Don't Know	4	12.9
Total	31	100

Further analysis was done to check the willingness of participants per district. The results show that Monze, Pemba and Sinazongwe Districts had the highest while Namwala had

the least willingness among the respondents in taking the COVID-19 vaccine (See table 13 below).

Table 13 Willingness to Take COVID-19 Vaccine Disaggregated by District

District	Yes	No	No Answer/ Don't Know	Total
Monze	5 (15.2%)	0 (0%)	0 (0%)	5 (15.2%)
Pemba	5 (15.2%)	2 (6.1%)	1 (3%)	8 (24.2%)

Sinazongwe	5 (15.2%)	3 (9.1%)	0 (0%)	8 (24.2%)
Kalomo	4 (12.1%)	1 (3%)	4 (12.1%)	9 (27.3%)
Namwala	3 (9.1%)	0 (0%)	0 (0%)	3 (9.1%)
Total	22 (66.7%)	6 (18.2%)	5 (15.2%)	33 (100%)

Another analysis was done to determine the proportion of males to females willing to take the COVID-19 vaccine if presented to them. The ratio of males to females that expressed willingness to take the COVID-19 vaccine if presented to them was higher at 70%. Males that expressed willingness to take up the COVID-19 vaccine were at 43.3%

while females who expressed willingness to take the Covid – 19 vaccine accounted for 26.7% (Table 14). These results suggest that women are more sceptical about taking the vaccine compared to men. To increase the number of females that would be willing to take the COVID-19 if presented to them, there is a need for increased awareness among women.

Table 14 Willingness to Take COVID-19 Vaccine Disaggregated by Sex

Sex	Yes	No	No Answer/ Dont Know	Total
Males	13 (43.3%)	2 (6.7%)	2 (6.7%)	17 (56.7%)
Females	8 (26.7%)	3 (10%)	2 (6.7%)	13 (43.3%)
Total	21 (70%)	5 (16.7%)	4 (13.3%)	30 (100%)

To understand whether or not the level of education influenced respondents' willingness to take the COVID-19 vaccine if presented to them, an analysis on the level of education and willingness to take the vaccine was done. The proportion of those that had attained primary education was the highest in indicating that they would be willing to take the

COVID-19 vaccine accounting for 41.9% of responses. This was followed by people that had attained education to secondary education at 19.4% and those that has not attained any level of education were at 2%. This is indicated in table 15 below.

Table 15 Willingness to Take COVID-19 Vaccine Disaggregated by Level of Education.

Level of Education	Yes	No	No Answer/ Don't Know	Total
None	2 (6.5%)	1 (3.2%)	0 (0%)	3 (9.7%)
Primary	13 (41.9%)	3 (9.7%)	1 (3.2%)	17 (54.8%)
Secondary	6 (19.4%)	2 (6.5%)	2 (6.5%)	10 (32.3%)
Tertiary	0 (0%)	0 (0%)	1 (3.2%)	1 (3.2%)
Total	21 (67.7%)	6 (19.4%)	4 (12.9%)	31 (100%)

• Factors Contributing to the Unwillingness to Take the COVID-19 Vaccine

Among respondents who did not express willingness to take up the COVID-19 vaccine when presented to them, further investigations were done to understand the cause for refusing to take the COVID-19 vaccine. For this population segment, the survey asked the respondents why they did not take the COVID-19 vaccine. One of the leading causes why most of the respondents (19.8) did not take the COVID-19 vaccine was the belief that people heard that vaccines are harmful to humans. Further, 14.1 % reported that they did not take the COVID-19 vaccine because of personal choice.

Multivariate logistic regression of factors associated with people getting vaccinated against COVID-19. The results indicate that district, number of people of in the

household, type of study participants, age, education level and one's occupation were not associated with people getting vaccinated against COVID - 19 vaccine. The study also established that presence of chronic sickness, drinking alcohol, smoking cigarettes and hearing about COVID-19 were also not predict people getting vaccinated against COVID -19. It was identified that among the residents of Sinazongwe, the likelihood of getting vaccinated was 7 times higher as compared to the residents of Namwala District. Further results indicated that among community members, there was 96% more likelihood of getting vaccinated, compared to children aged 12 -16 years. Furthermore, it was noted that there was 69% less likelihood of getting vaccinated among participants with no education, compared to their counterparts with Tertiary education. However, having no education has no significant effect on getting vaccinated. This is shown in table17 below.

Table 17 Multivariate Logistic Regression of Factors Associated with People Getting Vaccinated Against COVID- 19, n=150

Variables	P Value	AOR	95% Confidence Interval	
			Lower	Upper
District				
Namwala	0.109			
Monze	0.823	1.220	0.214	6.956
Pemba	0.116	3.900	0.713	21.319
Sinazongwe	0.021	7.341	1.351	39.897
Kalomo	0.172	3.042	0.617	15.000

Number of people in the household	0.840	1.014	0.886	1.161
Type of Participants				
Children aged 12 - 16 years	0.318			
Community Members	0.601	1.960	0.157	24.410
People living with disability	0.398	3.054	0.229	40.645
Faith leaders	0.894	1.213	0.070	20.984
Traditional leaders	0.338	0.217	0.010	4.938
Age of Participants				
Aged above 75 years	0.169			
17 – 24	0.790	1.447	0.095	22.020
25 – 34	0.087	0.094	0.006	1.411
35 – 44	0.369	0.314	0.025	3.931
45 – 54	0.805	0.732	0.061	8.759
55 – 64	0.233	0.171	0.009	3.110
65 – 74	0.805	0.713	0.049	10.391
12 - 16 years	0.636	1.321	0.417	4.182
Education Level				
Tertiary	0.969			
None	0.832	0.699	0.026	19.034
Primary	0.937	1.119	0.069	18.118
Secondary	0.921	1.146	0.078	16.896
Formal Occupation	0.521	0.435	0.034	5.527
Suffering from Chronic Sickness	0.344	0.553	0.162	1.886
Smoking cigarettes	0.615	1.777	0.189	16.714
Drinking Alcohol	0.855	0.806	0.080	8.154
Heard of Covid 19	1.000	0.000	0.000	.
Constant	1.000	2.538E8		

The study also conducted the focus group discussions (FGDs) in five district with the aim of identifying factors that contribute to low uptake of COVID-19 vaccine. During the FGD in Sinazongwe District, Lack of IEC materials and misconception that the vaccine was developed to eliminate the African countries after 2 years after been vaccinated were some of the reasons that were given as to why some people were not vaccinated in Sinazongwe District. Similar findings were observed in Namwala District as some people believe that they avoid getting vaccinated because they believe the vaccine is meant reduce the population. "The vaccine does not protect you from anything, even when you are vaccinated you can still get COVID-19 and it can still kill so why stressing getting the vaccine", said one of the respondent during the FGD in Sinazongwe. Notably to say, these findings could have a relation as was evidenced from the results coming from the quantitative survey were 16.7% respondents expressed unwillingness, similarly 13.3% showed hesitancy to getting vaccinated against COVID-19. The attributing factors could have been associated with some of the mentioned responses that came from the FGDs.

According to the FGD in Monze, it came to light that some people believe that the vaccine is the mark of the beast and they do not understand why it's the only diseases which is to be given a card after vaccination. Similar observations were also observed in Kalomo District. In some religious organizations administration of vaccines is a practice which is highly discouraged. According to some participants from Mawaya in Kalomo District, they said "people believe that it is demonic and therefore believe it should not be taken, this therefore makes community members shun away from taking

the vaccine." A seemingly similar response was given from community members from Macraymond in Kalomo District stating that "some religious denominations such as Zion believe in natural healing and as such you would find them using salt as a source of healing." During the focus group discussion in Pemba, it is believed that the COVID -19 vaccine initiate one in Satanism. "It is an automatic way of initiating community members into Satanism" says a Lady in Pemba District.

Lack of trust on the COVID - vaccine is one of the reasons for some people refusing to be vaccinated. According to a participant from Macraymond in Kalomo District he said that "People do not trust the vaccine, they belief that it will produce side effects in future." A similar response was given from participants coming from Mawaya community in Kalomo District which was "Some people prefer oral medications as opposed to injections because they believe that injections come with possible side effects." Other participants in the two FGDs added to say that there is a belief that you can heal from COVID19 naturally just by self-isolation.

III. CONCLUSION

For the most part this study provides a crucial understanding of the barriers relating to the low uptake of the COVID-19 vaccine in Monze, Pemba, Sinazongwe, Namwala and Kalomo Districts. Despite the pandemic posing a significant global toll and government providing all the necessary strides to mitigate the pandemic, few factors have been known to be barriers leading to the low uptake of

vaccination. One seemingly major factor is the vaccination attitudes community members especially in the rural areas have towards getting vaccinated. The attitudes arise as a result of myths and misconception that exists in their communities. One notably misconception common among the five districts and which has exacerbated in these communities especially among certain religious denomination is that the vaccine is from the devil.

Another significant barrier factor is the vulnerability to false information which was mostly associated to children as they were less likely to get vaccinated than adults. This could be as a result of adults generally possessing better knowledge about vaccination uptake than children. Another concerning factor was the possibility of causing infertility or being receptive to optimistic diseases. To this end, the universal acceptance of COVID-19 vaccines may require a concerted behaviour change effort by providing factual COVID-19 information to members of the community. However, we remain optimistic of a time when people's perceptions towards vaccine uptake improves as the aspiration of every nation is to ensure that it has healthful citizens for a viable and sustainable generation.

➤ Key Conclusion and Recommendations

- There is need to carry out sensitization campaigns in the communities by using IEC materials in local languages (Chitonga) and electronic media such as Radio and SMSs.
- There is need to orient/train faith and traditional leaders in behavioural change models as they have influence to change the mind-sets of their flock and subjects.
- Carry out vaccine awareness programs in schools because the research showed that children are less likely to get vaccinated than adults.

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APPENDIX**APPENDIX I – QUESTIONNAIRE****➤ Introduction**

Greet respondent. My name isand I am from Ministry of Health ,Zambia. We are a team looking at people's perceptions of the COVID-19 vaccine to be presented in Zambia. We want to hear from you of your views about the COVID-19 vaccine and how you perceive it. The discussion will take about 15 minutes. Please know that you are not obliged to participate in the study if you are uncomfortable doing that. Also know that not participating will not impact you or your household in anyway. However, if you agree to participate, know that whatever we discuss here will be strictly confidential and will only be used for research purposes. Do you understand the above and wish to continue with the survey 1 Yes 2 No [If they are unwilling to participate, thank them for their time and end the survey]

- Name of Interviewer:
- Date of interview:use dd/mm/yy
- Time
- District 1. Monze 2. Pemba 3. Sinazingwe 4. Kalomo 5. Namwala
- Area Programme 1 Choongo 2. Moyo/Hamaundu 3. Twachiyanda 4. Mbeza/Muchila 5. Sinazongwe
- Name of Community/Village:
- Name of Health Facility
- Number of people in a household

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- Type of participant ♦ 1. Community Member ♦ 2. People living with disability 3. Faith Leader ♦ 4. Traditional Leader 5. Children aged 12 - 16
- Name of Respondent (Optional)
- Age of Respondent (Note: All respondents must be 12 years and above) ♦ 1. 12 to 16 years 17 to 24 years ♦ 2. 25 to 34 years ♦ 3. 35 to 44 years ♦ 4. 45 to 54 years ♦ 5. 55 to 64 years ♦ 6. 65 to 74 years ♦ 7. 75 years or older
- Gender ♦ 1. Male ♦ 2. Female
- Level of education ♦ 1. Not educated ♦ 2. Primary education ♦ 3. Secondary education ♦ 4. Tertiary education
- What is your Occupation? 1. Formal 2. Informal
- Are you currently suffering from any Chronic Disease such as Diabetes, HIV/AIDS, Asthma, High Blood Pressure, Cancer and Epilepsy? 1. Yes 2. No 3. Don't know
- Do you smoke Cigarette? 1. Yes. 2. No
- Do you drink Alcohol? 1. Yes. 2. No
- What is the religion/denomination practiced in your household? ♦ 1. SDA ♦ 2. Catholic ♦ 3. Pentecostal ♦ 4. New Apostolic Faith ♦ 5. CMML ♦ 6. BIC ♦ 7. Watch Tower ♦ 8. Islam 9. Hindu 10. Other, specify

➤ To Understand People's Knowledge About the Covid-19 Vaccines

- Have you heard about the COVID-19 disease? ♦ 1. Yes ♦ 2. No
- Where did you hear about COVID-19? (If answer in Q.11 was "Yes") Tick all that apply! ♦ 1. Media (Television, Radio, Newspaper) ♦ 2. Social Media ♦ 3. Awareness campaigns ♦ 4. Health Workers ♦ 5. Other, specify
- Have you heard about the COVID-19 vaccine? ♦ 1. Yes ♦ 2. No
- Where did you hear about it? Tick all that apply! ♦ 1. Media (Television, Radio, Newspaper) ♦ 2. Social Media ♦ 3. Awareness campaigns ♦ 4. Health Workers ♦ 5. Other, specify
- Who do you trust most for information about the COVID-19 vaccine? Tick all that apply! ♦ 1. Media (Television, Radio, Newspaper) ♦ 2. Social Media ♦ 3. Awareness campaigns ♦ 4. Health Workers ♦ 5. Other, specify
- Who do you trust the least on information for COVID-19 vaccine? Tick all that apply! ♦ 1. Media (Television, Radio, Newspaper) ♦ 2. Social Media ♦ 3. Awareness campaigns ♦ 4. Health Workers ♦ 5. Other, specify
- What type of information do you want to know about the COVID-19 vaccine?.....

➤ *To Investigate Whether or Not Men and Women Would Take the Covid-19 Vaccine When Presented to Them*

- Do you think the COVID-19 vaccine is good for you? ♦ 1. Yes ♦ 2. No ♦ 3. Don't know
- Have you been vaccinated against COVID-19? ♦ 1. Yes ♦ 2. No ♦ 3. Don't know
- Are you fully vaccinated? ♦ 1. Yes ♦ 2. No ♦ 3. Don't know
- Are you planning to get fully vaccinated? 1. Yes 2. No 3. Don't know
- What are reasons for not being fully vaccinated?.....
- Why are you not vaccinated? Tick all that apply! ♦ 1. We have heard that it is harmful to humans ♦ 2. Because there is really no coronavirus (COVID-19 is a hoax) ♦ 3. Because it will be expensive ♦ 4. Because of long distances to accessing the Vaccine ♦ 5. My religion doesn't allow taking vaccines ♦ 6. Personal choice ♦ 7. I do not feel that I am at risk of catching the virus ♦ 8. I do not trust the COVID-19 vaccines ♦ 9. I 'am concerned about the safety of the vaccines ♦ 10. I do not have sufficient information to make the decision ♦ 7. Other specify
- Are you planning on getting vaccinated against COVID-19? ♦ 1. Yes ♦ 2. No (If NO, go to Q19) ♦ 3. Don't know
- Is there anything that would make you to be willing to take the COVID-19 vaccine? 1. Yes 2. No 3. Don't know
- What would enable you to take the COVID-19 vaccine?.....
- Would you rather wait and see if other people react badly to the vaccine before you decide to take the vaccine? ♦ 1. Yes ♦ 2. No ♦ 3. Don't know

➤ *To Identify the Specific Myths and Misconception that are Contributing to Low Covid-19 Vaccination*

- Are there any myths and misconception in your community concerning COVID-19 Vaccines? 1. Yes, 2. No 3. Don't Know
- What are some of the myths and misconception existing in your community concerning COVID-19 Vaccines? ,,,,,,

Thank you for participating in the Operational Research!